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AUSTRALIA



Australian Government
Bureau of Rural Sciences

National Tuna Fishery Report
AUSTRALIA

by

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*National Fishery Report presented at the Third meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission
(13–24 August 2007, Honolulu, USA)*

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The Bureau of Rural Sciences (BRS) is a professionally independent bureau within the Commonwealth Department of Agriculture, Fisheries and Forestry - Australia. The Bureau's role is to enhance the sustainable development of Australia's agricultural, forestry and fisheries industries by providing high quality scientific and technical advice to government, industry and the community.

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SUMMARY

Domestic longline activity off eastern Australia declined in 2006, with the number of active vessels falling from 100 (2005) to fewer than 50 vessels (2006). Longline fishing effort also declined, from 12.5 million hooks in 2003 to 8.8 million hooks in 2006. The decreased activity is attributed to high operating costs (driven mainly by high oil prices and the high cost of squid baits), the strength of the Australian dollar and reduced catch rates of swordfish in inshore areas, around seamounts. Structural adjustment in Australian Government-managed fisheries resulted in the surrender of almost 100 of the more than 200 longline permits originally available in the fishery.

The catch of yellowfin tuna by domestic longliners in 2006 was 1829 t, which was a substantial decline from the 2003 peak catch of 3096 t. The 2006 catch of bigeye tuna (498 t) was also less than the peak catch (1050 t) reported in 2001; and the 441 t of striped marlin was down on the 2003 level (634 t). The 2006 broadbill swordfish catch (1132 t) was the lowest since 2001 (1396 t). There is renewed interest in albacore tuna, with increased landings (2591 t) primarily for the canning market.

The proportion of swordfish taken from outside the AFZ continues to decrease with the decline of the fleet and increased fuel costs. The proportion taken from outside the zone decreased from 12% of the total weight in 2005 to 10% in 2006. Smaller proportions of the striped marlin, bigeye tuna and yellowfin tuna are taken outside the AFZ because those species are also the target of smaller longliners operating closer to ports.

Few purse seiners, troll and pole-and-line vessels operated off southern NSW in 2006. Catch levels were low and cannot be reported here because of confidentiality restrictions.

Recreational striped marlin catches were poor in 2006 although some reasonable catches were taken in tournaments off southern New South Wales. Blue marlin catches were down in terms of numbers but some bigger fish (>250 kgs) were landed. The heavy tackle fishery for large black marlin off Cairns reported a patchy season however good catches did occur when gamefishers were able to fish.

The Eastern Tuna and Billfish Fishery Statutory Management Plan (including individual allocation of fishing rights in the form of hook limits) is being implemented. Trigger catch limits have been introduced for albacore and swordfish. Mandatory measures have been introduced to mitigate seabird bycatch, including weighted swivels, tori lines, offal management and thawed bait.

CONTENTS

	page
SUMMARY	3
CONTENTS	4
INTRODUCTION	5
1.1 Annual Fisheries Information	5
1.1.1 Domestic longline	5
Background	5
Catch and Gear	5
Fleet, Effort and Fishery Characteristics	6
Non-Target Catch	6
1.1.2 Pole-and-line, Purse seine and Minor line	9
Background	9
Catch and Gear	9
Fleet, Effort and Fishery Characteristics	10
Non-Target Catch	10
1.1.3 Recreational fishing.....	10
Background	10
Catch and Gear	10
Fleet, Effort and Fishery Characteristics	10
1.2 Research and Statistics	11
1.2.1 Observer and port sampling programmes.....	11
1.2.2 Research activities	11
1.2.3 Statistical data collection systems.....	12
REFERENCES.....	13
FIGURES AND TABLES.....	12-17

INTRODUCTION

This report has been prepared by the Australian Government's Bureau of Rural Sciences (BRS) and describes Australia's tuna and billfish fisheries in the eastern Australian Fishing Zone (AFZ) and adjacent international waters. BRS is responsible for providing policy makers and government agencies with scientific advice for the management of Australia's pelagic resources.

Fishing methods used to catch tunas and billfish off eastern Australia include longline, purse seine, pole-and-line, various 'minor line' gears and recreational fishing.

There are currently no foreign longliners operating in the AFZ. Japan's longliners operated in the eastern AFZ from the late 1950s until November 1997. The Japanese fleet consisted of large (40–55 m) freezer longliners that remained at sea for 2–3 months, setting 2500–3500 hooks each day. Annual fishing effort in the eastern AFZ ranged up to 16 million hooks with up to 100 longliners operating in any one season. After the AFZ became operational in 1979, Japanese activity in the AFZ was licensed under bilateral agreements. As domestic recreational and commercial fisheries for pelagic species grew, Australia progressively restricted areas of access. The bilateral agreement lapsed in 1997.

1.1 ANNUAL FISHERIES INFORMATION

1.1.1 Domestic longline

Background

Domestic longline activity occurred sporadically in what is now the eastern Australian Fishing Zone (AFZ) during 1954–82, with catches sold to canneries and local fish markets. The successful airfreighting of fresh-chilled tuna to Japan in the early 1980s was followed by a marked increase in longline activity. However, many vessels left the fishery in 1988 because yellowfin catch rates off central and southern New South Wales (the centre of activity) had become too variable. There was a rapid expansion in the 1990s in northern Queensland waters, where catch rates of yellowfin and bigeye were high. In the mid 1990s, improved access to swordfish markets in the United States prompted many fishers to move to southern Queensland ports such as Mooloolaba to target swordfish. Longlining for swordfish has declined since early 2005 because of high fuel and bait costs. There has been a commensurate increase in albacore landings.

