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Australia's Tuna & Billfish Fisheries

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National Tuna Fishery Report
TUNA AND BILLFISH FISHERIES OF THE
NORTH-EASTERN AUSTRALIAN FISHING ZONE

by
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Background paper presented at the ninth meeting of the Standing Committee on Tuna and Billfish (Noumea, 22-23 July, 1996)

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Background Paper

Australia's Tuna & Billfish Fisheries

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SUMMARY

Catches of tropical tuna and billfish in the north-eastern Australian fishing zone are small compared with those in the wider Western Pacific. Their appearance off Australia's east coast varies seasonally and from year-to-year. Catches of yellowfin tuna, for example, are often linked to the incursion of warm water (18-22°C) from the Coral Sea southwards along the east coast.

Annual catches of tuna and billfish in the north-eastern Australian fishing zone range between 3000 and 11 000 t, averaging about 7500 t a year. Despite the progressive introduction of restrictions, distant-water, Japanese longliners fishing under bilateral access agreements with Australia continue to account for most of the catch. For example, they reported almost 60% of the total yellowfin catch of 3048 t in 1995. Most of the remainder is taken by Australians using longline in coastal waters. Large, distant-water style longliners chartered by Australian companies reported only 73 t of yellowfin in 1995. Recreational anglers also take small catches of yellowfin, but this probably amounts to less than 5% of the total yellowfin catch. Recreational angling accounts for a far greater proportion of the marlins – about half of the total black marlin catch, for example.

Tuna and billfish are taken by a variety of other methods, such as pole-and-line, purse seine and trolling. Pole-and-line and purse seine are used to take skipjack tuna off southern New South Wales. The annual skipjack catch reached 6000 t in the early 1990s then fell below 1500 t a year. In 1995 vessels using pole-and-line and purse seine reported catching 1270 t of skipjack.

Catch statistics, however, do not reflect the social and economic importance of tuna and billfish in Australia. The Australian longline fishery specialises in air-freighting fresh tuna to the lucrative sashimi markets of Japan. The large yellowfin and bigeye tuna taken from temperate waters of the eastern Australian fishing zone have a high oil content and command high prices as sashimi. Recreational anglers prize yellowfin, marlins and sailfish and as many as 5000 anglers fish for these species in north-eastern Australia.

Summary of fishery statistics for Australia's tuna and billfish fisheries. All weights are dressed weights. Note that vessel numbers and average catches are for 1990-95.

Sector	Commenced	No. of Boats	Target Species	Ave. YFT Catch (t)	1995 YFT Catch (t)	Ave. BET Catch (t)	1995 BET Catch (t)
Japanese Bilateral Longline	1955	50-100	YFT, BET, STM, BBS	1 758	1 832	461	na
Joint-venture Longline	1989	<20	YFT, BET, STM, BBS	7	0	2	0
Longline Charter	1987	<5	YFT, BET, STM, BBS	44	73	8	17
Australian Longline	1954	80-100	YFT, BET, STM, BBS	807	1 027	54	142
Pole & Purse Seine	1960	<25	SKT	15	4	1 270 t of SKT in 1995	
Other Methods	-	c 400	various	12	15	na	na
Recreational Angling	1910	c 3000	YFT, billfishes	c 100	na	<1	<1

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Australia's Tuna & Billfish Fisheries

INTRODUCTION

Waters off the east coast of Australia provide convenient fishing for tuna and billfish, partly because of the narrow continental shelf of some areas and ease of access to oceanic waters. A variety of fishing methods are used to catch tuna and billfish in Australia, including commercial longlining and recreational angling.

The East Coast tuna and billfish fishery is managed by the Commonwealth Government of Australia under the Offshore Constitutional Settlement. The Australian Fisheries Management Authority (AFMA) manages commercial operations taking tuna and billfish of the Australian fishing zone (AFZ) through consultation with the fishing industry, angling representatives and state governments. The East Coast Tuna Management Advisory Committee (ECTUNAMAC) is the formal vehicle for consultation.

