

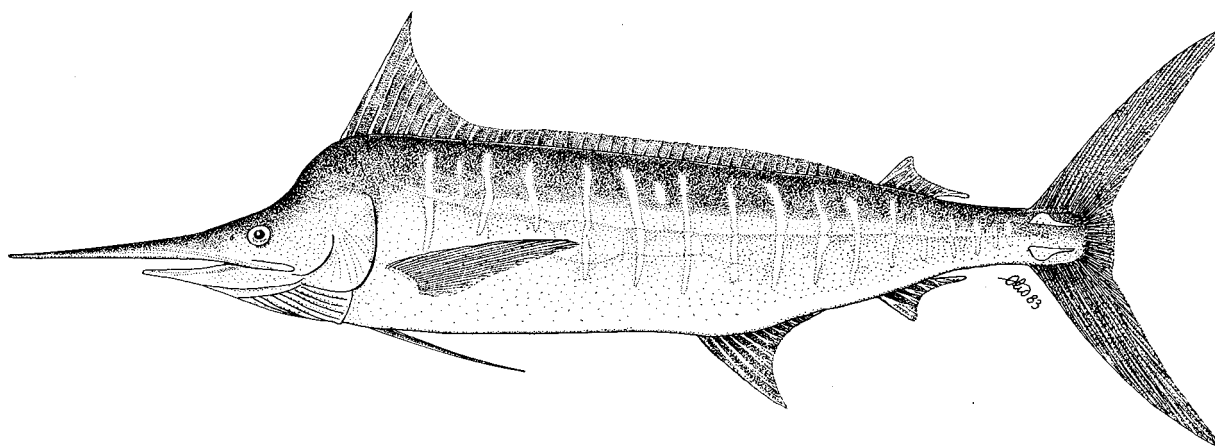


SCTB13 Working Paper

BBRG-3

Preliminary estimates of annual catches for billfish species taken in commercial and recreational fisheries of the western and central Pacific Ocean

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CONTENTS

1. INTRODUCTION	1
2. SOURCES OF ESTIMATES OF ANNUAL BILLFISH CATCHES	2
2.1 LONGLINE	2
2.2 PURSE SEINE	5
2.3 RECREATIONAL	6
3. DISCUSSION	9
4. ANNUAL BILLFISH CATCHES FOR THE WESTERN AND CENTRAL PACIFIC OCEAN	12
TABLE 1. LONGLINE CATCHES (METRIC TONNES) OF BLUE MARLIN IN THE WCPO	12
TABLE 2. LONGLINE CATCHES (METRIC TONNES) OF BLACK MARLIN IN THE WCPO	15
TABLE 3. LONGLINE CATCHES (METRIC TONNES) OF STRIPED MARLIN IN THE WCPO	18
TABLE 4. LONGLINE CATCHES (METRIC TONNES) OF SWORDFISH IN THE WCPO	21
TABLE 5. PURSE-SEINE CATCHES (METRIC TONNES) OF BLUE MARLIN IN THE WCPO	24
TABLE 6. PURSE-SEINE CATCHES (METRIC TONNES) OF BLACK MARLIN IN THE WCPO	25
TABLE 7. ESTIMATED RECREATIONAL VESSELS ACTIVE IN THE WCPO DURING 1998	26
TABLE 8. ESTIMATED RECREATIONAL CATCHES (METRIC TONNES) OF BILLFISH IN THE WCPO DURING 1998.	26
TABLE 9. RECREATIONAL CATCHES (METRIC TONNES) OF BLUE MARLIN IN THE WCPO	27
TABLE 10. RECREATIONAL CATCHES (METRIC TONNES) OF BLACK MARLIN IN THE WCPO	28
TABLE 11. RECREATIONAL CATCHES (METRIC TONNES) OF STRIPED MARLIN IN THE WCPO	29
TABLE 12. BLUE MARLIN CATCHES (METRIC TONNES) IN THE WCPO BY FISHERY	30
TABLE 13. BLACK MARLIN CATCHES (METRIC TONNES) IN THE WCPO BY FISHERY	30
TABLE 14. STRIPED MARLIN CATCHES (METRIC TONNES) IN THE WCPO BY FISHERY	30
TABLE 15. TOTAL WCPO FISHERY CATCHES (METRIC TONNES) OF BILLFISH BY SPECIES	31
REFERENCES	33

1. INTRODUCTION

Most of the billfish caught in the western and central Pacific Ocean (WCPO) tuna fisheries are taken by commercial longline fisheries, though billfish may be caught by a variety of other gears (e.g. handline, purse seine, coastal gillnet and recreational gamefishing).

Billfish as a group form the most distinctive part of the by-catch of longline vessels in the WCPO, and, in some cases, may be secondary or even primary target species. Bailey et al. (1996) suggest that estimates of total catch for the four main billfish species, namely blue marlin (*Makaira mazara*), black marlin (*M. indica*), striped marlin (*Tetrapturus audax*) and swordfish (*Xiphias gladius*), can be derived from logsheet data. Two additional billfish species (shortbill spearfish, *Tetrapturus angustirostris* & sailfish, *Istiophorus platypterus*) occur in the WCPO, but there have been problems in the logsheet reporting of these species (Farman, 1988; Bailey et al., 1996). Longline fisheries provide the longest available time-series of billfish catch.

Only recently have billfish been reported on purse seine logsheets; however, indications of catch from this source are likely to be hampered by problems of non-reporting and species mis-identification (Bailey et al., 1996). Even so, observer data suggests that the purse seine catch is much smaller than that taken by longline gear. Handline fisheries in the Philippines, Indonesia and Hawaii also exploit billfish, but no attempt has been made to include these fisheries at this stage of the estimation process due to the lack of data from these fisheries. The pole-and-line catch of billfish is extremely rare (Bailey et al., 1996).

The increase in significance of gamefisheries in the region during the past 10–15 years also suggests that some work will be required in ensuring gamefish catches are included in future estimates of billfish catch (Pacific Island Gamefish Tournament Symposium, 1998). In line with this initiative, work in establishing data collection from the gamefisheries has been a prime focus of work undertaken by SPC during the past two years. While considerable work has already been undertaken in obtaining historical catch information from gamefishing activities throughout the region, most recreational billfish catch estimates are currently unavailable or considered only very approximate. There are a few notable exceptions; for example, the efforts of local authorities, in conjunction with the Western Pacific Regional Fishery Management Council (WPRFMC), have produced fairly reliable estimates of historical billfish catches in the Hawaiian and Guam recreational game fisheries back to the early 1980s.

Noting the importance of billfish catches in the WPCO fisheries, the *Twelfth Meeting of the Standing Committee on Tuna and Billfish* (SCTB12), held in Papeete, Tahiti 16–23 June 1999, directed the Statistics Working Group (SWG) to " ...compile estimates of annual catches of striped marlin, blue marlin, black marlin and swordfish and prepare tables of annual catches for presentation at SCTB13".

In response, the main **objectives** of this paper are to

- Present the best estimates of the four main billfish species (blue marlin, black marlin and striped marlin, and swordfish) compiled for the longline, purse seine and recreational fisheries in the WCPO;
- Document the sources and/or derivation of these estimates;
- Highlight where there is a current lack of information;
- Stimulate interest in the hope of obtaining better estimates in the future.

It is expected that this work will become a permanent contribution to future meetings of the SCTB, in a similar manner to the considerable work involved in compiling estimates of target tuna catches for the WCPO tuna fisheries. We hope that the reliability of billfish catch estimates will continue to improve in the future, as has been the case with target tuna species over the past decade or so.

This paper focuses exclusively on the WCPO (the area west of 150° W) which covers the SPC member countries as well as eastern Indonesia and the Philippines. Figure 1 shows the areas of interest.

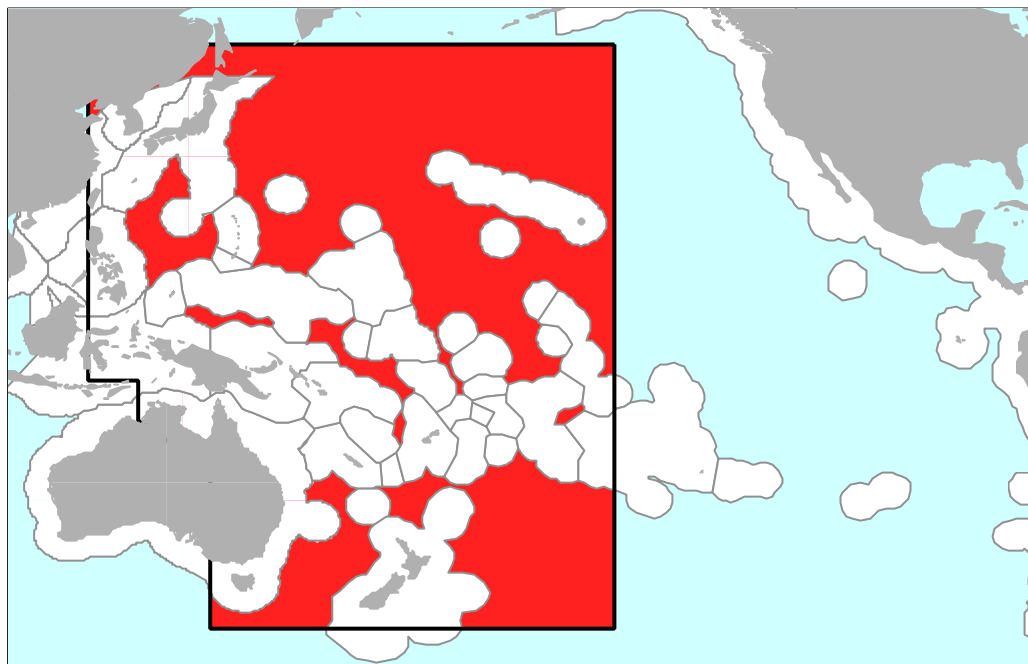


Figure 1. Pacific Ocean showing the WCPO

2. SOURCES OF ESTIMATES OF ANNUAL BILLFISH CATCHES

2.1 Longline

The quality of data available to estimate billfish catches in WCPO longline fisheries was considered in a working paper made available to SCTB12 (Williams et al., 1999). This work highlighted problems in using logbook data to estimate billfish catches for certain fleets, specifically, (i) discarding and under-reporting, (ii) inaccuracies in statistical extrapolation, and (iii) billfish species misidentification. This paper further showed how observer data could be used to highlight where problems exist in the logbook data, by comparing the logbook-reported species composition of billfish (to the total target tuna catch) to that reported by observers.

In preparing the tables for this document, problems with the logbook data have been dealt with by applying observer-reported species composition data to annual catch estimates of target tuna, as suggested in Williams et al., 1999. To provide the reader with an indication of the extent of logbook problems, and hence where observer-reported species composition data have been used, the following statistics are provided. These percentages represent the billfish catch (by species) that were solely sourced from logbook or landings data (the year selected is 1997, the most recent year for which aggregated catch data for most fleets have been provided).

Blue marlin : 81%; Black marlin : 61%; Striped marlin : 92%; Swordfish : 93%.

The sources of catch estimates by fleet are as follows:

American Samoa	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates were determined by applying the species composition of billfish (source : SCTB12 WP NFR-1, The offshore Pelagic Fisheries of American Samoa, Taniela Su'a) to annual catch estimates of target tuna for this fleet (Lawson, 1998).
Australia	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : All estimates were provided by the Bureau of Resource Sciences (Ward and Robins, personal communication, June 2000). The following notes accompanied the provision of these estimates: "(1) The estimates provided represent retained catches reported in logbooks. This is particularly important for black marlin and blue marlin where voluntary release and, since 1998, mandatory release has existed for commercial fishers. We will need to have a closer look at the logbook data and our (limited) observer data to estimate the amounts of those species released. (2) The billfish data do not yet include joint venture catches. Similarly, for the domestic billfish data we may need to go back to the foreign longline database and extract any charter data that might be held there. "
China	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : All estimates were determined by applying the species composition (by weight) of billfish species to total target tuna, obtained from observer data held at SPC, to annual catch estimates of target tuna (Lawson, 1999).
Cook Islands	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates determined by applying the species composition (by weight) of billfish species to total target tuna from logbooks to annual target tuna catch estimates (Lawson 1999).
Fed. States of Micronesia	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates determined by applying the species composition (by weight) of billfish species to total target tuna from logbooks to annual target tuna catch estimates (Lawson 1999).
Fiji	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates for 1994-1998 are provided in SCTB12 Working Paper NFR-6 Tuna and Billfish fisheries of Fiji's Fishing Zone (Illiapi Tuwai, 1999). Estimates for 1989-1993 and 1999 were determined by applying the species composition (by weight) of billfish species to total target tuna for the period 1994-1998, to annual catch estimates of target tuna (Lawson, 1999).
French Polynesia	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : All catch estimates were provided by Arsene Stein in his email message of 12 April 2000.
Indonesia	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates were derived by applying the species composition of billfish species to total target tuna (Carrara and Uktolseja, 1997), to annual catch estimates of target tuna (Lawson, 1999).
Japan, coastal	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : No estimates for this fleet are currently available.
Japan, offshore/distant water	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates for 1962-1969 were obtained by applying estimates of average weight to aggregate catch data (in numbers of fish) provided to SPC by the Japan National Research Institute of Far Seas Fisheries (NRIFSF). Estimates for 1970-1997 were provided in SCTB13 WP NFR-8 <i>Japanese Tuna Fisheries in the western Pacific Ocean and fishing activities in 1998</i> (Okamoto et al., 1999). Estimates for 1997 have been carried over for 1998 and 1999.
Kiribati	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates determined by applying the proportion of logbook-reported target tuna catch to annual target tuna catch

estimates (Lawson 1999), to the logbook-reported billfish catches.