With reduced fishing effort and landings, the Gross Value of Production fell to AUD28.7 million in 2005–06 from AUD42.5 million in 2004–05 (ABARE, 2007). This decline was largely a result of decreased catches in high value species such as yellowfin and bigeye tuna and swordfish. In addition, the introduction of longlining techniques from Samoa combined with increased operating costs and fluctuating market returns saw many longliners targeting low-value albacore during the first half of 2006. Recent decreases in the price of albacore and a strengthening Australian dollar has prompted some longliners to move back to targeting swordfish.

Catch and Gear

The catch of yellowfin tuna reported in logbooks by domestic longliners in 2006 was 1829 t, which was a substantial decline from the 2003 peak of 3157 t (Figure 1, Table 1). Nominal catch rates were higher in 2006 (208 kg per 1000 hooks) compared to 2005 (150 kg per 1000 hooks) but well below those recorded in the early 1990s when yellowfin tuna were the primary target of most longliners. Comparison of nominal

catch rates is of limited value due to constant shifts in targeting by longliners in this region.

The 2006 catch of bigeye tuna (498 t) was also less than the peak catch (1156 t) reported in 2001; and the 441 t of striped marlin was lower than the 2001 catch (789 t). The broadbill swordfish catch (1132 t) continues to decline (Table 1). This decline is also management-related as a competitive Total Allowable Catch (TAC) of 1,400 tonnes has been introduced in the fishery to stabilise catch rates and address concerns of localised depletion. There is renewed interest in albacore tuna, with 2591 t reported by longliners in 2006 (Table 1; Table 2). Landings of albacore for the canning market substantially increased during 2006.

Fleet, Effort and Fishery Characteristics

Domestic longliners are generally 15–25 m long, although several larger vessels joined the fleet in 2000–03. The longliners use monofilament gear and, on average, set 1007 hooks each day on 86 days per year. Trip length ranges up to about 20 days, but most are 3–14 days. The catch is stored on ice, in ice slurry, in refrigerated brine or in freezers. Most longliners range 40–300 nm from port, although some swordfish longliners range up to 1000 nm from port. In 2006, 3% of longline effort was reported from international waters adjacent to the AFZ.