This paper was prepared for the ninth meeting of the Standing Committee on Tuna and Billfish (SCTB9, Noumea, 22-23 July, 1996). It describes the methods used by Australians to catch tropical tuna and billfish in the north-eastern Australian fishing zone, fishing fleet structure and catch levels¹. Programs for collecting and validating data are outlined for each fishing method.

RECREATIONAL ANGLING

Anglers have been taking tuna and billfish off eastern Australia since the early 1900s. During the 1970s boats capable of operating offshore became available at reasonable prices and angling for tuna and billfish grew in popularity. The popularity of angling for large pelagic species is also related to the ease of access to fishing grounds. The continental shelf is less than 8 nm wide in some places along the south-east coast and anglers may catch tuna and billfish from the shore at several locations.

Fishing Activities

The appearance of many pelagic species in north-eastern Australian waters varies seasonally and from year to year. Angling occurs over a wide geographic area and catches depend on season and targeting. Yellowfin tuna have outstanding fighting qualities, although large marlins are generally considered the ultimate angling prize. Anglers rarely catch bigeye tuna, whereas southern bluefin tuna (SBT) were an important recreational species until restrictions on commercial catches were introduced.

Each year, thousands of anglers fish for tuna and billfish off north-eastern Australia. The recreational fishery is composed of three components: clubs and organised events, charter boat operations and angling not associated with organised activities or charter boats.

Monitoring Programs

There is no program for routinely collecting catch and effort data from anglers targeting tuna or billfish. In 1989 *Kewagama Research* investigated methods of collecting catch and effort data from anglers taking tuna and billfish off north-eastern Australia (West 1990 & Ward 1991). With funding from ECTUNAMAC, *Pepperell Research & Consulting* completed a pilot study and is developing a data collection program based on the radio reporting system used in many gamefishing tournaments. There is a disparate series of data on recreational angling club catches, covering clubs from Cairns to Victoria and sources such as club records, tournament records and club weighmaster lists, extending back to 1960 for several clubs. There are no historical effort data, although some tournament records have boat numbers. Since 1994, gamefishing clubs have cooperated in a monitoring program to record effort data, noting catch and hours fished during competitions. Members report data by radio, and the data are validated by field visits to

¹The term 'north-eastern Australian fishing zone' refers to all AFZ waters north of 45°S and east of 141°E. 'Tropical tuna' refers to tuna taken in the AFZ, except for southern bluefin tuna (i.e., yellowfin, bigeye, albacore, skipjack, longtail and dogtooth tuna).

Table 1. Summary of numbers of tunas and billfishes reported tagged and released and recaptured by recreational anglers under the New South Wales Gamefish Tagging Program. Also shown are the reported numbers tagged and released in 1994/95 (Mathews & Deguara 1995:6).

	Southern Bluefin	Yellowfin Tuna	Bigeye Tuna	Albacore	Skipjack	Other Tunas	Broadbill Swordfish	Striped Marlin	Black Marlin	Blue Marlin	Sail- fish	Spear- fish
1994/95	17	1 813	15	454	726	5 252	4	416	567	166	930	32
1973-95	1 069	15 702	84	6 356	13 573	14 646	36	1 822	22 050	1 005	10 387	78
Recaptures	48	355	1	50	52	85	1	14	139	1	110	0

Note that for several species these include small numbers of fish tagged in other countries, such as Papua New Guinea and Fiji.

the major competitions. Data collection includes interviews to obtain details of non-line-class catches which would not otherwise be reported.

The Queensland Department of Primary Industries has established a recreational angling database to collate all existing data sets, such as annual reports. A sample entry for eight clubs over three years is in the system for yellowfin and it is intended to enter all of the available club data onto this system.

Catch and effort of charter boats and the non-organised ('leisure') sectors are much more difficult to measure and to monitor. Some charter boat captains keep detailed logbooks and these may provide useful historical time series.

Most angling organisations and management agencies in Australia encourage anglers to tag and release excess catch. Many anglers who target tuna and billfish voluntarily tag and release them under the New South Wales (NSW) Cooperative Gamefish Tagging Program. The data indicate the general distribution of recreational angling activities and trends in catches, masked by changes in effort levels, targeting, reporting of releases, and the popularity of tagging. The data apply mainly to the near-coast rather than offshore area. The program was established in 1973. By 1995 anglers had reported tagging over 51 000 tuna and 35 000 billfish (Table 1)². The number of tuna and billfish tagged and released has increased in recent years. For 1994/95 they reported tagging over 5000 tuna and 2000 billfish. The popularity of tagging is due to angler organisations encouraging tagging, increased numbers of anglers and improvements in fishing equipment.