Korea	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates for 1975–1987 were obtained from aggregate catch data provided to SPC by the Korean National Fisheries Research and Development Institute (NFRDI). Estimates for 1998 and 1999 were determined by applying the species composition of billfish species to total target tuna for 1997, to annual catch estimates of target tuna (Lawson, 1999).
Marshall Islands	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates determined by applying the species composition (by weight) of billfish species to total target tuna from logbooks to annual target tuna catch estimates (Lawson 1999).
New Caledonia	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates determined by applying the proportion of logbook-reported target tuna catch to annual target tuna catch estimates (Lawson 1999), to the logbook-reported billfish catches. The 1999 estimates were determined by applying the species composition of billfish species (in recent years only), to the annual catch estimate of target tuna for 1999.
New Zealand	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates of catches provided by Brent Ashley (Ministry of Fisheries–MAF) in his email of 26 April 2000. Note that regulations in place restrict the landing of certain marlin species. A small proportion of these catches may include those by gears other than longline.
Papua New Guinea	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates were determined by applying the species composition of billfish, from logbook data for the year 1998, to annual catch estimates (Lawson, 1999). The estimate for 1998 has been carried over to 1999.
Philippines	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates were derived by applying the species composition of billfish species to total target tuna in the adjacent Indonesian longline fishery (Carrara and Uktolseja, 1997), to annual catch estimates of target tuna for the Philippine longline fishery (Lawson, 1999).
Samoa	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates were determined by applying species composition of billfish catch (from port sampling) to annual tuna catch estimates. All information provided by Toni Mulipola in his email message of 14 April, 2000.
Solomon Islands	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates were determined by applying the species composition of billfish to target tuna catch, provided for 1999 by Edwin Oriehaka, to annual catch estimates (Lawson, 1999).
Taiwan, distant-water	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : Estimates for 1967–1996 were obtained from aggregate catch data provided to SPC by the Taiwanese Overseas Fisheries Development Council (OFDC). Annual catch estimates for 1997–1999 were determined by applying the species composition of billfish species to total target tuna for 1994–1996, to annual catch estimates of target tuna (Lawson, 1999) for each year.
Taiwan, offshore, Micronesia	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : All estimates were determined by applying the species composition (by weight) of billfish species to total target tuna, obtained from observer data held at SPC, to annual catch estimates of target tuna (Lawson, 1999).
Taiwan, offshore, Taiwan	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : All estimates obtained from the Taiwan Fisheries Bureau (1998). Estimates for 1997 have been carried over to 1998 and 1999
Tonga	<u>Blue marlin, black marlin, striped marlin, swordfish</u> : All estimates were determined by applying the species composition (by weight) of billfish species to total target tuna, obtained from observer data held at SPC, to annual catch estimates of target tuna

(Lawson, 1999).

United States of America Blue marlin, black marlin, striped marlin, swordfish: Estimates of catches in SPC member countries were determined by applying the proportion of logbook-reported target tuna catch to annual target tuna catch estimates (Lawson 1999), to the logbook-reported billfish catches.

Estimates of catches for the Hawaiian longline fishery were obtained from Curran et al. (1996), Curran (pers. comm.) and WPRFMC (1999). Note that the reported black marlin catch is accepted as a misidentification problem and is understood to be negligible (Curran et al. 1996); hence it is not reported here. Estimates for 1997 have been carried over to 1998 and 1999 for this fleet.

Vanuatu Blue marlin, black marlin, striped marlin, swordfish: Estimates were determined by applying the proportion of logbook-reported target tuna catch to annual target tuna catch estimates (Lawson 1999), to the logbook-reported billfish catches.

2.2 Purse seine

Indications of billfish catch in the purse seine fishery, according to logbook data, are hampered by problems of non-reporting and species misidentification (Bailey et al., 1996). Observer records provide a better indication but observer coverage on purse seine vessels in the WCPO has been low. Nonetheless, the following is an attempt to provide annual catch estimates of billfish taken in the WCPO purse-seine fishery, based on the observer data collected to date. Bailey et al. (1996) and recently-collected observer data suggest that two species of billfish, blue marlin and black marlin, are by far the predominant species taken in the tropical purse seine fishery of the WCPO; this paper therefore deals with these species only.

The premise for calculating billfish catch estimates for the purse seine fishery is the application of billfish catch rates (kg/set) derived from observer data to annual estimates of the total number of sets, derived from annual tuna catch estimates and logbook data. We have assumed that variations in catch rates probably exist amongst the different fleets and amongst the different set types (i.e. school associations) and we have therefore structured the data in this manner; note that we have not considered inter-annual variability at this stage due to a lack of data.

In order to ensure there were no biases in the observer data, the data were screened in the following manner:

- Only observer records where the school association was recorded were used;
- Sets with low or no tuna catch (i.e. less than 6 t) were not considered. Vessel captains often do not report unsuccessful sets, while observers report all sets regardless. As the calculation of CPUE in this procedure depends on the number of sets, it was important to ensure consistency in both the observer and logbook data sets;
- Observer trips where all billfish catch were recorded under the generic "billfish" category were not used;
- Observer trips where substantial catches of black marlin, but no blue marlin, were recorded were not used (suggesting species misidentification—9 observer trips out of 365) ;
- Observer trips with a substantial number of sets (i.e. over 30), but no billfish catch, were not used (suggesting no attention to by-catch reporting—3 observer trips out of 365).

The following tables show the derived CPUE (catch per set) for each fleet and set type (in bold). It was arbitrarily decided to reject instances where the total number of observed sets (by fleet and school type) was less than 100. Average CPUE by set type was used in the cases where there were insufficient data at the fleet level. The average value for "drifting FAD" was used for school type codes 5, 6 and 7 (these set types are rare and represent a small proportion of the total number of sets).

Estimated Blue Marlin CPUE (MT per set) for each Purse seine fleet												
School Code	AU	FM	ID	JP	KI	KR	PG	PH	SB	TW	US	VU
1 - Free swimming	0.00430	0.00430	0.00430	0.00430	0.00430	0.00087	0.00430	0.00430	0.00430	0.00788	0.00417	0.00430
2 - Feeding on baitfish	0.00486	0.00486	0.00486	0.00486	0.00486	0.00410	0.00486	0.00486	0.00486	0.00666	0.00454	0.00486
3 - Log	0.01065	0.01065	0.01065	0.01396	0.01065	0.00385	0.01065	0.01065	0.01065	0.01109	0.01144	0.01065
4 - Drifting FAD	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00585	0.00897	0.00865
5 - Anchored FAD	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865
6 - Marine Mammal	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865
7 - Whale shark	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865	0.00865

Estimated Black Marlin CPUE (MT per set) for each Purse seine fleet												
School Code	AU	FM	ID	JP	KI	KR	PG	PH	SB	TW	US	VU
1 - Free swimming	0.00318	0.00318	0.00318	0.00318	0.00318	0.00156	0.00318	0.00318	0.00318	0.00307	0.00409	0.00318
2 - Feeding on baitfish	0.00797	0.00797	0.00797	0.00797	0.00797	0.00671	0.00797	0.00797	0.00797	0.02317	0.00470	0.00797
3 - Log	0.00840	0.00840	0.00840	0.00567	0.00840	0.00973	0.00840	0.00840	0.00840	0.00920	0.00807	0.00840
4 - Drifting FAD	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00540	0.00471	0.00478
5 - Anchored FAD	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478
6 - Marine Mammal	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478
7 - Whale shark	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478	0.00478

The annual tuna catch per set, by set type, and the proportion of total sets, by set type, were determined for each fleet and year from logbook data. The total sets, by set type, were then determined by applying annual (tuna) catch estimates. The estimate of total sets is obtained with the following formula

$$S_{afy} = Q_{afy} \cdot [C_{fy} / L_{fy}] \quad (1)$$

where S_{afy} is an estimate of total sets for set type a undertaken by fleet f in year y ; Q_{afy} is the total number of sets for set type a undertaken by fleet f in year y , according to logbook data; C_{fy} is the total tuna catch estimate for fleet f in year y ; and L_{fy} is the total tuna catch by fleet f in year y , according to logbook data, where the set type has been provided only.

The estimates of annual sets by fleet and school type were then applied to the catch rates of billfish (in the tables above) to produce annual catch estimates of blue marlin and black marlin (see Tables 5 and 6). Note that the estimates for 1998 have been carried-over to 1999 at this stage.

2.3 Recreational

Considerable efforts to improve data coverage and collection in the recreational fisheries have resulted in information now being available with which to provide some indications of billfish catches. In this paper, an attempt has been made to estimate the 1998 billfish catches for nearly all known recreational game fisheries in the region. Historical information is presently only available from a few countries. It is hoped that more historical information will become available and thus improve our data knowledge for these fisheries in the future.

Recognising the differences between tag-and-release and landed catch in recreational fisheries throughout the region, we attempted to compile tag-and-release fish as a separate category to the landed catch. At this stage, it has only been possible to do this for black marlin taken in Australian east-coast waters. In the

future, it is hoped that we can provide a separate table showing the number of tagged-and-released fish, estimated weight and sources of information to determine this weight, for all recreational fisheries.

In order to categorize the reliability of the estimates provided herein, the following indicators have been assigned:

- * Estimate is very unreliable
- ** Estimate is unreliable
- *** Estimate is reliable
- **** Estimate is very reliable

Note that, where available, information has been provided for sailfish and short-billed spearfish catches, even though estimates for these species are not provided in this paper. It should also be noted that the tonnages quoted in this document also include an estimate for released fish as well.

American Samoa Vessels****: Estimates were provided by the Dept. of Fisheries and Wildlife (Tulafono, pers. Comm.,1999).

Blue marlin & Sailfish****: Estimates derived from WPRFMC 1998 Annual report. Note that 'recreational fishermen' are allowed to sell their catch. Data from 1994 includes longline catch data.

Australia Vessels: Private gamefishing vessels is unknown, charter vessels*** (Pepperell, pers. Comm. 1999).

Black marlin*: Estimates were derived from tagging data compiled by the NSW Fisheries Research Institute–NSWFRI (around 1,500 fish in NSW and QLD, particularly off Cairns) and information provided by Dr Julian Pepperell (pers. comm.) regarding the average weights of fish taken in each area. Blue marlin, striped marlin & sailfish: Estimates are derived from assumptions from NSWFR tagging data and that less of these species are caught off eastern Australia than black marlin.

Cook Islands Vessels****: Estimates were determined from information supplied by the Aitutaki Fishing Club and the Cook Island Game Fishing Club.

Blue marlin, striped marlin, black marlin and sailfish**: Estimates were determined from pers. Comm. with the Ministry of Marine Resources, the Aitutaki Fishing Club and the Cook Island Game Fishing Club.

Fed States of Micronesia Vessels**: Estimates were obtained from the Micronesian Maritime Authority (T. Park, pers. comm.)

Blue marlin, striped marlin, black marlin and sailfish*: Estimating that about 20% of the commercial catch (from the SPC database) as caught by recreational fishermen.

Fiji Vessels**: Estimates were provided by A. Threadingham (Fiji International Gamefishing Association).

Blue marlin, striped marlin, black marlin and sailfish*: Estimates were derived from historic FIGFA tournament data and multiplied (by 5) to compensate for non-tournament catch.

French Polynesia Vessels****: Estimates were provided by the Marine Resources Service (Terii Vallaux, pers. comm.), and Dr. Charles Daxboeck and Alban Ellacott (Tahiti International Billfish Association).

Blue marlin, striped marlin and black marlin****: Estimates were derived from historic tournament catches (Ellacott 1999) and then multiplied by 1.2 to compensate for additional catches not reported to TIBA. The average weight of blue marlin was estimated at 170kg (<http://www.tahitisportfishing.com/>).