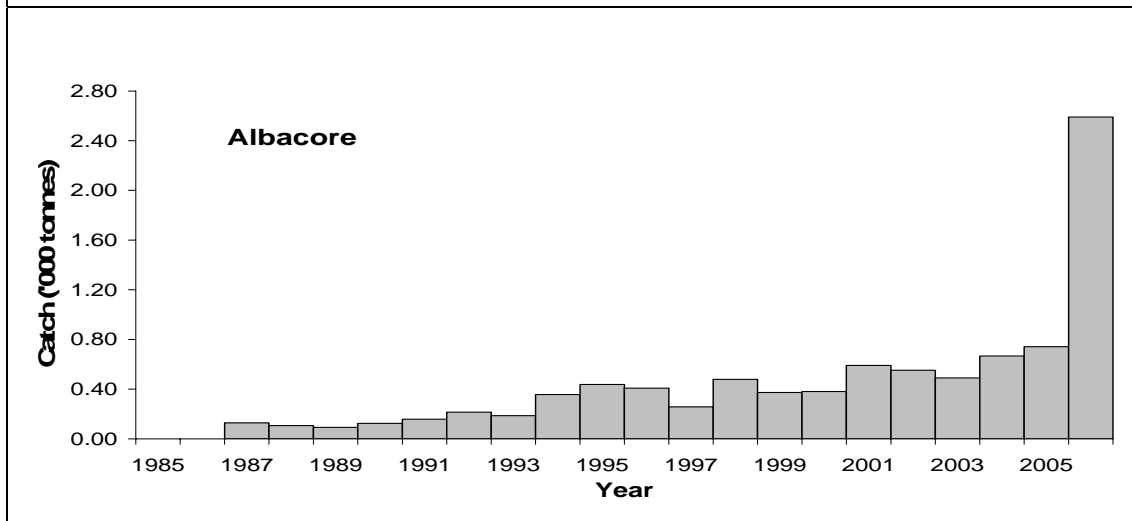
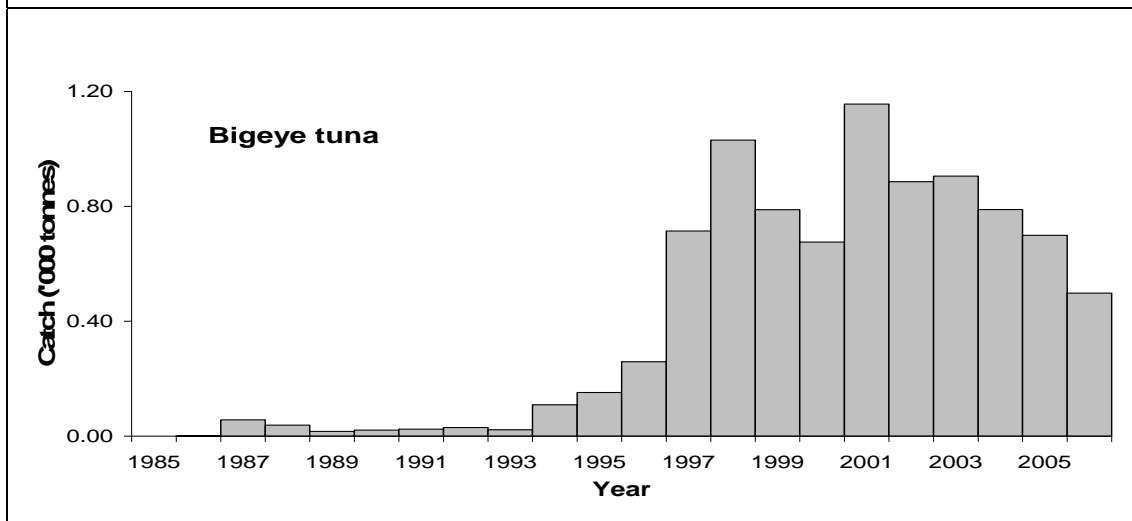
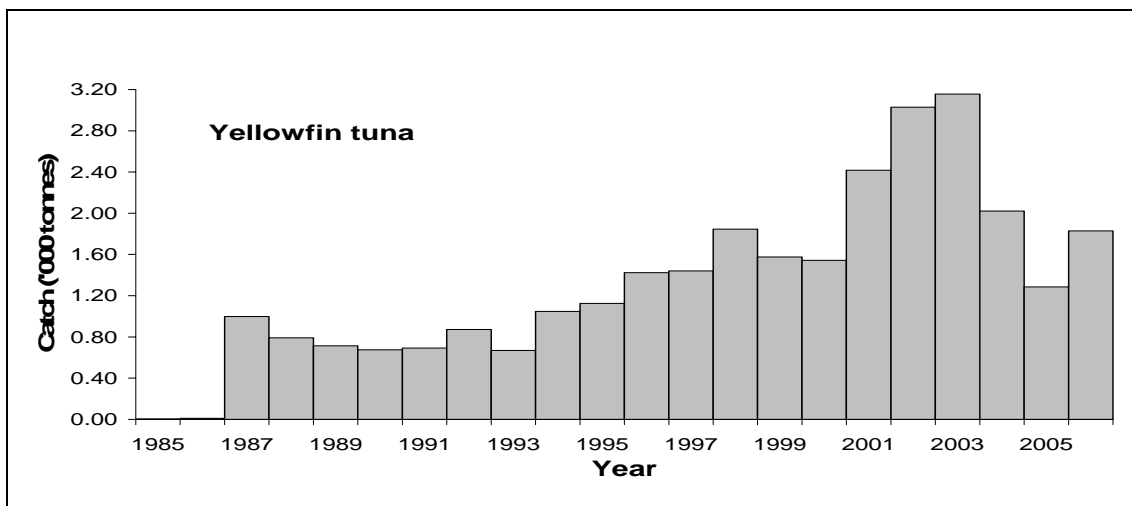
The expansion of the swordfish sector in the late 1990s resulted in a trebling of annual longline fishing effort. The total number of hooks set in the fishery peaked at 12.2 million hooks in 2003, then fell to 8.8 million in 2006 (Catches for 2006 are calculated from Catch Disposal Records (CDRs).

Figure 2). The number of active longline vessels also declined, from 142 in 2002, to 97 in 2005. The declines are attributed to increased operating costs (driven mainly by high oil prices and the high cost of squid baits), the strength of the Australian dollar in relation to the Japanese Yen and US Dollar, and reduced catch rates of bigeye tuna and especially swordfish. Many operators continue to fish for tuna and billfish as part of diversified operations targeting a range of species. This is especially true in the more southerly areas of the fishery.

Longline techniques vary considerably with season and target species. The use of live bait is common among fishers targeting yellowfin tuna, particularly in more southern latitudes (e.g. 30–40°S). Catches are stored on ice or chilled brine, and trips are usually one week in duration, although longer trips (e.g. 10–20 days) are common among longliners targeting swordfish. Most of the bigeye and yellowfin tuna are airfreighted to Japan, with the remainder sold at sashimi markets in Australia. About 70% of the swordfish are airfreighted to the US, although sales into Japan are increasing. Most of the striped marlin is exported to Japan. Several byproduct species, such as mahi mahi and rudderfish, are exported to Japan and the US.

Non-Target Catch

The longline catch composition reported through logbooks from 1997 is presented in Table 3. At 118 t, the reported catches of mahi mahi has declined from its peak of 305 t in 2004. Annual catches of wahoo fluctuated between 9 and 44 t since 1996, with the highest catch recorded in 2003. Logbooks also show a small decrease in catches of blue shark (10 t), bronze whaler (15 t) and shortfin mako (44 t) in 2006. Trip limits for bycatch species are imposed on tuna fishers under agreements between the Commonwealth and relevant State Governments.