Catches

Fishing for yellowfin tends to be in on organised events, such as tournaments. A survey of angler clubs in north-eastern Australia (West 1990), for example, indicated that they landed over 2887 yellowfin and 618 marlins in 1988/89. Angler clubs based in New South Wales accounted for 69% of the yellowfin landed. Angler clubs in Queensland landed 18% of the marlins, whereas they accounted for 80% of the 1307 marlins tagged and released in 1988/89. There is no information on tuna or billfish catches by charter operators or independent anglers. The catch of tuna by these components is generally believed to be smaller than the catch of club anglers.

A steady reduction in black marlin catches and an increase in striped marlin catches are a feature of the past few years. Gamefish tagging data and anecdotal reports of landings indicate that catches of juvenile black marlin have become less frequent off New South Wales (NSW) since 1991. During the same period, striped marlin catches have increased. This coincided with an increase in longline catches of striped marlin and an easing of El Niño conditions over the Pacific. The origins of the reduction in black marlin catches are unclear.

Following concern by recreational anglers over the effects of longlining on black and blue marlin resources, in 1994 ECTUNAMAC recommended a ban on the landing of all billfish (except broadbill swordfish) by recreational and commercial fishers. A review of legislation, however, resulted in a lifting of restrictions on the retention of black marlin and blue marlin, although voluntary industry restrictions remain in place.

AUSTRALIAN LONGLINE

A longline fishery has existed off New South Wales since 1954. It expanded rapidly after 1984 following the successful export of yellowfin and bigeye to the fresh-chilled sashimi markets of Japan. By 1989, 240 operators held longline endorsements. Many operators

²Most of the tuna and billfish tagged under the NSW Gamefish Tagging Program are released in New South Wales or Queensland. However, the numbers quoted here and in Table 1 are based on a summary presented by Mathews & Deguara (1995:6) which includes small numbers of fish released with Program tags in other States and in other countries, such as Papua New Guinea and Fiji.

left the fishery in subsequent years, and only about one-third of those licensed to longline currently operate in the fishery.

Fishing Craft and Operations

In 1995, 170 Australian operators had domestic longline permits, although fewer than 50 vessels operated on a full-time basis. Many of these vessels supplement longlining for yellowfin with activities in other fisheries. They are mostly 15-18 m in length and operate within 60 nautical miles of the coast. They usually set between 400 and 700 hooks each day, at sunrise or, sometimes, sunset. Australian longliners usually set their longlines shallow to maximise yellowfin catches. Off North Queensland, however, longliners sometimes set their longlines deep for bigeye. In recent years average vessel size has increased with more activity reported in offshore waters, 100 nm or more from the coast. From time-to-time larger, Australian-flagged longliners have operated in the fishery, including three, 33 m Taiwanese-style longliners in 1994 and 1995.

Catches are stored on ice, and trips are usually two- or three days' duration. About 60% of the tuna are now air-freighted to sashimi markets in Japan, with the remainder being sold at sashimi markets in Australia or through retail outlets in Japan.

Fishing activity is closely linked to the seasonal movement of warm water along the Australian east coast. Many fishers follow sea surface isotherms of 18-22°C. Longlining occurs off northern New South Wales (30°S) in July-September. Activity gradually spreads southwards as the east Australian current strengthens and waters warm. The fishery concentrates on the far south coast of New South Wales (35-38°S) by early winter (April-June), before contracting to northern New South Wales. Commercial catches of tropical tunas are reported in late-summer from as far south as 39°S and occasionally 42°S.