Guam	<p><u>Vessels****</u>: estimates from WPRFMC (1999).</p> <p><u>Blue marlin & sailfish***</u>: estimates from WPRFMC (1999).</p>
Hawaii	<p><u>Vessels***</u>: There is no estimate of private vessels (unknown, but numerous). Charter vessels (J. Bright, pers. comm. Tropicilla productions).</p> <p><u>Blue marlin and striped marlin and swordfish***</u>: WPRFMC (1999), <u>black marlin & sailfish***</u>: Estimates obtained from 'The Charter Desk' (pers. comm. Jan. 2000) who obtain catch and weight information when the charter boats come into the harbour at the end of the day. No effort information is obtained. <u>Spearfish and sailfish**</u>: Estimates obtained from the 'The Charter Desk' (pers. comm. Jan. 2000), though only numbers of fish recorded – weight estimates obtained by multiplying the number of fish by 15kg for spearfish and 25kg for sailfish.</p>
Kiribati	<p><u>Vessels**</u>: Estimates were derived from information provided by the Betio Game Fishing Club (BGFC, http://members.xoom.com/fishos/BGFC_Main_Page.htm), the Fisheries Division (M. Kamatie, pers. comm.) and pers. comm. Derrick Pendle (BGFC).</p> <p><u>Blue marlin & black marlin & sailfish*</u>: Estimates derived from information provided by Derrick Pendle (pers. comm. BGFC) and Being Yeating (SPC).</p>
Marshall Islands	<p><u>Vessels**</u>: Estimates derived from information provided by Danny Jack (pers. comm. MIMRA).</p> <p><u>Blue marlin*</u>: estimates derived from tournament data provided by E. Bigler (pers. comm. Marshalls Billfish Club).</p>
Nauru	<p><u>Vessels***</u>: Estimates derived from pers obs. (K. Bigelow SPC) and information provided by Sean Oppenheimer (Capelle & Partner).</p> <p><u>Blue marlin*</u>: Estimates derived from information provided by Sean Oppenheimer (pers comm.).</p>
New Caledonia	<p><u>Vessels***</u>: Estimates provided by Bureau de peches et de l'aquaculture.</p> <p><u>Blue marlin, striped marlin and black marlin, spearfish & sailfish**</u>: Estimates derived from annual reports provided by 'Statistiques section espadon, Cercle Nautique Caledonien (CNC)'. These data were doubled to represent the inclusion of non-tournament fish captures.</p>
New Zealand	<p><u>Vessels</u>: Unknown.</p> <p><u>Striped marlin*</u>: A rough estimate derived from tagging data (NIWA).</p>
Niue	<p><u>Vessels***</u>: Estimates derived from information provided by Brendon Pasisi (pers. comm., Dept. of Ag. Forestry & Fisheries).</p> <p><u>Striped marlin and black marlin & sailfish*</u>: Estimates from conversations with gamefishermen from Niue.</p>
Palau	<p><u>Vessels***</u>: Estimates obtained from personal communications with Sam Scott (Palau Sport Fish. Assoc.) and Tom Graham (Palau Conservation Society).</p> <p><u>Blue marlin and sailfish**</u>: Estimates derived from information provided by Palau Sport fishing association tournament records and personal communications with Sam Scott (Palau Sport Fish. Assoc.).</p>
PNG	<p><u>Vessels**</u>: Estimates derived from personal communications with Joel Opnai (National Fisheries Authority) and from John Cross (president; Game Fishing Association of PNG).</p> <p><u>Blue marlin & black marlin and sailfish*</u>: Estimated from historic tournament data and multiplied by 4 to represent the inclusion of non-tournament catch.</p>

Samoa	<u>No information available.</u>
Solomons Islands	<u>Vessels**</u> : estimates obtained from Sylvester Diake (pers. comm., Dept. of Ag. & Fish.). <u>Blue marlin, striped marlin & black marlin & sailfish*</u> : Estimated from personal communications with Sylvester Diake (Dept. of Ag. & Fish.) and Dirk Sieling (charter operator).
Tokelau	<u>Vessels**</u> : estimates obtained from Mose Pelassio (pers. comm., Dept. Nat. Res. & Env.). <u>Blue marlin, striped marlin and black marlin*</u> : Estimates obtained from the number of vessels operating and the presence of marlin in the vicinity (SPC longline data).
Tonga	<u>Vessels***</u> : estimates obtained from Neil Dalgety (pers. comm., Tonga International Gamefish Association) and pers. obs. <u>Blue marlin, black marlin and sailfish*</u> : Estimated from tournament catch data (TIGFA) and extrapolation from commercial longline data (SPC data base).
Tuvalu	<u>Vessels***</u> : Estimates provided by Samasoni Finikaso (pers. comm., Fisheries Dept.). <u>Billfish species</u> : No information
Vanuatu	<u>Vessels***</u> : estimates provided by Nick Gardiner (pers. comm., Port Vila Gamefish Club). <u>Blue marlin, striped marlin, and black marlin and sailfish*</u> : Estimated from tournament data and multiplied by 3 to estimate non-tournament catches.
Wallis and Futuna	<u>No information available.</u>

3. DISCUSSION

During the past two to three years some effort has been made to improve the annual catch estimates of billfish taken in commercial fisheries of the WCPO. There has been a noted improvement in the information provided during this time, but more work is required. Compiling historical catch estimates of billfish from recreational fisheries has been a more difficult task since there has generally been no obligation to collect or monitor catches taken in the wide variety of fisheries making up this category. We hope that continued efforts on behalf of all involved will improve these catch estimates in the future.

In spite of the preliminary nature of these estimates, the information collected to date provides some indications on the catch of the four selected billfish in WCPO fisheries. Figures 2 and 3 show the annual catches of the billfish species in the longline and purse seine fisheries, respectively. Figure 4 show the comparison of blue marlin and black marlin catch by fishery during 1998 (the only year for which estimates for all recreational fisheries have been determined at this stage).

The following are basic observations drawn from this information.

- The annual time series of billfish catches from the longline fishery shows that striped marlin and blue marlin were the predominant species during in the 1960s. This was no doubt related to the areas fished. During the 1970s, the catches of striped marlin dropped considerably and was the prime reason for the overall reduction in billfish catch. During the 1980s and 1990s, catches were generally stable, although there was an increase in swordfish catch mainly due to the establishment of several target fisheries during this period. Note also that it was during this period that several countries established closed areas and introduced regulations that prevented the landing of certain billfish species in their waters (i.e. Australia and New Zealand). Reported black marlin and (to a lesser extent) striped marlin catches

decreased in the late 1980s and 1990s due in part to these enforcement measures. Blue marlin catch fluctuated throughout, with larger catches notably during the mid-1990s when there was an increase in the number of mainland Chinese and Taiwanese offshore vessels fishing in equatorial waters;

- Estimated billfish catch in the purse seine fishery essentially follows the trend of the target tuna species catch (particularly since the estimation procedure uses tuna catch stratified by fleet and set type). The proportion of black marlin to blue marlin is higher in the purse seine fishery than in the longline fishery, perhaps due to (i) associated sets (floating objects) taking black marlin, and (ii) the areas frequently fished include Melanesian coastal waters where black marlin are known to be found;
- Longlining accounts for the majority of the blue marlin, black marlin, striped marlin and swordfish catch. The recreational fishery has taken a significant proportion of the black marlin catch in recent years (Figure 4). This situation is understood to be primarily due to the establishment of closed areas and regulations preventing the retention of black marlin by longline vessels in the area (i.e. off the north-east coast of Australia) where black marlin are known to be abundant.

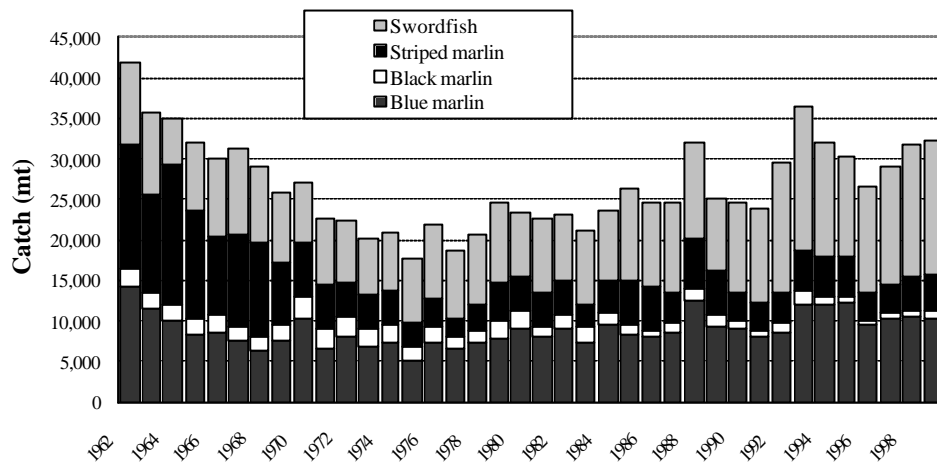


Figure 2. Annual catch of billfish species in the WCPO longline fishery

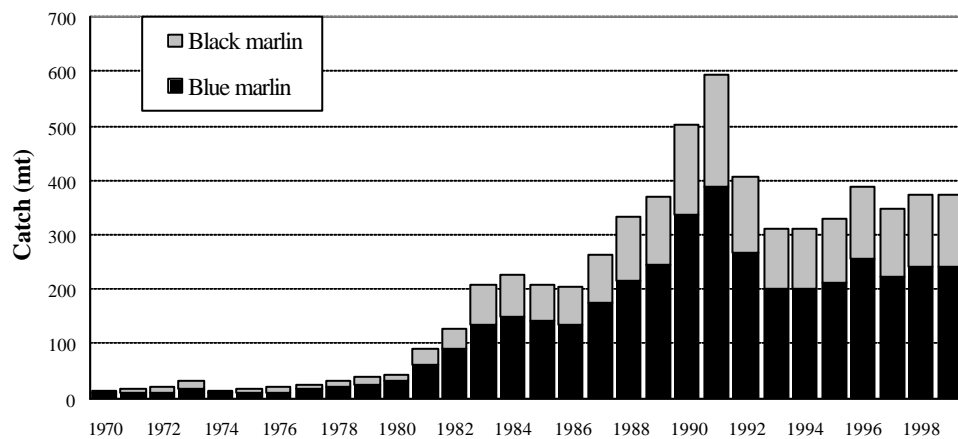


Figure 3. Annual catch of billfish species in the WCPO purse seine fishery

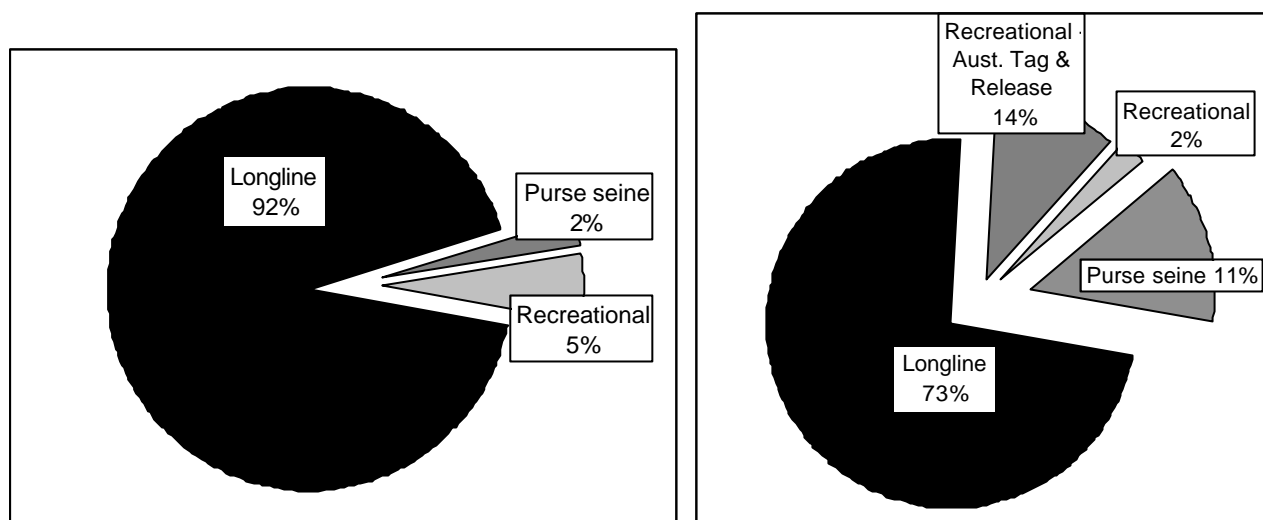


Figure 4. Blue marlin (left) and black marlin (right) catch by WCPO fishery for 1998

4. Annual billfish catches for the western and central Pacific Ocean

Table 1. Longline catches (metric tonnes) of blue marlin in the WCPO

Legend : '-' no catch; '...' catches not available; '(')' provisional estimates only.