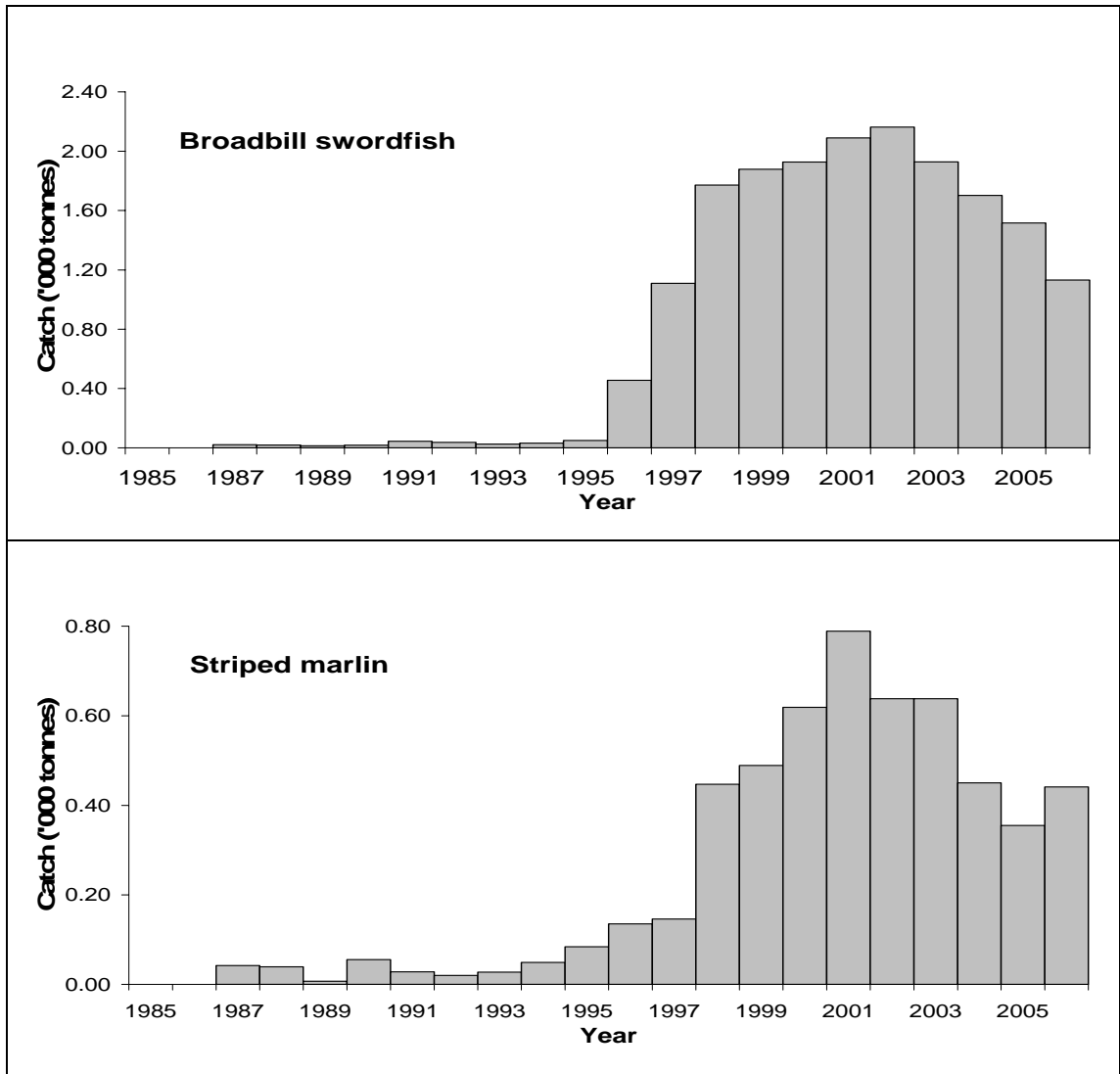


Figure 1: Annual catches of target species reported in logbooks by domestic longliners fishing in the eastern Australian Fishing Zone and adjacent high seas aggregated by calendar year. All catches are metric tonnes (t) and processed weight. Pre-1997 data have been raised for logbook coverage. Catches for 2006 are calculated from Catch Disposal Records (CDRs).