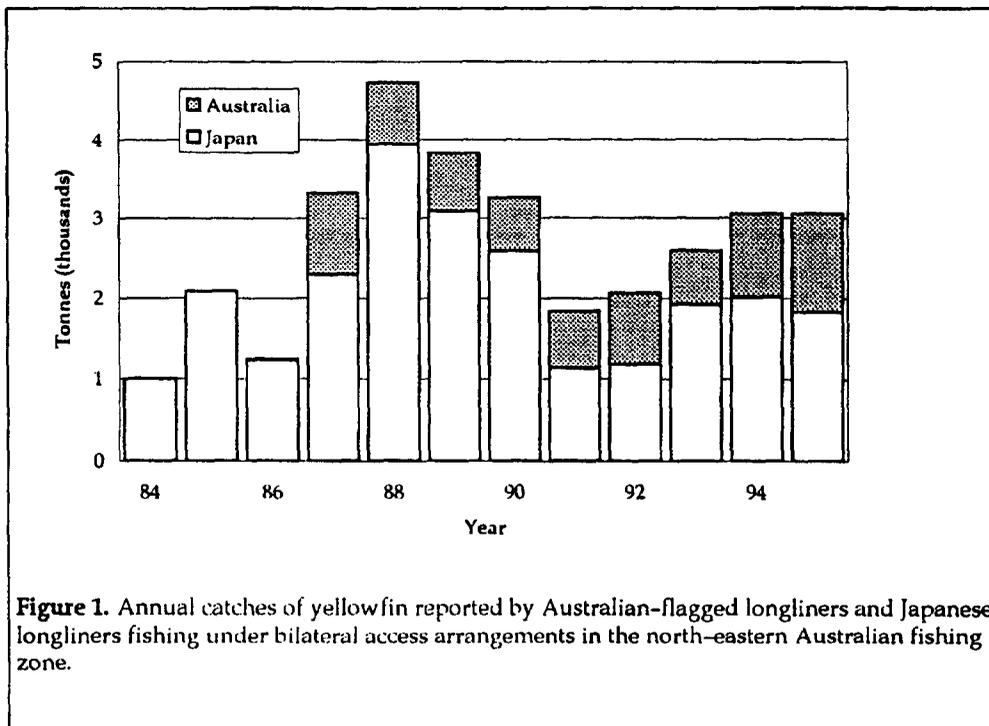
Monitoring Programs

Diplock (1987, unpub.) reported catches during the early development of the fishery. A logbook was introduced for Australian longliners in 1988. Of the fishers endorsed to longline off the east coast, however, less than 50% had logbooks before 1989. Field officers were employed in 1989 to visit fishers and to distribute and collect logbooks. By 1990 approximately 85% of fishers had been issued with logbooks. Dendinos & Skousen (1991) estimated that 90% of the yellowfin landed by longliners were reported in logbooks. Field support of the logbook program lapsed in 1993. However, in 1995, the Australian Fisheries Management Authority (AFMA) mailed all endorsees requesting the submission of outstanding logbooks. AFMA estimates that about 95% of longliners were regularly submitting logbooks in 1995.

Catch and effort data for each day's fishing and, sometimes, size data (length or weight) are reported for each fish in the logbook. Information on fishing craft and gear details is also reported in the logbook. AFMA have redesigned logbooks for longline (and for other methods used to take tunas and billfishes).

Catches

The total catch of yellowfin in 1995 was 1145 t. This was similar to the 1994 catch (1027 t) and higher than catches in the early 1990s (600 to 800 t per year).



The 1995 season commenced in August off northern NSW, with good catches of high quality yellowfin and striped marlin. Longliners continued to fish in that area until mid-November before relocating off southern NSW. Because catches were low, most vessels moved north to the waters off central NSW for the remainder of the season. Unlike previous years, longliners rarely fished in the far south in 1995.

The 1994 season featured an expansion of longlining off north Queensland. In 1995, vessels continued to target this area, extending fishing operations further offshore and northward. However, because of good catches to the south catches from this area accounted for only 30% of the total yellowfin catch compared with 45% in 1994.

In recent years, Japanese longliners have tended to fish in northern waters of the East Coast Tuna and Billfish Fishery during summer. The bilateral agreement for access to the AFZ by Japanese longliners lapsed in November 1995 because of disagreement over southern bluefin tuna (*T. maccoyii*) quotas. In the 1994/95 fishing year effort was limited to 2575 boat-days, with no more than 2100 days to be expended in the period 1 July 1995 to 31 October 1995.