YEAR	AMERICAN SAMOA	AUSTRALIA DOMESTIC	AUSTRALIA- JAPAN JV	CHINA	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	INDONESIA	JAPAN COASTAL
1950	-	-	-	-	-	-	-	-	...	...
1951	-	-	-	-	-	-	-	-	...	...
1952	-	-	-	-	-	-	-	-	...	...
1953	-	-	-	-	-	-	-	-	...	...
1954	-	-	-	-	-	-	-	-	...	...
1955	-	-	-	-	-	-	-	-	...	...
1956	-	-	-	-	-	-	-	-	...	...
1957	-	-	-	-	-	-	-	-	...	...
1958	-	-	-	-	-	-	-	-	...	...
1959	-	-	-	-	-	-	-	-	...	...
1960	-	-	-	-	-	-	-	-	...	...
1961	-	-	-	-	-	-	-	-	...	...
1962	-	-	-	-	-	-	-	-	...	...
1963	-	-	-	-	-	-	-	-	...	...
1964	-	-	-	-	-	-	-	-	...	...
1965	-	-	-	-	-	-	-	-	...	...
1966	-	-	-	-	-	-	-	-	...	...
1967	-	-	-	-	-	-	-	-	...	...
1968	-	-	-	-	-	-	-	-	...	...
1969	-	-	-	-	-	-	-	-	...	...
1970	-	-	-	-	-	-	-	-	...	...
1971	-	-	-	-	-	-	-	-	...	...
1972	-	-	-	-	-	-	-	-	...	...
1973	-	-	-	-	-	-	-	-	...	...
1974	-	-	-	-	-	-	-	-	...	...
1975	-	-	-	-	-	-	-	-	...	...
1976	-	-	-	-	-	-	-	-	...	...
1977	-	-	-	-	-	-	-	-	...	...
1978	-	-	-	-	-	-	-	-	111	...
1979	-	-	-	-	-	-	-	-	116	...
1980	-	-	-	-	-	-	-	-	135	...
1981	-	-	-	-	-	-	-	-	165	...
1982	-	-	-	-	-	-	-	-	330	...
1983	-	-	-	-	-	-	-	-	96	...
1984	-	-	-	-	-	-	-	-	153	...
1985	-	0	-	-	-	-	-	-	225	...
1986	-	0	-	-	-	-	-	-	223	...
1987	-	51	-	-	-	-	-	-	846	...
1988	-	36	-	3	-	-	-	-	888	...
1989	-	0	...	8	-	-	2	-	468	...
1990	-	18	...	26	-	-	8	3	503	...
1991	-	1	...	59	-	2	29	23	554	...
1992	-	2	...	159	-	10	42	77	570	...
1993	-	0	...	375	-	11	65	205	570	...
1994	-	4	...	874	2	27	118	349	420	...
1995	1	4	...	1,394	16	18	224	416	635	...
1996	5	9	-	611	4	7	161	422	726	...
1997	16	0	-	363	-	13	209	337	700	...
1998	25	0	-	153	-	25	198	307	(700)	...
1999	25	0	-	238	-	(25)	227	355	(700)	...

Table 1. Longline catches (metric tonnes) of blue marlin in the WCPO (continued)

YEAR	JAPAN OFFSHORE AND DW	KIRIBATI	KOREA	MARSHALL ISLANDS	NEW CALEDONIA	NEW ZEALAND	PAPUA NEW GUINEA	PHILIPPINES	SAMOA	SOLOMON ISLANDS
1950	...	-	-	-	-	-	-	...	-	-
1951	...	-	-	-	-	-	-	...	-	-
1952	...	-	-	-	-	-	-	...	-	-
1953	...	-	-	-	-	-	-	...	-	-
1954	...	-	-	-	-	-	-	...	-	-
1955	...	-	-	-	-	-	-	...	-	-
1956	...	-	-	-	-	-	-	...	-	-
1957	...	-	-	-	-	-	-	...	-	-
1958	...	-	...	-	-	-	-	...	-	-
1959	...	-	...	-	-	-	-	...	-	-
1960	...	-	...	-	-	-	-	...	-	-
1961	...	-	...	-	-	-	-	...	-	-
1962	13,569	-	...	-	-	-	-	...	-	-
1963	10,892	-	...	-	-	-	-	...	-	-
1964	9,287	-	...	-	-	-	-	...	-	-
1965	7,247	-	...	-	-	-	-	...	-	-
1966	7,676	-	...	-	-	-	-	...	-	-
1967	6,290	-	...	-	-	-	-	...	-	-
1968	5,041	-	...	-	-	-	-	...	-	-
1969	5,585	-	...	-	-	-	-	...	-	-
1970	8,225	-	...	-	-	-	-	54	-	-
1971	4,709	-	...	-	-	-	-	60	-	-
1972	6,177	-	...	-	-	-	-	63	-	-
1973	5,106	-	...	-	-	-	-	75	-	0
1974	5,193	-	...	-	-	-	-	87	-	-
1975	3,409	-	29	-	-	-	-	89	-	-
1976	3,707	-	712	-	-	-	-	75	-	1
1977	4,206	-	546	-	-	-	-	106	-	1
1978	5,045	-	592	-	-	-	-	63	-	1
1979	4,500	-	1,188	-	-	-	-	83	-	2
1980	6,071	-	826	-	-	-	-	108	-	2
1981	5,382	-	953	-	-	-	-	148	-	1
1982	5,440	-	890	-	-	-	-	173	-	1
1983	4,238	-	420	-	8	-	-	258	-	2
1984	6,006	-	848	-	10	-	-	117	-	1
1985	5,185	-	893	-	18	-	-	166	-	1
1986	5,422	-	791	-	11	-	-	220	-	-
1987	3,903	-	1,453	-	26	-	-	345	-	-
1988	5,063	-	1,277	-	10	-	-	290	-	-
1989	4,078	-	1,176	-	18	0	-	316	-	-
1990	3,056	-	1,103	-	10	0	-	202	-	-
1991	3,024	-	632	-	3	0	-	238	-	-
1992	3,054	-	1,060	0	7	0	-	111	-	-
1993	3,555	-	1,104	14	10	0	0	95	...	-
1994	3,847	-	637	0	4	0	1	129	8	-
1995	3,578	1	1,212	1	5	0	9	121	23	5
1996	2,173	0	456	...	4	0	11	122	23	-
1997	1,961	...	654	-	4	0	30	134	53	-
1998	(1,940)	...	709	-	3	(0)	19	(134)	56	8
1999	(1,938)	...	540	-	15	(0)	(19)	(134)	47	11

Table 1. Longline catches (metric tonnes) of blue marlin in the WCPO (continued)

YEAR	TAIWAN DISTANT- WATER	TAIWAN OFFSHORE MICRONESIA	TAIWAN OFFSHORE TAIWAN	TONGA	UNITED STATES	VANUATU	TOTAL
1950	-	-	...	-	-	-	...
1951	-	-	...	-	-	-	...
1952	-	-	...	-	-	-	...
1953	-	-	...	-	-	-	...
1954	...	-	...	-	-	-	...
1955	...	-	...	-	-	-	...
1956	...	-	...	-	-	-	...
1957	...	-	...	-	-	-	...
1958	...	-	...	-	-	-	...
1959	...	-	887	-	-	-	...
1960	...	-	781	-	-	-	...
1961	...	-	948	-	-	-	...
1962	...	-	703	-	-	-	14,272
1963	...	-	628	-	-	-	11,520
1964	...	-	691	-	-	-	9,978
1965	...	-	934	-	-	-	8,181
1966	...	-	1,016	-	-	-	8,692
1967	293	-	1,035	-	-	-	7,618
1968	502	-	898	-	-	-	6,441
1969	590	-	1,443	-	-	-	7,618
1970	760	-	1,230	-	-	-	10,269
1971	590	-	1,385	-	-	-	6,744
1972	532	-	1,331	-	-	-	8,103
1973	503	-	1,205	-	-	-	6,890
1974	428	-	1,650	-	-	-	7,358
1975	301	-	1,312	-	-	-	5,139
1976	382	-	2,628	-	-	-	7,504
1977	453	-	1,291	-	-	-	6,602
1978	342	-	1,175	-	-	-	7,329
1979	333	-	1,633	-	-	-	7,856
1980	271	-	1,626	-	32	-	9,072
1981	271	-	1,134	-	42	-	8,095
1982	173	-	1,812	4	136	-	8,960
1983	146	-	2,129	4	72	-	7,372
1984	210	-	2,121	5	23	-	9,494
1985	135	-	1,789	5	26	-	8,443
1986	122	-	1,187	5	38	-	8,020
1987	142	...	1,723	6	45	-	8,540
1988	196	...	4,617	6	90	-	12,474
1989	173	...	2,822	5	364	-	9,430
1990	336	846	2,644	4	318	-	9,078
1991	357	637	1,730	4	704	-	7,997
1992	107	842	2,152	5	354	-	8,551
1993	230	1,546	3,769	7	373	-	11,931
1994	738	625	3,876	8	383	-	12,051
1995	274	574	3,007	10	696	11	12,235
1996	159	250	3,820	12	523	19	9,517
1997	186	681	4,336	(12)	522	13	10,226
1998	218	634	4,850	(12)	520	3	10,514
1999	225	401	4,850	(12)	(520)	(3)	10,285

Table 2. Longline catches (metric tonnes) of black marlin in the WCPO**Legend :** '-' no catch; '...' catches not available; '()' provisional estimates only.

YEAR	AMERICAN SAMOA	AUSTRALIA DOMESTIC	AUSTRALIA- JAPAN JV	CHINA	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	INDONESIA	JAPAN COASTAL
1950	-	-	-	-	-	-	-	-	...	...
1951	-	-	-	-	-	-	-	-	...	...
1952	-	-	-	-	-	-	-	-	...	...
1953	-	-	-	-	-	-	-	-	...	...
1954	-	-	-	-	-	-	-	-	...	...
1955	-	-	-	-	-	-	-	-	...	...
1956	-	-	-	-	-	-	-	-	...	...
1957	-	-	-	-	-	-	-	-	...	...
1958	-	-	-	-	-	-	-	-	...	...
1959	-	-	-	-	-	-	-	-	...	...
1960	-	-	-	-	-	-	-	-	...	...
1961	-	-	-	-	-	-	-	-	...	...
1962	-	-	-	-	-	-	-	-	...	...
1963	-	-	-	-	-	-	-	-	...	...
1964	-	-	-	-	-	-	-	-	...	...
1965	-	-	-	-	-	-	-	-	...	...
1966	-	-	-	-	-	-	-	-	...	...
1967	-	-	-	-	-	-	-	-	...	...
1968	-	-	-	-	-	-	-	-	...	...
1969	-	-	-	-	-	-	-	-	...	...
1970	-	-	-	-	-	-	-	-	...	...
1971	-	-	-	-	-	-	-	-	...	...
1972	-	-	-	-	-	-	-	-	...	...
1973	-	-	-	-	-	-	-	-	...	...
1974	-	-	-	-	-	-	-	-	...	...
1975	-	-	-	-	-	-	-	-	...	...
1976	-	-	-	-	-	-	-	-	...	...
1977	-	-	-	-	-	-	-	-	...	...
1978	-	-	-	-	-	-	-	-	0	...
1979	-	-	-	-	-	-	-	-	0	...
1980	-	-	-	-	-	-	-	-	0	...
1981	-	-	-	-	-	-	-	-	0	...
1982	-	-	-	-	-	-	-	-	0	...
1983	-	-	-	-	-	-	-	-	0	...
1984	-	-	-	-	-	-	-	-	0	...
1985	-	0	-	-	-	-	-	-	0	...
1986	-	0	-	-	-	-	-	-	0	...
1987	-	17	-	-	-	-	-	-	0	...
1988	-	13	-	2	-	-	-	-	0	...
1989	-	1	...	8	-	-	0	-	0	...
1990	-	13	...	24	-	-	2	0	0	...
1991	-	15	...	53	-	0	6	+	0	...
1992	-	8	...	144	-	0	9	+	0	...
1993	-	0	...	339	-	1	14	2	0	...
1994	-	3	...	240	6	6	107	2	0	...
1995	0	2	...	93	4	1	6	2	0	...
1996	0	5	-	127	2	0	10	2	0	...
1997	0	0	-	63	-	4	40	2	0	...
1998	0	0	-	115	-	13	38	2	(210)	...
1999	0	0	-	168	-	(13)	50	2	(210)	...

Table 2. Longline catches (metric tonnes) of black marlin in the WCPO (continued)

YEAR	JAPAN OFFSHORE AND DW	KIRIBATI	KOREA	MARSHALL ISLANDS	NEW CALEDONIA	NEW ZEALAND	PAPUA NEW GUINEA	PHILIPPINES	SAMOA	SOLOMON ISLANDS
1950	...	-	-	-	-	-	-	...	-	-
1951	...	-	-	-	-	-	-	...	-	-
1952	...	-	-	-	-	-	-	...	-	-
1953	...	-	-	-	-	-	-	...	-	-
1954	...	-	-	-	-	-	-	...	-	-
1955	...	-	-	-	-	-	-	...	-	-
1956	...	-	-	-	-	-	-	...	-	-
1957	...	-	-	-	-	-	-	...	-	-
1958	...	-	...	-	-	-	-	...	-	-
1959	...	-	...	-	-	-	-	...	-	-
1960	...	-	...	-	-	-	-	...	-	-
1961	...	-	...	-	-	-	-	...	-	-
1962	978	-	...	-	-	-	-	...	-	-
1963	838	-	...	-	-	-	-	...	-	-
1964	717	-	...	-	-	-	-	...	-	-
1965	1,123	-	...	-	-	-	-	...	-	-
1966	1,024	-	...	-	-	-	-	...	-	-
1967	587	-	...	-	-	-	-	...	-	-
1968	424	-	...	-	-	-	-	...	-	-
1969	579	-	...	-	-	-	-	...	-	-
1970	1,223	-	...	-	-	-	-	16	-	-
1971	1,271	-	...	-	-	-	-	18	-	-
1972	980	-	...	-	-	-	-	19	-	-
1973	904	-	...	-	-	-	-	22	-	0
1974	824	-	...	-	-	-	-	26	-	-
1975	657	-	...	-	-	-	-	27	-	-
1976	413	-	...	-	-	-	-	22	-	1
1977	552	-	...	-	-	-	-	32	-	1
1978	814	-	...	-	-	-	-	19	-	1
1979	763	-	...	-	-	-	-	25	-	2
1980	758	-	...	-	-	-	-	32	-	2
1981	707	-	...	-	-	-	-	44	-	1
1982	689	-	...	-	-	-	-	52	-	1
1983	568	-	...	-	2	-	-	77	-	2
1984	561	-	...	-	2	-	-	35	-	1
1985	537	-	...	-	23	-	-	50	-	1
1986	306	-	...	-	37	-	-	66	-	-
1987	317	-	103	-	83	-	-	103	-	-
1988	556	-	162	-	48	-	-	87	-	-
1989	215	-	129	-	59	0	-	95	-	-
1990	138	-	148	-	49	0	-	60	-	-
1991	129	-	47	-	35	0	-	71	-	-
1992	149	-	122	0	20	0	-	33	-	-
1993	181	-	98	0	32	0	0	29	...	-
1994	242	-	53	0	10	0	1	39	3	-
1995	152	0	33	0	11	0	3	36	10	0
1996	89	0	15	...	10	0	4	37	10	-
1997	75	...	48	-	11	0	11	40	23	-
1998	(75)	...	52	-	16	(0)	7	(40)	22	1
1999	(75)	...	40	-	46	(0)	(7)	(40)	23	1