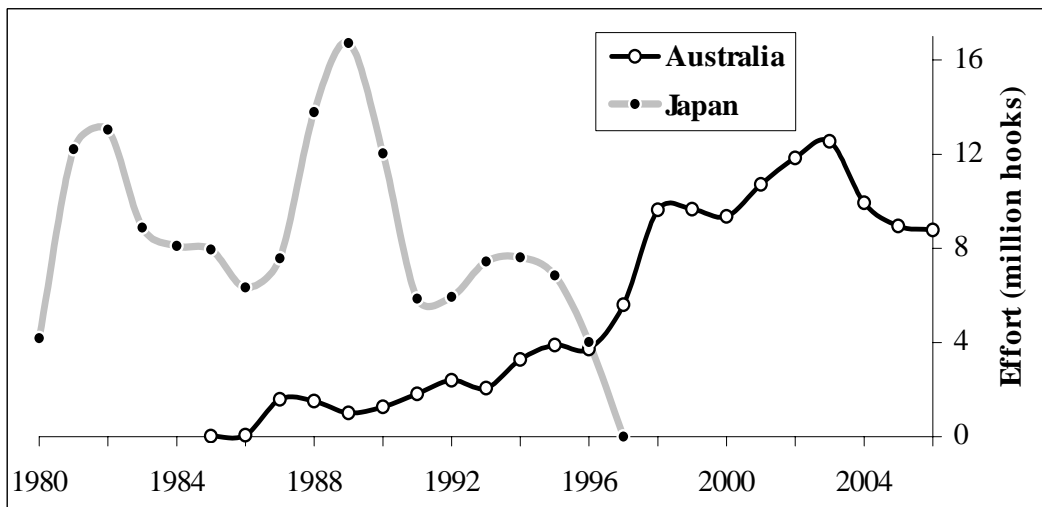


Figure 2: Annual longline effort reported by Australia's longliners (black line) in the eastern AFZ and adjacent high seas and Japan's longliners (grey line) in the eastern AFZ.

A domestic observer program has monitored target and non-target catches since 2001-02 (Table 5). The number of observed wildlife captures has decreased from 240 in 2001-02 to 27 in 2006 (calendar year). A total estimate of observed and unobserved captures is presented in Table 6, with information on life status detailed in Table 7.

1.1.2 Pole-and-line, Purse seine and Minor line

Background

With the introduction of live-bait-and-pole techniques for southern bluefin tuna (*Thunnus maccoyii*) and sporadic catches of skipjack (*Katsuwonus pelamis*) and yellowfin, the pole-and-line fishery expanded rapidly in the 1950s. The introduction of purse seining in the 1970s boosted catches further. In the eastern AFZ, skipjack are occasionally fished from southern New South Wales to north-eastern Tasmania from November to June, when sea surface temperatures are above 17°C. Small troll catches of pelagic species have been reported from New South Wales since first settlement.

Catch and Gear

Pole-and-line and purse seine catches for 2006 cannot be disclosed because fewer than five vessels operated in 2006. These vessels do not operate outside the AFZ. This fishery had taken significant catches of skipjack tuna in the past, peaking at over 6000 t in 1992, before declining to 1000 t in 1998 and increasing again to about 4000 t in 2000 (Figure 3). The Eden cannery closed in 1999 and the total catch subsequently fell to about 500 t in 2001 and only 92 t in 2002. Pole-and-line and purse seine catches of skipjack tuna in the eastern AFZ had declined to 183 t in 2004.

Catches in the 'Minor Line' category includes troll, handline and rod-and-reel fisheries (Table 2) and vary markedly according to the inshore availability of yellowfin tuna in particular. Regardless, catches are generally a small proportion of the longline catch. In 2006, the purse seine, pole-and-line and minor line methods reported a combined catch of 43 t (Table 2). The performance of the minor line fishery is closely aligned with the experiences of the recreational sector as the two groups use similar methods and often fish in close association.

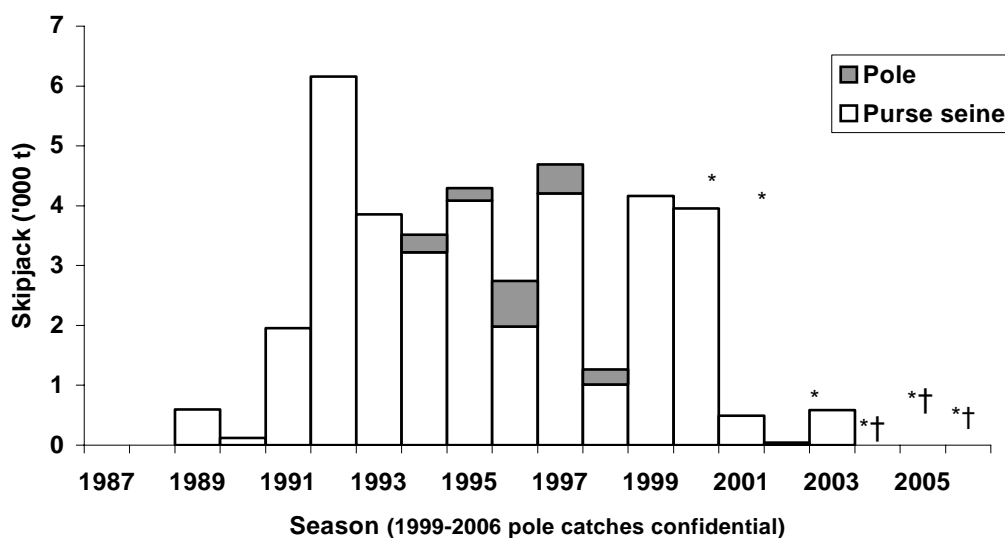


Figure 3: Eastern Tuna and Billfish Fishery annual skipjack tuna catch reported by Australian purse seine and pole-and-line vessels (*confidential pole-and-line data; †confidential purse seine data).

Fleet, Effort and Fishery

Characteristics

Most poling vessels are 15–20 m long. Most purse-seiners are 20–25 m long, but several vessels are 40–45 m. Purse seine and pole-and-line fishers often use satellite thermal imagery and spotters in aircraft to locate schools. In 2006 there were no dedicated pole-and-line vessels and less than five purse seiners active in the WCPFC area.