JOINT-VENTURE AND CHARTER LONGLINE

Japanese longliners have fished for tuna and billfish off the east coast of Australia since the early 1950s. Japanese fishing activities have been progressively restricted since the declaration of the Australian fishing zone in 1979. Nevertheless, the Japanese longline fishery remains the major fishery taking yellowfin in the Australian fishing zone. Since 1987, Australian companies have chartered several distant-water style longliners to fish in the Australian fishing zone. Japanese longliners have also fished for southern bluefin tuna in the AFZ south of 34°S under joint-venture arrangements with Australian companies since 1989.

Unlike distant-water operations in the equatorial Western Pacific, where deep longlining techniques are used to target bigeye, in the north-eastern Australian fishing zone longliners target yellowfin with 'regular' sets. Here bigeye comprise only 5% of the total catch. Other species targeted by joint-venture and charter longliners include broadbill swordfish and striped marlin. The catch is sold at frozen-sashimi markets in Japan.

In southern waters (40-50°S) bilateral and joint-venture longliners fish for southern bluefin tuna, mostly in May-June. When operating off New South Wales the joint-venture longliners have occasionally reported catches of tropical tuna and billfish (Table 2). Their catches of yellowfin, for example, have ranged up to 74 t a year (1989). Charter longliner catches of yellowfin ranged up to 512 t of yellowfin (1987).

Charter longliners must complete the Australia longline logbook. Joint venture longliners must record catches and activities each day in the foreign tuna longline logbook issued to bilateral longliners. Australia requires that bilateral and joint venture longliners also report their position by radio each day. Before November 1990 they reported catches by radio for six day periods; they now report catches each day. Fishing craft and gear details are recorded in forms distributed by fishing companies for the Australian Government. Information on fishing craft and gear is also available from licensing forms.

Under the AFZ Observer Program, Australian fisheries officers and scientists are regularly placed on bilateral, charter and joint-venture longliners operating in the Australian fishing zone to collect biological data and to verify logbooks and radio reports.

POLE-AND-LINE AND PURSE SEINE

Pole-and-line and purse seine vessels fish for skipjack tuna off the far south coast of New South Wales (35-38°S). Skipjack are poled and purse seined in late spring and summer. The fishery expanded rapidly in the late 1980s. The skipjack catch had traditionally been 100-200 t, but rose to 1200 t in 1988/89, 3350 t in 1989/90 and 6000 t in 1990/91 and 1991/92³. Catches then fell to 1629 t in 1993/94 and to 1132 t in 1994/95. Yellowfin are a bycatch of the pole-and-line and purse seine fishery. Regulations restrict their yellowfin bycatch to less than 50% of the total catch in any one set and less than 2% of each vessel's monthly catch. Regardless, the bycatch of yellowfin is normally quite small, amounting to less than 30 t in most years.

The pole-and-line vessels are mostly 12-25 m. Most are multi-purpose vessels involved in other fisheries, such as longline. When fishing for skipjack they usually work collaboratively with purse seiners. The purse seiners range in size from 13 to 42 m (80-450 GRT). As many as nine purse seiners fished during the 1990s. Most vessels now have logbooks and complete them. In 1995 AFMA have redesigned the purse seine and pole-and-line logbooks.

In 1994-95, 17 Australian operators had domestic purse seine permits and about 100 vessels had pole-and-line permits. However, only three purse seiners and nine pole-and-line vessels fished. The total catch of skipjack tuna in 1994-95 was 1163 t. This was lower than the 1993-94 catch (1705 t) and considerably less than the peak catch of 7000 t in 1991-92.

The 1994-95 season started in early December with good catches off Eden, NSW. The size of skipjack (1.8 to 2.0 kg) was small at this time, and canneries reported little bycatch of other tuna species. In the first week of January a cold water inversion along the coast caused the skipjack to move further offshore and beyond the range of local vessels. As a consequence, few skipjack were caught in subsequent months.