Table 2. Longline catches (metric tonnes) of black marlin in the WCPO (continued)

YEAR	TAIWAN DISTANT- WATER	TAIWAN OFFSHORE MICRONESIA	TAIWAN OFFSHORE TAIWAN	TONGA	UNITED STATES	VANUATU	TOTAL
1950	-	-	...	-	-	-	...
1951	-	-	...	-	-	-	...
1952	-	-	...	-	-	-	...
1953	-	-	...	-	-	-	...
1954	...	-	...	-	-	-	...
1955	...	-	...	-	-	-	...
1956	...	-	...	-	-	-	...
1957	...	-	...	-	-	-	...
1958	...	-	...	-	-	-	...
1959	...	-	1,869	-	-	-	...
1960	...	-	1,244	-	-	-	...
1961	...	-	1,332	-	-	-	...
1962	...	-	1,175	-	-	-	2,153
1963	...	-	1,113	-	-	-	1,951
1964	...	-	1,262	-	-	-	1,979
1965	...	-	978	-	-	-	2,101
1966	...	-	1,090	-	-	-	2,114
1967	15	-	981	-	-	-	1,583
1968	27	-	1,052	-	-	-	1,503
1969	34	-	1,266	-	-	-	1,879
1970	44	-	1,293	-	-	-	2,577
1971	72	-	925	-	-	-	2,286
1972	61	-	1,383	-	-	-	2,443
1973	56	-	1,208	-	-	-	2,191
1974	50	-	1,251	-	-	-	2,151
1975	19	-	1,089	-	-	-	1,792
1976	18	-	1,452	-	-	-	1,906
1977	23	-	735	-	-	-	1,342
1978	34	-	548	-	-	-	1,416
1979	111	-	1,151	-	-	-	2,053
1980	32	-	1,363	-	0	-	2,188
1981	28	-	530	-	0	-	1,310
1982	14	-	1,087	5	0	-	1,847
1983	7	-	1,107	5	0	-	1,769
1984	12	-	1,019	5	0	-	1,635
1985	8	-	597	5	0	-	1,221
1986	4	-	298	6	0	-	717
1987	2	...	525	7	...	-	1,158
1988	11	...	470	6	...	-	1,354
1989	1	...	856	5	...	-	1,368
1990	9	105	306	4	...	-	858
1991	6	79	286	4	0	-	733
1992	10	105	651	5	1	-	1,255
1993	65	223	684	7	1	-	1,676
1994	13	78	248	9	15	-	1,074
1995	18	57	443	10	5	1	889
1996	2	0	209	13	1	4	539
1997	11	149	193	(13)	0	3	687
1998	11	23	247	(13)	4	1	889
1999	11	90	(247)	(13)	1	1	1,037

Table 3. Longline catches (metric tonnes) of striped marlin in the WCPO**Legend :** '-' no catch; '...' catches not available; '()' provisional estimates only.

YEAR	AMERICAN SAMOA	AUSTRALIA DOMESTIC	AUSTRALIA- JAPAN JV	CHINA	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	INDONESIA	JAPAN COASTAL
1950	-	-	-	-	-	-	-	-	...	...
1951	-	-	-	-	-	-	-	-	...	...
1952	-	-	-	-	-	-	-	-	...	...
1953	-	-	-	-	-	-	-	-	...	...
1954	-	-	-	-	-	-	-	-	...	...
1955	-	-	-	-	-	-	-	-	...	...
1956	-	-	-	-	-	-	-	-	...	...
1957	-	-	-	-	-	-	-	-	...	...
1958	-	-	-	-	-	-	-	-	...	...
1959	-	-	-	-	-	-	-	-	...	...
1960	-	-	-	-	-	-	-	-	...	...
1961	-	-	-	-	-	-	-	-	...	...
1962	-	-	-	-	-	-	-	-	...	...
1963	-	-	-	-	-	-	-	-	...	...
1964	-	-	-	-	-	-	-	-	...	...
1965	-	-	-	-	-	-	-	-	...	...
1966	-	-	-	-	-	-	-	-	...	...
1967	-	-	-	-	-	-	-	-	...	...
1968	-	-	-	-	-	-	-	-	...	...
1969	-	-	-	-	-	-	-	-	...	...
1970	-	-	-	-	-	-	-	-	...	...
1971	-	-	-	-	-	-	-	-	...	...
1972	-	-	-	-	-	-	-	-	...	...
1973	-	-	-	-	-	-	-	-	...	...
1974	-	-	-	-	-	-	-	-	...	...
1975	-	-	-	-	-	-	-	-	...	...
1976	-	-	-	-	-	-	-	-	...	...
1977	-	-	-	-	-	-	-	-	...	...
1978	-	-	-	-	-	-	-	-	22	...
1979	-	-	-	-	-	-	-	-	23	...
1980	-	-	-	-	-	-	-	-	27	...
1981	-	-	-	-	-	-	-	-	33	...
1982	-	-	-	-	-	-	-	-	66	...
1983	-	-	-	-	-	-	-	-	19	...
1984	-	-	-	-	-	-	-	-	31	...
1985	-	0	-	-	-	-	-	-	45	...
1986	-	0	-	-	-	-	-	-	45	...
1987	-	65	-	-	-	-	-	-	169	...
1988	-	76	-	1	-	-	-	-	178	...
1989	-	6	...	3	-	-	1	-	94	...
1990	-	66	...	11	-	-	4	2	101	...
1991	-	32	...	24	-	0	15	7	111	...
1992	-	22	...	64	-	0	21	25	114	...
1993	-	27	...	150	-	1	33	68	114	...
1994	-	54	...	204	7	1	35	103	84	...
1995	0	87	...	12	11	5	67	71	127	...
1996	0	138	-	0	5	2	75	109	145	...
1997	0	198	-	13	-	1	89	148	140	...
1998	0	447	-	32	-	5	203	101	(140)	...
1999	0	484	-	29	-	5	117	161	(140)	...

Table 3. Longline catches of striped marlin in the WCPO (continued)

YEAR	JAPAN OFFSHORE AND DW	KIRIBATI	KOREA	MARSHALL ISLANDS	NEW CALEDONIA	NEW ZEALAND	PAPUA NEW GUINEA	PHILIPPINES	SAMOA	SOLOMON ISLANDS
1950	...	-	-	-	-	-	-	...	-	-
1951	...	-	-	-	-	-	-	...	-	-
1952	...	-	-	-	-	-	-	...	-	-
1953	...	-	-	-	-	-	-	...	-	-
1954	...	-	-	-	-	-	-	...	-	-
1955	...	-	-	-	-	-	-	...	-	-
1956	...	-	-	-	-	-	-	...	-	-
1957	...	-	-	-	-	-	-	...	-	-
1958	...	-	...	-	-	-	-	...	-	-
1959	...	-	...	-	-	-	-	...	-	-
1960	...	-	...	-	-	-	-	...	-	-
1961	...	-	...	-	-	-	-	...	-	-
1962	14,875	-	...	-	-	-	-	...	-	-
1963	11,824	-	...	-	-	-	-	...	-	-
1964	16,628	-	...	-	-	-	-	...	-	-
1965	12,939	-	...	-	-	-	-	...	-	-
1966	9,222	-	...	-	-	-	-	...	-	-
1967	10,913	-	...	-	-	-	-	...	-	-
1968	11,216	-	...	-	-	-	-	...	-	-
1969	7,221	-	...	-	-	-	-	...	-	-
1970	6,135	-	...	-	-	-	-	11	-	-
1971	4,816	-	...	-	-	-	-	12	-	-
1972	3,455	-	...	-	-	-	-	13	-	-
1973	3,766	-	...	-	-	-	-	15	-	0
1974	3,475	-	...	-	-	-	-	17	-	-
1975	2,233	-	27	-	-	-	-	18	-	-
1976	2,112	-	248	-	-	-	-	15	-	0
1977	1,505	-	115	-	-	-	-	21	-	0
1978	2,033	-	480	-	-	-	-	13	-	0
1979	3,574	-	291	-	-	-	-	17	-	1
1980	3,393	-	51	-	-	-	-	22	-	1
1981	3,081	-	489	-	-	-	-	30	-	0
1982	3,093	-	333	-	-	-	-	35	-	0
1983	2,094	-	150	-	21	-	-	52	-	0
1984	2,787	-	253	-	23	-	-	23	-	0
1985	3,653	-	283	-	68	-	-	33	-	0
1986	4,397	-	199	-	81	-	-	44	-	-
1987	2,809	-	189	-	88	-	-	69	-	-
1988	4,763	-	222	-	39	-	-	58	-	-
1989	3,836	-	152	-	89	0	-	63	-	-
1990	2,234	-	100	-	93	0	-	40	-	-
1991	2,532	-	39	-	29	0	-	48	-	-
1992	2,331	-	100	0	32	0	-	22	-	-
1993	3,228	-	111	0	27	0	0	19	...	-
1994	2,937	-	102	0	37	0	1	26	7	-
1995	3,058	0	118	0	31	0	4	24	21	0
1996	2,078	0	51	...	41	2	5	24	21	-
1997	1,919	...	103	-	22	1	15	27	49	-
1998	(1,919)	...	112	-	61	(1)	9	(27)	41	0
1999	(1,919)	...	85	-	80	(7)	(9)	(27)	59	0

Table 3. Longline catches (metric tonnes) of striped marlin in the WCPO (continued)

YEAR	TAIWAN DISTANT- WATER	TAIWAN OFFSHORE MICRONESIA	TAIWAN OFFSHORE TAIWAN	TONGA	UNITED STATES	VANUATU	TOTAL
1950	-	-	...	-	-	-	...
1951	-	-	...	-	-	-	...
1952	-	-	...	-	-	-	...
1953	-	-	...	-	-	-	...
1954	...	-	...	-	-	-	...
1955	...	-	...	-	-	-	...
1956	...	-	...	-	-	-	...
1957	...	-	...	-	-	-	...
1958	...	-	...	-	-	-	...
1959	...	-	543	-	-	-	...
1960	...	-	391	-	-	-	...
1961	...	-	398	-	-	-	...
1962	...	-	306	-	-	-	15,181
1963	...	-	332	-	-	-	12,156
1964	...	-	560	-	-	-	17,188
1965	...	-	392	-	-	-	13,331
1966	...	-	355	-	-	-	9,577
1967	68	-	340	-	-	-	11,321
1968	81	-	385	-	-	-	11,682
1969	77	-	332	-	-	-	7,630
1970	209	-	571	-	-	-	6,926
1971	123	-	495	-	-	-	5,446
1972	248	-	449	-	-	-	4,164
1973	145	-	380	-	-	-	4,306
1974	88	-	568	-	-	-	4,149
1975	171	-	487	-	-	-	2,936
1976	144	-	732	-	-	-	3,251
1977	183	-	347	-	-	-	2,171
1978	180	-	524	-	-	-	3,252
1979	233	-	618	-	-	-	4,756
1980	178	-	432	-	105	-	4,208
1981	167	-	223	-	94	-	4,116
1982	107	-	491	10	140	-	4,274
1983	56	-	397	10	114	-	2,913
1984	115	-	555	10	91	-	3,889
1985	58	-	965	11	75	-	5,192
1986	23	-	513	12	191	-	5,505
1987	45	...	179	14	273	-	3,900
1988	58	...	383	13	500	-	6,291
1989	160	...	457	11	591	-	5,463
1990	113	64	184	9	500	-	3,521
1991	101	48	137	9	524	-	3,656
1992	101	64	254	11	545	-	3,706
1993	88	270	219	16	632	-	5,004
1994	438	47	221	19	402	-	4,726
1995	223	75	137	22	728	2	4,823
1996	176	0	83	27	524	5	3,512
1997	113	80	136	(27)	524	1	3,606
1998	180	19	267	(27)	529	0	4,121
1999	186	110	(267)	(27)	526	0	4,237

Table 4. Longline catches (metric tonnes) of swordfish in the WCPO

Legend : '-' no catch; '...' catches not available; '()' provisional estimates only.