Pole-and-line and purse seine vessels fish for skipjack tuna off the far south coast of New South Wales (35–38°S). In the eastern AFZ, skipjack are fished from southern New South Wales to north-eastern Tasmania from November to June, when sea surface temperatures are above 17°C. There are no dedicated vessels in the minor line fisheries; the catches are reported by vessels involved in other fisheries (e.g., longline) on their way to and from fishing grounds.

Non-Target Catch

Yellowfin tuna are a bycatch of the pole-and-line and purse seine fishery. Regulations restrict their yellowfin tuna bycatch to less than 50% of the total catch in any trip and less than 2% of each vessel's annual catch. The bycatch of yellowfin tuna is usually quite small, amounting to less than 1% in most years.

1.1.3 Recreational fishing

Background

Recreational and charter anglers have taken tuna and billfish off eastern Australia since the early 1900s. During the 1970s boats capable of ranging beyond 20 nm became available at reasonable prices and angling for tuna and billfish grew in popularity. The continental shelf is less than 8 nm wide in some places along the southeast coast, and anglers catch tuna and billfish from the shore at several locations. The Game Fishing Association of Australia was formed in 1938. By 2000 it boasted a membership of more than 10 000 anglers, most based on the east coast of Australia. Many gamefishers tag and release much of their catch, especially marlins. A consultative process, involving commercial and recreational fishers, charter operators and State and Commonwealth Governments is developing options for resource sharing.

Catch and Gear

Black marlin catch rates were higher in 1996/97 and 1998/9 seasons when large numbers of small black marlin occurred closer to the coast. Blue marlin catch rates increased in 1997-1999 seasons, possibly due to increased directed effort towards this species (Murphy et al 2002). Striped marlin catch rates in tournaments were relatively steady during 1993–2000, although catch rates in southern latitudes were reported to be exceptionally high in the summer and autumn of the 1998/9 and 1999/2000 seasons (Murphy et al 2002). Recent analyses of charter boat catch rates for striped marlin off the south east coast support this anecdotal evidence (Bromhead et al. 2004).

Recreational striped marlin catches were poor in 2006 although some reasonable catches were taken in tournaments off southern New South Wales. Blue marlin catches were down in terms of numbers but some bigger fish (>250 kgs) were landed. The heavy tackle fishery for large black marlin off Cairns reported a patchy season however good catches did occur when gamefishers were able to fish. Yellowfin catches inshore were reasonable with some 40–50 kg fish being landed however they were not consistent in their availability. As with the commercial sector, the recreational sector reported very few mahi mahi.

Fleet, Effort and Fishery Characteristics

There are several hundred charter boats operating off eastern Australia, and many of these take customers fishing for pelagic species from time-to-time. Over 200 charter boats in NSW have gamefishing endorsement, and a charter boat logbook has

operated there since 2000. Tournament monitoring was initiated in 1994. A logbook program is also in place for charter boats that target black marlin off north Queensland.

1.2 RESEARCH AND STATISTICS

1.2.1 Observer and port sampling programmes

Independent observers have been deployed on domestic longliners since 2001 as part of a program to test the effectiveness of seabird mitigation devices. Since July 2003, observers have been deployed more broadly across the fishery with more general duties, such as the collection of data on fishing gear and the size- and species composition of catches. A total of 4.1% of sets and 4.3% of hooks set were observed between July 2004 and June 2005 (Dambacher 2005).

1.2.2 Research activities

The Australian Government and fishing industry allocate considerable funds to fishery research and monitoring each year. In addition to the logbook program, key areas of recent and or ongoing research and monitoring include:

Current Projects

- Defining regional connections in south-west Pacific swordfish (CSIRO)
- Investigating the size composition, age composition and spawning activity of albacore tuna in the ETBF (CSIRO)
- Measuring effort creep in the ETBF (BRS)
- Determination of the ecological impacts of longline fishing in the ETBF (CSIRO)
- Development of a robust suite of stock status indicators for the Southern and Western and Eastern Tuna and Billfish fisheries (CSIRO)
- Determination of effective longline effort in the ETBF (CSIRO)
- Reduction of interactions by marine mammals with longline and gillnet gears: development and assessment of predation and by-catch mitigation devices (QDPI&F)
- Archival hard parts collection, a basis for routine ageing of tuna and billfish (CSIRO)
- Mitigation measures to reduce longline interaction with seabirds (AAD, SeaNet)
- Integrated assessment and the development and evaluation of an assessment framework for the ETBF (CSIRO)

Recent projects

- Stock assessment of striped marlin in the south-western Pacific Ocean (BRS, June 2006)
- An analysis of interactions between domestic longline and recreational gamefish fisheries taking or targeting striped marlin off NSW (BRS and NSW DPI, June 2006)
- Analysis of seabird mitigation trials (BRS, June 2006)
- A review of byproduct interactions and economics in Australia's tuna and billfish fisheries (BRS, June 2006)
- Integrated analysis and assessment of the ETBF (CSIRO)