DISTANT WATER PURSE SEINE

Several Australian operators began purse seining in areas beyond the Australian fishing zone in 1987. In 1990 six Australian purse seiners were licensed to fish in Papua New Guinea's exclusive economic zone. Four of these were also licensed to fish in the Federated States of Micronesia (FSM), and later formed joint-ventures with FSM

³Catches reported in logbooks were a poor estimate of catches in the pole-and-line and purse seine fishery during 1986-92. Consequently, we used annual landings reported by canneries for that period.

companies. Activity declined in 1991. No Australian-flagged purse seiners were reported to have fished outside the Australian fishing zone in 1994 or 1995.

OTHER COMMERCIAL OPERATIONS

Commercial fishers take tuna and billfish by using a variety of other methods, including trolling, handlining and droplining. Only rudimentary information is available on tuna and billfish catches by these other methods. New South Wales catch returns ('Form 49s') indicate that 40-80 t of yellowfin were taken by methods other than longlining, purse seining or poling in the late-1980s. In 1991 AFMA introduced a logbook for other methods used to take tuna. However, coverage was uncertain because of the opportunistic nature of activity. AFMA have redesigned the logbook for other methods, which is now called the 'Australian Tuna Line Fishing Logbook'.

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Table 2. Summary of catch and effort reported by longliners in the north-eastern AFZ (i.e., east of 140°E and north of 40°S), aggregated by calendar year (AFZIS logbook data retrieved in March 1996). Row totals are for all species, not only those shown in this table. 'Boats' is the number of longliners submitting logbooks.

Type	Year	No. of Effort ('000		Yellowfin		SBT		Albacore		Bigeye		Swordfish		Black Marlin		Striped Marlin		Blue Marlin		Sailfish		Total	
		Boats	hooks)	t	no.	t	no.	t	no.	t	no.	t	no.	t	no.	t	no.	t	no.	t	no.	t	no.
Australian																							
	86	15	16	8	202	0	0	0	40	1	11	0	1	0	3	0	0	0	0	0	0	9	297
	87	68	415	252	9 488	1	24	33	3 676	22	289	9	172	0	4	6	94	0	2	0	1	361	15 633
	88	66	408	272	11 091	10	162	24	2 700	12	167	9	158	0	3	4	59	0	3	0	5	362	15 785
	89	93	694	542	19 160	1	16	68	7 660	12	188	10	226	0	6	4	69	0	9	0	1	675	29 449
	90	97	689	537	25 221	5	62	43	4 887	13	212	13	321	0	9	5	77	0	6	0	0	656	33 796
	91	88	1 084	560	28 231	14	292	118	12 765	16	303	32	746	0	154	11	178	0	43	0	1	799	47 061
	92	95	1 391	682	34 823	75	2 454	140	14 454	14	398	20	551	1	36	12	211	2	48	0	0	1 010	59 630
	93	82	1 460	542	27 836	185	6 156	148	15 136	18	627	20	597	0	42	22	370	0	75	0	0	977	55 600
	94	80	1 993	813	32 511	211	6 662	280	28 040	87	3 146	21	994	1	133	32	610	2	69	0	0	1 524	81 241
	95	93	2 943	1 027	47 029	-	-	390	33 203	142	5 262	-	-	-	-	-	-	-	-	-	-	1 981	107 696
Charter																							
	87	3	712	512	20 448	9	289	65	4 200	14	439	3	66	9	109	31	503	27	437	3	90	713	28 330
	88	2	634	254	10 501	0	1	59	4 207	13	421	0	2	6	74	31	547	18	208	3	183	419	17 359
	89	3	37	9	241	1	25	2	153	1	31	0	6	2	26	2	40	0	0	0	0	19	577
	90	2	395	46	1 275	0	0	74	4 231	6	177	3	76	11	109	49	718	16	171	2	65	218	7 391
	91	5	314	47	1 475	133	5 239	31	2 911	8	204	9	200	12	165	16	284	1	8	0	20	273	11 503
	92	3	416	77	2 600	36	1 402	42	3 345	14	409	13	268	6	74	7	118	0	3	0	0	212	10 055
	93	CONFIDENTIAL																					
	94	CONFIDENTIAL																					
	95	4	807	73	3 443	-	-	44	4 094	17	546	-	-	-	-	-	-	-	-	-	-	275	16 305