YEAR	AMERICAN SAMOA	AUSTRALIA DOMESTIC	AUSTRALIA- JAPAN JV	CHINA	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	INDONESIA	JAPAN COASTAL
1950	-	-	-	-	-	-	-	-	...	...
1951	-	-	-	-	-	-	-	-	...	...
1952	-	-	-	-	-	-	-	-	...	...
1953	-	-	-	-	-	-	-	-	...	...
1954	-	-	-	-	-	-	-	-	...	...
1955	-	-	-	-	-	-	-	-	...	...
1956	-	-	-	-	-	-	-	-	...	...
1957	-	-	-	-	-	-	-	-	...	...
1958	-	-	-	-	-	-	-	-	...	...
1959	-	-	-	-	-	-	-	-	...	...
1960	-	-	-	-	-	-	-	-	...	...
1961	-	-	-	-	-	-	-	-	...	...
1962	-	-	-	-	-	-	-	-	...	...
1963	-	-	-	-	-	-	-	-	...	...
1964	-	-	-	-	-	-	-	-	...	...
1965	-	-	-	-	-	-	-	-	...	...
1966	-	-	-	-	-	-	-	-	...	...
1967	-	-	-	-	-	-	-	-	...	...
1968	-	-	-	-	-	-	-	-	...	...
1969	-	-	-	-	-	-	-	-	...	...
1970	-	-	-	-	-	-	-	-	...	...
1971	-	-	-	-	-	-	-	-	...	...
1972	-	-	-	-	-	-	-	-	...	...
1973	-	-	-	-	-	-	-	-	...	...
1974	-	-	-	-	-	-	-	-	...	...
1975	-	-	-	-	-	-	-	-	...	...
1976	-	-	-	-	-	-	-	-	...	...
1977	-	-	-	-	-	-	-	-	...	...
1978	-	-	-	-	-	-	-	-	61	...
1979	-	-	-	-	-	-	-	-	64	...
1980	-	-	-	-	-	-	-	-	74	...
1981	-	-	-	-	-	-	-	-	91	...
1982	-	-	-	-	-	-	-	-	181	...
1983	-	-	-	-	-	-	-	-	53	...
1984	-	-	-	-	-	-	-	-	84	...
1985	-	0	-	-	-	-	-	-	124	...
1986	-	0	-	-	-	-	-	-	122	...
1987	-	21	-	-	-	-	-	-	465	...
1988	-	19	-	2	-	-	-	-	488	...
1989	-	13	...	8	-	-	1	-	258	...
1990	-	19	...	25	-	-	5	1	277	...
1991	-	50	...	55	-	0	17	4	305	...
1992	-	40	...	147	-	2	25	24	314	...
1993	-	26	...	349	-	3	39	64	314	...
1994	-	34	...	703	22	4	0	72	231	...
1995	0	52	...	377	28	2	211	61	349	...
1996	0	458	-	1,059	9	1	167	84	399	...
1997	0	1,405	-	184	-	4	78	56	385	...
1998	0	1,772	-	378	-	6	92	58	(385)	...
1999	0	1,877	-	321	-	6	136	66	(385)	...

Table 4. Longline catches (metric tonnes) of swordfish in the WCPO (continued)

YEAR	JAPAN OFFSHORE AND DW	KIRIBATI	KOREA	MARSHALL ISLANDS	NEW CALEDONIA	NEW ZEALAND	PAPUA NEW GUINEA	PHILIPPINES	SAMOA	SOLOMON ISLANDS
1950	...	-	-	-	-	-	-	...	-	-
1951	...	-	-	-	-	-	-	...	-	-
1952	...	-	-	-	-	-	-	...	-	-
1953	...	-	-	-	-	-	-	...	-	-
1954	...	-	-	-	-	-	-	...	-	-
1955	...	-	-	-	-	-	-	...	-	-
1956	...	-	-	-	-	-	-	...	-	-
1957	...	-	-	-	-	-	-	...	-	-
1958	...	-	...	-	-	-	-	...	-	-
1959	...	-	...	-	-	-	-	...	-	-
1960	...	-	...	-	-	-	-	...	-	-
1961	...	-	...	-	-	-	-	...	-	-
1962	9,860	-	...	-	-	-	-	...	-	-
1963	9,398	-	...	-	-	-	-	...	-	-
1964	5,581	-	...	-	-	-	-	...	-	-
1965	7,842	-	...	-	-	-	-	...	-	-
1966	9,198	-	...	-	-	-	-	...	-	-
1967	9,942	-	...	-	-	-	-	...	-	-
1968	8,632	-	...	-	-	-	-	...	-	-
1969	7,784	-	...	-	-	-	-	...	-	-
1970	6,213	-	...	-	-	-	-	30	-	-
1971	7,131	-	...	-	-	-	-	33	-	-
1972	6,555	-	...	-	-	-	-	34	-	-
1973	5,792	-	...	-	-	-	-	41	-	0
1974	6,339	-	...	-	-	-	-	48	-	-
1975	6,682	-	23	-	-	-	-	49	-	-
1976	7,859	-	422	-	-	-	-	41	-	1
1977	7,752	-	166	-	-	-	-	58	-	1
1978	7,937	-	127	-	-	-	-	35	-	1
1979	8,803	-	211	-	-	-	-	46	-	3
1980	6,573	-	227	-	-	-	-	59	-	3
1981	7,956	-	317	-	-	-	-	81	-	1
1982	6,894	-	183	-	-	-	-	95	-	1
1983	7,942	-	80	-	2	-	-	142	-	2
1984	7,583	-	144	-	6	-	-	65	-	1
1985	10,223	-	219	-	5	-	-	91	-	1
1986	9,414	-	180	-	13	-	-	121	-	-
1987	9,493	-	292	-	15	-	-	190	-	-
1988	9,641	-	225	-	3	-	-	159	-	-
1989	6,897	-	330	-	5	0	-	174	-	-
1990	6,404	-	361	-	7	9	-	111	-	-
1991	5,315	-	161	-	6	36	-	131	-	-
1992	8,821	-	288	0	4	25	-	61	-	-
1993	9,194	-	300	2	6	70	0	52	...	-
1994	8,319	-	280	0	1	96	1	71	17	-
1995	6,974	0	291	2	3	103	6	67	49	0
1996	7,470	0	200	...	4	162	7	67	49	-
1997	8,725	...	167	-	4	213	21	74	114	-
1998	(8,725)	...	181	-	8	(536)	13	(74)	95	1
1999	(8,725)	...	138	-	9	(1,059)	(13)	(74)	124	1

Table 4. Longline catches (metric tonnes) of swordfish in the WCPO (continued)

YEAR	TAIWAN DISTANT- WATER	TAIWAN OFFSHORE MICRONESIA	TAIWAN OFFSHORE TAIWAN	TONGA	UNITED STATES	VANUATU	TOTAL
1950	-	-	...	-	-	-	...
1951	-	-	...	-	-	-	...
1952	-	-	...	-	-	-	...
1953	-	-	...	-	-	-	...
1954	...	-	...	-	-	-	...
1955	...	-	...	-	-	-	...
1956	...	-	...	-	-	-	...
1957	...	-	...	-	-	-	...
1958	...	-	...	-	-	-	...
1959	...	-	367	-	-	-	...
1960	...	-	427	-	-	-	...
1961	...	-	520	-	-	-	...
1962	...	-	318	-	-	-	10,178
1963	...	-	494	-	-	-	9,892
1964	...	-	343	-	-	-	5,924
1965	...	-	358	-	-	-	8,200
1966	...	-	331	-	-	-	9,529
1967	16	-	588	-	-	-	10,545
1968	46	-	646	-	-	-	9,323
1969	110	-	763	-	-	-	8,657
1970	79	-	843	-	-	-	7,165
1971	95	-	904	-	-	-	8,163
1972	96	-	992	-	-	-	7,678
1973	115	-	862	-	-	-	6,811
1974	109	-	860	-	-	-	7,356
1975	121	-	816	-	-	-	7,690
1976	98	-	899	-	-	-	9,320
1977	64	-	613	-	-	-	8,654
1978	92	-	542	-	-	-	8,795
1979	201	-	546	-	-	-	9,873
1980	137	-	661	-	0	-	7,735
1981	102	-	603	-	0	-	9,151
1982	56	-	656	5	0	-	8,073
1983	44	-	855	5	0	-	9,125
1984	82	-	783	6	0	-	8,753
1985	52	-	733	6	0	-	11,455
1986	31	-	566	6	0	-	10,455
1987	30	...	456	8	0	-	10,969
1988	41	...	1,328	7	0	-	11,915
1989	31	...	777	6	273	-	8,773
1990	107	507	1,390	5	1,909	-	11,136
1991	65	381	462	5	4,500	-	11,492
1992	117	504	366	6	5,276	-	16,020
1993	78	610	666	8	5,911	-	17,692
1994	217	374	568	10	3,203	-	14,224
1995	215	256	559	12	2,662	2	12,280
1996	110	179	657	15	1,969	3	13,070
1997	80	230	662	(15)	1,968	1	14,384
1998	142	217	1,428	(15)	1,971	0	16,097
1999	147	163	1,428	(15)	(1,971)	0	16,658

Table 5. Purse-seine catches (metric tonnes) of blue marlin in the WCPO

Year	AU	FM	ID	JP	KI	KR	MX	PG	PH	SB	TW	US	VU	TOTAL
1967	-	-	-	0	-	-	-	-	-	-	-	-	-	0
1968	-	-	-	0	-	-	-	-	-	-	-	-	-	0
1969	-	-	-	0	-	-	-	-	-	-	-	-	-	0
1970	-	-	-	1	-	-	-	-	8	-	-	-	-	8
1971	-	-	-	0	-	-	-	-	10	-	-	-	-	10
1972	-	-	-	0	-	-	-	-	11	-	-	-	-	11
1973	-	-	-	0	-	-	-	-	18	-	-	-	-	18
1974	-	-	-	1	-	-	-	-	8	-	-	-	-	9
1975	-	-	-	4	-	-	-	-	7	-	-	-	-	11
1976	-	-	-	6	-	-	-	-	6	-	-	-	-	12
1977	-	-	-	9	-	-	-	-	8	-	-	-	-	17
1978	-	-	-	18	-	-	-	-	5	-	-	-	-	23
1979	-	-	-	17	-	-	-	-	10	-	-	-	-	26
1980	-	-	12	11	-	-	-	-	7	-	-	0	-	30
1981	-	-	13	30	-	1	-	-	9	-	0	9	-	61
1982	-	-	12	49	-	2	-	-	12	-	0	14	-	89
1983	-	-	14	69	-	1	-	-	21	-	3	28	-	136
1984	-	-	13	75	-	3	-	-	17	1	8	32	-	149
1985	-	-	13	76	-	2	-	-	19	1	10	21	-	142
1986	-	-	18	63	-	3	-	-	18	1	14	21	-	138
1987	-	-	20	60	-	6	-	-	33	1	33	23	-	175
1988	-	-	17	66	-	6	-	-	23	2	55	48	-	216
1989	-	-	19	70	-	8	-	-	31	2	86	29	-	245
1990	2	0	18	65	-	15	-	-	48	2	161	28	-	339
1991	2	0	16	53	-	18	-	-	52	1	201	45	-	389
1992	1	4	12	53	-	16	-	-	30	3	114	34	-	267
1993	1	6	12	53	-	12	-	-	22	2	59	34	-	202
1994	0	8	11	51	-	13	-	-	22	2	54	38	0	200
1995	0	4	12	49	1	10	1	2	29	3	71	31	1	213
1996	0	3	16	67	1	15	1	1	32	3	87	28	2	256
1997	0	4	17	45	1	15	1	7	38	6	61	24	5	224
1998	0	4	21	37	2	19	1	8	48	3	68	22	6	239
1999	(0)	(4)	(21)	(37)	(2)	(19)	(1)	(8)	(48)	(3)	(68)	(22)	(6)	(239)

Table 6. Purse-seine catches (metric tonnes) of black marlin in the WCPO**Legend :** '-' no catch; '...' catches not available; '(') provisional estimates only.