- Migration and habitat preferences of bigeye tuna on the east coast of Australia (CSIRO, May 2005)
- Crossing the line: sea turtle handling guidelines for the longline fishing industry (Belldi Consultancy, Feb 2005)
- Age and growth of broadbill swordfish from Australian waters (CSIRO, Sep 2004)
- New deep setting longline technique for bycatch mitigation (SPC, SeaNet, Aug 2004)
- Assessment of blue shark population status in the western south Pacific (CSIRO, 2004)
- Age and growth of bigeye tuna from the eastern and western AFZ (CSIRO, Dec 2003)
- Development of an operating model and evaluation of harvest strategies for the ETBF (CSIRO, Nov 2003)
- Swordfish-environment-seamount-fishery interactions off eastern Australia (CSIRO, Oct 2003)
- Striped marlin: biology and fisheries (BRS, 2003)
- Investigation of the origin of yellowfin tuna recruits to the eastern AFZ (CSIRO, Nov 2002)
- Reproductive dynamics of broadbill swordfish in the domestic longline fishery off eastern Australia (Aug 2002)

Many anglers who target tuna and billfish voluntarily tag and release under the New South Wales Cooperative Gamefish Tagging Program, which was established in 1973. 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 number of tuna and billfish tagged under Gamefish Tagging Program varies year-to-year particularly within a given species (Table 4).

1.2.3 Statistical data collection systems

The Commonwealth Government introduced a logbook for Japanese longliners in 1979, and Australian observers were placed on Japan's longliners in the AFZ to verify catch reporting and to collect biological and fisheries data. The historical longline logbook, radio and observer data from Japanese vessels continues to provide a valuable source of information for fishery assessments and management decision making.

The Commonwealth introduced a logbook for domestic longliners in 1986. The logbook has been revised on several occasions. The latest (AL05), which is designed to also collect information required for a seabird threat abatement plan (TAP), was distributed in 2000. Return of logbooks by Australian longliners improved when it became a condition of fishing permits and has been virtually 100% in recent years.

Catch Disposal Records (CDRs) were implemented in the ETBF in January 2006. CDRs are completed by both the fisher and the licensed fish receiver at the point of unload to obtain accurate data on fish numbers and verified weight by species. Skippers tend to over-estimate the weights reported in logbooks for most species, so the CDR data will be reported in official statistics in future. Weight estimates are also derived from the size-monitoring program, and are likely to be more accurate than logbook data for that part of the time series.

Catch and effort logbooks have been introduced for charter operators in both Queensland and New South Wales. NSW DPI has also monitored catch and effort

data from gamefishing tournaments over the past ten years and a report summarising their observations was released in 2002.

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Table 1: Summary of catch and effort reported by Australia's longliners operating the eastern Australian fishing and adjacent high seas aggregated by calendar year. All catches are metric tonnes (t) processed weight. Pre-1997 data have been raised for logbook coverage. 'No. of Vessels' represents the number of longliners returning logbooks. It should be noted that the number of permits in the fishery exceeds these numbers.

Year	No. of vessels	Hooks ('000s)	Yellowfin tuna (t)	SBT (t)	Albacore (t)	Bigeye tuna (t)	Swordfish (t)	Black marlin (t)	Striped marlin (t)	Blue marlin (t)	Sailfish (t)	Spearfish (t)	Other (t)	Total (t)
1986	32	61	11	10	0	1	0	0	0	0	0	0	21	43
1987	133	1 588	998	12	129	57	21	9	42	27	3	3	1 223	2 524
1988	134	1 514	791	23	107	38	19	7	39	18	3	6	83	1 134
1989	124	1 008	714	3	93	17	13	2	7	0	0	0	49	899
1990	117	1 274	674	7	124	21	18	11	55	16	2	2	52	982
1991	111	1 822	692	103	158	24	44	10	28	1	1	1	71	1 133
1992	124	2 393	872	152	214	30	37	6	20	2	2	1	104	1 441
1993	109	2 065	670	245	186	22	25	0	27	0	0	1	59	1 235
1994	110	3 274	1 047	346	357	109	32	2	49	4	4	4	117	2 071
1995	109	3 898	1 126	244	438	152	49	2	84	4	3	4	174	2 280
1996	119	4 220	1 424	161	408	259	456	<1	135	9	<1	<1	246	3 098
1997	137	5 606	1 441	318	258	714	1 109	<1	146	<1	<1	1	220	3 783
1998	156	8 776	1 846	427	478	1 031	1 772	^a <1	447	^a <1	2	5	525	6 679
1999	145	9 661	1 577	86	373	788	1 878	^a 0	489	^a 0	2	5	637	5 913
2000	140	9 355	1 543	92	381	676	1 927	^a 0	619	^a 0	5	3	544	5 783
2001	159	10 711	2 418	58	591	1 156	2 089	^a 0	789	^a 0	4	10	902	8 013
2002	144	11 838	3 028	35	553	886	2 163	^a 0	638	^a 0	8	20	827	8 155
2003	134	12 540	3 157	40	490	905	1 929	^a 0	638	^a 0	5	19	743	7 916
2004	121	9 815	2 021	215	667	789	1 703	^a 0	450	^a 0	1	17	785	6 610
2005	97	8 949	1 286	32	743	699	1 517	^a 0	355	^a 0	3	13	592	5 239
2006	80	8 788	1 829	9	2 591	498	1 132	^a 0	441	^a 0	3	38	735	7 273

^aLegislation introduced in 1997 requires longliners to release all blue and black marlin, thus restricting the weight data available for those species.