Year	AU	FM	ID	JP	KI	KR	MX	PG	PH	SB	TW	US	VU	TOTAL
1967	-	-	-	0	-	-	-	-	-	-	-	-	-	0
1968	-	-	-	0	-	-	-	-	-	-	-	-	-	0
1969	-	-	-	0	-	-	-	-	-	-	-	-	-	0
1970	-	-	-	0	-	-	-	-	6	-	-	-	-	6
1971	-	-	-	0	-	-	-	-	7	-	-	-	-	7
1972	-	-	-	0	-	-	-	-	8	-	-	-	-	8
1973	-	-	-	0	-	-	-	-	13	-	-	-	-	13
1974	-	-	-	0	-	-	-	-	6	-	-	-	-	6
1975	-	-	-	1	-	-	-	-	5	-	-	-	-	6
1976	-	-	-	1	-	-	-	-	5	-	-	-	-	6
1977	-	-	-	2	-	-	-	-	6	-	-	-	-	8
1978	-	-	-	4	-	-	-	-	4	-	-	-	-	8
1979	-	-	0	4	-	-	-	-	7	-	-	-	-	12
1980	-	-	4	3	-	-	-	-	5	-	-	0	-	12
1981	-	-	4	7	-	0	-	-	7	-	-	9	-	27
1982	-	-	4	13	-	1	-	-	9	-	0	14	-	40
1983	-	-	5	21	-	1	-	-	15	0	1	27	-	71
1984	-	-	5	23	-	1	-	-	13	1	3	32	-	77
1985	-	-	5	21	-	1	-	-	14	1	4	21	-	67
1986	-	-	7	18	-	1	-	-	14	1	5	20	-	66
1987	-	-	7	18	-	3	-	-	25	1	13	23	-	88
1988	-	-	6	20	-	4	-	-	17	1	21	47	-	117
1989	0	-	8	23	-	5	-	-	23	1	34	29	-	122
1990	1	-	8	20	-	8	-	-	35	1	63	28	-	164
1991	1	0	8	20	-	12	-	-	38	1	78	44	-	203
1992	0	2	6	20	-	10	-	-	23	2	44	33	-	139
1993	0	3	5	20	-	8	-	-	17	1	23	33	-	111
1994	0	4	5	17	-	9	0	0	17	2	21	37	0	112
1995	0	2	5	18	0	8	1	2	21	2	28	30	1	117
1996	0	1	7	22	1	11	1	1	23	2	34	27	2	132
1997	0	1	7	14	1	10	1	5	28	4	24	24	5	124
1998	0	1	10	13	1	12	1	6	36	2	26	22	6	135
1999	(0)	(1)	(10)	(13)	(1)	(12)	(1)	(6)	(36)	(2)	(26)	(22)	(6)	(135)

Table 7. Estimated recreational vessels active in the WCPO during 1998

Country	Estimated No. of private 'game' boats	Estimated No. of charter boats
American Samoa	10 - 20	?
Australia (east coast)	1,000+	100
Cook Islands	60	10
FSM	120	1
Fiji	50	10
French Polynesia	450	10
Guam	100+ (and 500+ sportfishers)	25
Hawaii	200+	144
Kiribati	20	4
Marshall Islands	50	1
Nauru	?	1 - 2
New Caledonia	100	5
New Zealand	500+	?
Niue	40	3
Northern Mariana islands	143	24
Palau	50 - 100	10 - 20
PNG	80 - 100	10 - 20
Samoa	6 - 8	?
Solomon Islands	10 - 20	4
Tokelau	30	
Tonga	20 - 30	6 - 8
Tuvalu	100+	
Vanuatu	30 - 40	6
Wallis & Futuna	?	?

Table 8. Estimated recreational catches (metric tonnes) of billfish in the WCPO during 1998.

Note that catches presented here may include a component of 'tag-and-release' fish, except for Australia, where a separate category for tagged-and-released black marlin has been allocated.

Country	Blue marlin	Striped marlin	Black marlin	Total
American Samoa	19.1			19.1
Australia (east coast)	40.0	120.0	6.0	166.0
Aust. (east coast) Tag & Release	...	...	174.0	174.0
Cook Islands	4.0	1.5	0.5	6.0
FSM	3.0	0.5	0.5	4.0
Fiji	8.8		1.7	10.5
French Polynesia	180.0	0.5	1.0	181.5
Guam	96.0			96.0
Hawaii	199.0	19.5	3.2	221.7
Kiribati	2.0		0.8	2.8
Marshall Islands	6.0			6.0
Nauru	4.0			4.0
New Caledonia	1.7	0.1	0.4	2.2
New Zealand		100.0		100.0
Niue		0.5	3.0	3.5
Northern Marianas	1.5			1.5
Palau	6.3			6.3
Pitcairn				0.0
PNG	5.2		2.0	7.2
Samoa				0.0
Solomon Islands	3.0	0.7	1.0	4.7
Tokelau	1.0	0.5	0.5	2.0
Tonga	3.0		2.0	5.0
Tuvalu				0.0
Vanuatu	20.0	1.0	1.0	22.0
Wallis & Futuna				0.0
Total	603.6	244.8	197.6	1046.0

Table 9. Recreational catches (metric tonnes) of blue marlin in the WCPO

Legend : '-' no catch; '...' catches not available; '(') provisional estimates only.

Note that catches presented here may include a component of 'tag-and-release' fish.

YEAR	AMERICAN SAMOA	AUSTRALIA (EAST COAST)	AUSTRALIA (EAST COAST) TAG & RELEASE	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	GUAM	HAWAII	KIRIBATI	MARSHALL ISLANDS	NAURU
1980	-	-	-	-	-	-	-	71	...	-	-	-
1981	-	-	-	-	-	-	-	89	...	-	-	-
1982	0	...	...	-	-	-	-	71	...	-	-	-
1983	0	...	...	-	-	-	-	67	...	-	-	-
1984	3	...	...	-	-	-	-	139	...	-	-	-
1985	1	...	...	-	-	-	-	171	...	-	-	-
1986	2	...	...	-	-	-	-	127	...	-	-	-
1987	0	...	...	-	-	-	-	161	251	-	-	-
1988	4	...	...	-	-	-	-	151	257	-	-	-
1989	5	...	...	-	-	-	-	240	324	-	-	-
1990	1	...	...	...	...	...	...	300	285	...	...	...
1991	4	...	...	...	...	...	...	286	339	...	...	...
1992	2	...	...	...	...	...	...	280	255	...	...	...
1993	3	...	...	...	...	...	...	217	306	...	...	...
1994	6	...	...	...	...	...	...	268	293	...	...	...
1995	12	...	...	...	...	...	...	223	310	...	...	...
1996	13	...	...	...	...	...	...	133	394	...	...	...
1997	17	...	...	...	...	...	...	200	363	...	...	...
1998	19	40	...	4	3	9	180	96	199	2	6	4
1999	(19)	(40)	...	(4)	(3)	(9)	(180)	(96)	(199)	(2)	(6)	(4)

YEAR	NEW CALEDONIA	NEW ZEALAND	NIUE	NORTHERN MARINANAS	PALAU	PAPUA NEW GUINEA	SOLOMON ISLANDS	TOKELAU	TONGA	VANUATU	TOTAL
1980	-	-	-	-	-	-	-	-	-	-	(71)
1981	-	-	-	-	-	-	-	-	-	-	(89)
1982	-	-	-	0	-	-	-	-	-	-	(72)
1983	...	-	-	1	-	-	-	-	-	-	(69)
1984	...	-	-	1	-	-	-	-	-	-	(142)
1985	...	-	-	1	-	-	-	-	-	-	(172)
1986	...	-	-	1	-	-	-	-	-	-	(130)
1987	...	-	-	1	-	-	-	-	-	-	(413)
1988	...	-	-	0	-	-	-	-	-	-	(413)
1989	...	-	-	2	-	-	-	-	-	-	(571)
1990	...	...	...	1	...	...	...	...	...	...	(587)
1991	...	...	...	1	...	...	...	...	...	...	(629)
1992	...	...	...	2	...	...	...	...	...	...	(540)
1993	...	...	...	1	...	...	...	...	...	...	(528)
1994	1	...	...	1	...	...	...	...	...	...	(570)
1995	0	...	...	2	...	...	...	...	...	...	(547)
1996	0	...	...	3	...	...	...	...	...	...	(543)
1997	2	...	...	3	...	...	...	...	...	...	(586)
1998	2	0	0	2	6	5	3	1	3	20	604
1999	(2)	(0)	(0)	(2)	(6)	(5)	(3)	(1)	(3)	(20)	(604)

Table 10. Recreational catches (metric tonnes) of black marlin in the WCPO

Legend : '-' no catch; '...' catches not available; '()' provisional estimates only.

Note that catches presented here may include a component of 'tag-and-release' fish, except for Australia, where a separate category has been allocated.

YEAR	AMERICAN SAMOA	AUSTRALIA EAST COAST	AUSTRALIA (EAST COAST) TAG & RELEASE	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	GUAM	HAWAII	KIRIBATI	MARSHALL ISLANDS	NAURU
1980	-	-	-	-	-	-	-	0	...	-	-	-
1981	-	-	-	-	-	-	-	0	...	-	-	-
1982	-	-	-	-	-	-	...	-	-	-
1983	-	-	-	-	-	-	...	-	-	-
1984	-	-	-	-	-	-	...	-	-	-
1985	-	-	-	-	-	-	...	-	-	-
1986	-	-	-	-	-	-	...	-	-	-
1987	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-
1990	-	-	-
1991	-	-	-
1992	-	-	-
1993	-	-	-
1994	-	-	-
1995	-	-	1	...	...	...
1996	-	-	2	...	...	...
1997	-	-	3	...	...	...
1998	-	6	174	1	1	2	1	-	3	1	0	0
1999	-	(6)	(174)	(1)	(1)	(2)	(1)	-	(2)	(1)	(0)	(0)

YEAR	NEW CALEDONIA	NEW ZEALAND	NIUE	NORTHERN MARINANAS	PALAU	PAPUA NEW GUINEA	SOLOMON ISLANDS	TOKELAU	TONGA	VANUATU	TOTAL
1980	-	-	-	-	-	-	-	-	-	-	(0)
1981	-	-	-	-	-	-	-	-	-	-	(0)
1982	-	-	-	-	-	-	-	-	-	-	(0)
1983	...	-	-	-	-	-	-	-	-	-	(0)
1984	...	-	-	-	-	-	-	-	-	-	(0)
1985	...	-	-	-	-	-	-	-	-	-	(0)
1986	...	-	-	-	-	-	-	-	-	-	(0)
1987	...	-	-	-	-	-	-	-	-	-	(0)
1988	...	-	-	-	-	-	-	-	-	-	(0)
1989	...	-	-	-	-	-	-	-	-	-	(0)
1990	...	...	...	-	...	...	...	...	...	...	(0)
1991	...	...	...	-	...	...	...	...	...	...	(0)
1992	...	...	...	-	...	...	...	...	...	...	(0)
1993	...	...	...	-	...	...	...	...	...	...	(0)
1994	0	...	...	-	...	...	...	...	...	...	(0)
1995	0	...	...	-	...	...	...	...	...	...	(1)
1996	0	...	...	-	...	...	...	...	...	...	(2)
1997	0	...	...	-	...	...	...	...	...	...	(4)
1998	0	0	3	-	0	2	1	1	2	1	198
1999	(0)	(0)	(3)	-	(0)	(2)	(1)	(1)	(2)	(1)	(197)

Table 11. Recreational catches (metric tonnes) of striped marlin in the WCPO**Legend :** '-' no catch; '...' catches not available; '(')' provisional estimates only.

Note that catches presented here may include a component of "tag-and-release" fish.

YEAR	AMERICAN SAMOA	AUSTRALIA EAST COAST	AUSTRALIA (EAST COAST) TAG & RELEASE	COOK ISLANDS	FEDERATED STATES OF MICRONESIA	FIJI	FRENCH POLYNESIA	GUAM	HAWAII	KIRIBATI	MARSHALL ISLANDS	NAURU
1980	-	-	-	-	-	-	-	0	...	-	-	-
1981	-	-	-	-	-	-	-	0	...	-	-	-
1982	-	-	-	-	-	-	...	-	-	-
1983	-	-	-	-	-	-	...	-	-	-
1984	-	-	-	-	-	-	...	-	-	-
1985	-	-	-	-	-	-	...	-	-	-
1986	-	-	-	-	-	-	...	-	-	-
1987	-	-	-	-	-	-	30	-	-	-
1988	-	-	-	-	-	-	53	-	-	-
1989	-	-	-	-	-	-	24	-	-	-
1990	-	-	27	...	...	...
1991	-	-	40	...	...	...
1992	-	-	37	...	...	...
1993	-	-	68	...	...	...
1994	-	-	35	...	...	...
1995	-	-	52	...	...	...
1996	-	-	53	...	...	...
1997	-	-	37	...	...	...
1998	-	120	...	2	1	0	1	-	20	0	0	0
1999	-	(120)	...	(2)	(1)	(0)	(1)	-	(20)	(0)	(0)	(0)

YEAR	NEW CALEDONIA	NEW ZEALAND	NIUE	NORTHERN MARINANAS	PALAU	PAPUA NEW GUINEA	SOLOMON ISLANDS	TOKELAU	TONGA	VANUATU	TOTAL
1980	-	-	-	-	-	-	-	-	-	-	(0)
1981	-	-	-	-	-	-	-	-	-	-	(0)
1982	-	-	-	-	-	-	-	-	-	-	(0)
1983	...	-	-	-	-	-	-	-	-	-	(0)
1984	...	-	-	-	-	-	-	-	-	-	(0)
1985	...	-	-	-	-	-	-	-	-	-	(0)
1986	...	-	-	-	-	-	-	-	-	-	(0)
1987	...	-	-	-	-	-	-	-	-	-	(30)
1988	...	-	-	-	-	-	-	-	-	-	(53)
1989	...	-	-	-	-	-	-	-	-	-	(24)
1990	...	...	...	-	...	...	...	...	...	...	(27)
1991	...	...	...	-	...	...	...	...	...	...	(40)
1992	...	...	...	-	...	...	...	...	...	...	(37)
1993	...	...	...	-	...	...	...	...	...	...	(68)
1994	0	...	...	-	...	...	...	...	...	...	(35)
1995	0	...	...	-	...	...	...	...	...	...	(52)
1996	0	...	...	-	...	...	...	...	...	...	(53)
1997	0	...	...	-	...	...	...	...	...	...	(37)
1998	0	100	1	-	0	0	1	1	0	1	246
1999	(0)	(100)	(1)	-	(0)	(0)	(1)	(1)	(0)	(1)	(246)

Table 12. Blue marlin catches (metric tonnes) in the WCPO by fishery

Note that the recreational catch includes a component of 'tag-and-release' fish.

YEAR	Longline	%	Purse seine	%	Recreational	%	Total
1980	9,072	99%	30	0%	(71)	1%	9,172
1981	8,095	98%	61	1%	(89)	1%	8,245
1982	8,960	98%	89	1%	(72)	1%	9,120
1983	7,372	97%	136	2%	(69)	1%	7,577
1984	9,494	97%	149	2%	(142)	1%	9,785
1985	8,443	96%	142	2%	(172)	2%	8,758
1986	8,020	97%	138	2%	(130)	2%	8,287
1987	8,540	94%	175	2%	(413)	5%	9,128
1988	12,474	95%	216	2%	(413)	3%	13,103
1989	9,430	92%	245	2%	(571)	6%	10,247
1990	9,078	91%	339	3%	(587)	6%	10,004
1991	7,997	89%	389	4%	(629)	7%	9,014
1992	8,551	91%	267	3%	(540)	6%	9,357
1993	11,931	94%	202	2%	(528)	4%	12,660
1994	12,051	94%	200	2%	(570)	4%	12,821
1995	12,235	94%	213	2%	(547)	4%	12,994
1996	9,517	92%	256	2%	(543)	5%	10,315
1997	10,226	93%	224	2%	(586)	5%	11,036
1998	10,514	93%	239	2%	604	5%	11,357
1999	10,285	92%	239	2%	(604)	5%	11,127

Table 13. Black marlin catches (metric tonnes) in the WCPO by fishery

Note that the recreational catch includes a component of 'tag-and-release' fish.

YEAR	Longline	%	Purse seine	%	Recreational	%	Total
1980	2,188	99%	12	1%	(0)	0%	2,200
1981	1,310	98%	27	2%	(0)	0%	1,337
1982	1,847	98%	40	2%	(0)	0%	1,888
1983	1,769	96%	71	4%	(0)	0%	1,839
1984	1,635	95%	77	5%	(0)	0%	1,713
1985	1,221	95%	67	5%	(0)	0%	1,287
1986	717	92%	66	8%	(0)	0%	783
1987	1,158	93%	88	7%	(0)	0%	1,246
1988	1,354	92%	117	8%	(0)	0%	1,471
1989	1,368	92%	122	8%	(0)	0%	1,490
1990	858	84%	164	16%	(0)	0%	1,022
1991	733	78%	203	22%	(0)	0%	935
1992	1,255	90%	139	10%	(0)	0%	1,395
1993	1,676	94%	111	6%	(0)	0%	1,787
1994	1,074	91%	112	9%	(0)	0%	1,185
1995	889	88%	117	12%	(1)	0%	1,007
1996	539	80%	132	20%	(2)	0%	673
1997	687	84%	124	15%	(4)	0%	815
1998	889	73%	135	11%	198	16%	1,223
1999	1,037	76%	135	10%	(197)	14%	1,369

Table 14. Striped marlin catches (metric tonnes) in the WCPO by fishery

Note that the recreational catch includes a component of 'tag-and-release' fish.

YEAR	Longline	%	Purse seine	%	Recreational	%	Total
1980	4,208	100%	...	...	(0)	0%	4,208
1981	4,116	100%	...	...	(0)	0%	4,116
1982	4,274	100%	...	...	(0)	0%	4,274
1983	2,913	100%	...	...	(0)	0%	2,913
1984	3,889	100%	...	...	(0)	0%	3,889
1985	5,192	100%	...	...	(0)	0%	5,192
1986	5,505	100%	...	...	(0)	0%	5,505
1987	3,900	99%	...	...	(30)	1%	3,929
1988	6,291	99%	...	...	(53)	1%	6,344
1989	5,463	100%	...	...	(24)	0%	5,486
1990	3,521	99%	...	...	(27)	1%	3,548
1991	3,656	99%	...	...	(40)	1%	3,696
1992	3,706	99%	...	...	(37)	1%	3,744
1993	5,004	99%	...	...	(68)	1%	5,072
1994	4,726	99%	...	...	(35)	1%	4,760
1995	4,823	99%	...	...	(52)	1%	4,875
1996	3,512	99%	...	...	(53)	1%	3,565
1997	3,606	99%	...	...	(37)	1%	3,643
1998	4,121	94%	...	...	246	6%	4,367
1999	4,237	95%	...	...	(246)	5%	4,483

Table 15. Total WCPO fishery catches (metric tonnes) of billfish by species

Note that the recreational catch includes a component of 'tag-and-release' fish.

YEAR	LONGLINE					PURSE SEINE			RECREATIONAL			
	Blue Marlin	Black Marlin	Striped Marlin	Sword-fish	Total	Blue Marlin	Black Marlin	Total	Blue Marlin	Black Marlin	Striped Marlin	Total
1950	...	...	...	...	...	-	-	0	...	...	...	...
1951	...	...	...	...	...	-	-	0	...	...	...	...
1952	...	...	...	...	...	-	-	0	...	...	...	...
1953	...	...	...	...	...	-	-	0	...	...	...	...
1954	...	...	...	...	...	-	-	0	...	...	...	...
1955	...	...	...	...	...	-	-	0	...	...	...	...
1956	...	...	...	...	...	-	-	0	...	...	...	...
1957	...	...	...	...	...	-	-	0	...	...	...	...
1958	...	...	...	...	...	-	-	0	...	...	...	...
1959	...	...	...	...	...	-	-	0	...	...	...	...
1960	...	...	...	...	...	-	-	0	...	...	...	...
1961	...	...	...	...	...	-	-	0	...	...	...	...
1962	14,272	2,153	15,181	10,178	41,784	-	-	0	...	...	...	...
1963	11,520	1,951	12,156	9,892	35,519	-	-	0	...	...	...	...
1964	9,978	1,979	17,188	5,924	35,069	-	-	0	...	...	...	...
1965	8,181	2,101	13,331	8,200	31,812	-	-	0	...	...	...	...
1966	8,692	2,114	9,577	9,529	29,912	-	-	0	...	...	...	...
1967	7,618	1,583	11,321	10,545	31,067	0	0	0	...	...	...	...
1968	6,441	1,503	11,682	9,323	28,950	0	0	0	...	...	...	...
1969	7,618	1,879	7,630	8,657	25,785	0	0	0	...	...	...	...
1970	10,269	2,577	6,926	7,165	26,936	8	6	14	...	...	...	...
1971	6,744	2,286	5,446	8,163	22,640	10	7	18	...	...	...	...
1972	8,103	2,443	4,164	7,678	22,388	11	8	20	...	...	...	...
1973	6,890	2,191	4,306	6,811	20,198	18	13	31	...	...	...	...
1974	7,358	2,151	4,149	7,356	21,014	9	6	15	...	...	...	...
1975	5,139	1,792	2,936	7,690	17,558	11	6	17	...	...	...	...
1976	7,504	1,906	3,251	9,320	21,981	12	6	18	...	...	...	...
1977	6,602	1,342	2,171	8,654	18,770	17	8	26	...	...	...	...
1978	7,329	1,416	3,252	8,795	20,791	23	8	31	...	...	...	...
1979	7,856	2,053	4,756	9,873	24,538	26	12	38	...	...	...	...
1980	9,072	2,188	4,208	7,735	23,202	30	12	42	(71)	(0)	(0)	(71)
1981	8,095	1,310	4,116	9,151	22,673	61	27	88	(89)	(0)	(0)	(89)
1982	8,960	1,847	4,274	8,073	23,154	89	40	129	(72)	(0)	(0)	(72)
1983	7,372	1,769	2,913	9,125	21,179	136	71	207	(69)	(0)	(0)	(69)
1984	9,494	1,635	3,889	8,753	23,771	149	77	227	(142)	(0)	(0)	(142)
1985	8,443	1,221	5,192	11,455	26,311	142	67	209	(172)	(0)	(0)	(172)
1986	8,020	717	5,505	10,455	24,696	138	66	204	(130)	(0)	(0)	(130)
1987	8,540	1,158	3,900	10,969	24,567	175	88	264	(413)	(0)	(30)	(443)
1988	12,474	1,354	6,291	11,915	32,034	216	117	333	(413)	(0)	(53)	(466)
1989	9,430	1,368	5,463	8,773	25,034	245	122	367	(571)	(0)	(24)	(595)
1990	9,078	858	3,521	11,136	24,592	339	164	502	(587)	(0)	(27)	(614)
1991	7,997	733	3,656	11,492	23,878	389	203	591	(629)	(0)	(40)	(669)
1992	8,551	1,255	3,706	16,020	29,533	267	139	406	(540)	(0)	(37)	(577)
1993	11,931	1,676	5,004	17,692	36,303	202	111	313	(528)	(0)	(68)	(596)
1994	12,051	1,074	4,726	14,224	32,074	200	112	312	(570)	(0)	(35)	(604)
1995	12,235	889	4,823	12,280	30,226	213	117	330	(547)	(1)	(52)	(600)
1996	9,517	539	3,512	13,070	26,637	256	132	388	(543)	(2)	(53)	(598)
1997	10,226	687	3,606	14,384	28,903	224	124	349	(586)	(4)	(37)	(626)
1998	10,514	889	4,121	16,097	31,622	239	135	375	604	198	246	1,047
1999	10,285	1,037	4,237	16,658	32,217	(239)	(135)	(375)	(604)	(197)	(246)	(1,046)

Table 15. Total catches (metric tonnes) of blue marlin, black marlin, striped marlin and swordfish by gear (continued)

ALL FISHERIES								
YEAR	Blue Marlin	%	Black Marlin	%	Striped Marlin	%	Sword- fish	% Total
1950	...		...		...		...	...
1951	...		...		...		...	...
1952	...		...		...		...	...
1953	...		...		...		...	...
1954	...		...		...		...	...
1955	...		...		...		...	...
1956	...		...		...		...	...
1957	...		...		...		...	...
1958	...		...		...		...	...
1959	...		...		...		...	...
1960	...		...		...		...	...
1961	...		...		...		...	...
1962	14,272	34%	2,153	5%	15,181	36%	10,178	24%
1963	11,520	32%	1,951	5%	12,156	34%	9,892	28%
1964	9,978	28%	1,979	6%	17,188	49%	5,924	17%
1965	8,181	26%	2,101	7%	13,331	42%	8,200	26%
1966	8,692	29%	2,114	7%	9,577	32%	9,529	32%
1967	7,618	25%	1,583	5%	11,321	36%	10,545	34%
1968	6,441	22%	1,503	5%	11,682	40%	9,323	32%
1969	7,618	30%	1,879	7%	7,630	30%	8,657	34%
1970	10,277	38%	2,582	10%	6,926	26%	7,165	27%
1971	6,754	30%	2,294	10%	5,446	24%	8,163	36%
1972	8,114	36%	2,452	11%	4,164	19%	7,678	34%
1973	6,907	34%	2,204	11%	4,306	21%	6,811	34%
1974	7,367	35%	2,157	10%	4,149	20%	7,356	35%
1975	5,150	29%	1,798	10%	2,936	17%	7,690	44%
1976	7,517	34%	1,912	9%	3,251	15%	9,320	42%
1977	6,620	35%	1,350	7%	2,171	12%	8,654	46%
1978	7,352	35%	1,424	7%	3,252	16%	8,795	42%
1979	7,882	32%	2,064	8%	4,756	19%	9,873	40%
1980	9,172	39%	2,200	9%	4,208	18%	7,735	33%
1981	8,245	36%	1,337	6%	4,116	18%	9,151	40%
1982	9,120	39%	1,888	8%	4,274	18%	8,073	35%
1983	7,577	35%	1,839	9%	2,913	14%	9,125	43%
1984	9,785	41%	1,713	7%	3,889	16%	8,753	36%
1985	8,758	33%	1,287	5%	5,192	19%	11,455	43%
1986	8,287	33%	783	3%	5,505	22%	10,455	42%
1987	9,128	36%	1,246	5%	3,929	16%	10,969	43%
1988	13,103	40%	1,471	4%	6,344	19%	11,915	36%
1989	10,247	39%	1,490	6%	5,486	21%	8,773	34%
1990	10,004	39%	1,022	4%	3,548	14%	11,136	43%
1991	9,014	36%	935	4%	3,696	15%	11,492	46%
1992	9,357	31%	1,395	5%	3,744	12%	16,020	52%
1993	12,660	34%	1,787	5%	5,072	14%	17,692	48%
1994	12,821	39%	1,185	4%	4,760	14%	14,224	43%
1995	12,994	42%	1,007	3%	4,875	16%	12,280	39%
1996	10,315	37%	673	2%	3,565	13%	13,070	47%
1997	11,036	37%	815	3%	3,643	12%	14,384	48%
1998	11,357	34%	1,223	4%	4,367	13%	16,097	49%
1999	11,127	33%	1,369	4%	4,483	13%	16,658	50%

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