^b 2006 catch is calculated from Catch Disposal Records (CDRs)

Table 2: ETBF Catch (t) by gear reported in logbooks for 2003-2006.

Species	All Gears				Pole-&-Line & Purse seine				Longline				Other Commercial Methods			
	2003	2004	2005	2006	2003	2004	2005*	2006*	2003	2004	2005	2006	2003	2004	2005*	2006*
Albacore	486	670	757	2430	0	0	0	0	484	667	753	2428	2	3	4	2
Bigeye tuna	890	814	712	453	0	0	0	0	878	789	709	438	12	25	3	15
Black marlin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue marlin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Broadbill swordfish	1894	1703	1598	995	0	0	0	0	1894	1703	1596	995	0	0	0	0
Other	567	640	625	583	0	0	0	0	565	623	624	566	2	16	1	17
Sailfish	4	1	3	2	0	0	0	0	4	1	3	2	0	0	0	0
Shark	164	167	121	95	0	0	0	0	164	165	120	95	0	2	1	0
Skipjack	602	181	2	50	597	183	0	0	3	1	2	49	3	0	1	1
Southern bluefin tuna	40	215	38	6	0	0	0	0	40	215	38	6	0	0	0	0
Spearfish	18	17	14	26	0	0	0	0	18	17	14	26	0	0	0	0
Striped marlin	634	450	376	465	0	0	0	0	633	450	375	465	1	0	1	0
Yellowfin tuna	3096	2001	1335	1703	0	6	0	0	3090	1984	1334	1695	6	11	1	8

* 2005 Pole and Line and Purse seine catches have been aggregated with Other Commercial Methods due to domestic confidentiality regulations.

Table 3: ETBF Logbook catches (t) for all methods, including bycatch 2000-05.

Species	Year									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Albacore	258	478	373	381	591	553	490	667	756	2430
Bigeye tuna	714	1031	788	676	1156	886	905	789	712	453
Yellowfin tuna	949	1846	1572	1536	2415	3024	3148	1984	1336	1703
Northern bluefin tuna	1	3	5	8	8	6	12	10	13	5
Southern bluefin tuna	385	573	169	92	58	35	40	215	38	6
Skipjack tuna	6	11	4	2	5	8	3	1	3	50
Broadbill swordfish	1109	1772	1878	1927	2089	2163	1929	1703	1596	995
Striped marlin	146	447	489	619	789	638	638	450	376	465
Black marlin	0	0	0	0	0	0	0	0	0	0
Blue marlin	0	0	0	0	0	0	0	0	0	0
Sailfish	0	2	2	5	4	8	5	1	3	2
Shortbill spearfish	1	5	5	3	10	20	19	17	14	26
Dolphinfish	22	147	123	80	272	280	222	305	189	118
Escolar	3	6	3	3	8	11	87	79	84	64
Moonfish	5	0	5	5	5	8	9	9	11	98
Ray's bream	15	5	7	6	7	10	8	6	29	7
Rudderfish	49	117	159	161	253	277	204	195	154	125
Wahoo	6	14	13	9	11	21	30	12	12	44
Other fish	6	9	5	4	3	2	1	2	11	28
Blue whaler shark	41	49	58	26	34	24	11	22	11	10
Blacktip sharks	0	8	14	7	4	4	9	6	3	4
Bronze whaler shark	8	29	38	28	44	28	26	30	20	15
Dusky whaler shark	0	0	0	2	6	4	2	3	1	2
Oceanic whitetip shark	0	3	8	12	24	22	13	9	6	4
Scalloped hammerhead shark	5	6	6	9	19	15	14	9	1	7
Shortfin mako shark	40	86	163	165	180	96	82	73	64	44
Thresher shark	2	8	5	5	6	2	1	1	1	1
Tiger shark	0	9	12	9	11	7	7	8	6	4
Other sharks	13	15	10	1	1	2	2	3	7	4

Table 4: Summary of the number of tunas and billfishes tagged and released and reported by anglers to the NSW Gamefish Tagging Program.

Common name	1973-80	1980-90	1990-00	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	Total
Marlin, black	1 927	10 700	2 838	1 671	2 417	1 179	583	1 290	4 268	1 838	3304	1373	582	1045	1009	1416	2676	40116
Marlin, Blue marlin	2	379	117	126	92	140	168	145	172	252	421	337	206	255	189	369	231	3601
Marlin, Striped marlin	5	461	190	180	220	345	427	1 017	1 172	1 116	1551	1846	674	973	810	1151	1213	13351
Sailfish	240	4 837	878	1 252	950	1 188	937	845	1 007	1 984	1519	1097	422	318	921	924	569	19888
Spearfish, shortbill	0	9	2	8	16	12	32	10	1	17	17	9	7	45	19	15	22	241
Swordfish, broadbill	0	11	4	2	12	3	4	9	1	5	-	-	6	1	0	0	0	58
Total billfishes	2 174	16 397	4 029	3 239	3 707	2 867	2 151	3 316	6 621	5 212	6812	4662	1897	2637	2948	3875	4711	65781
Albacore	26	1 911	555	1 179	319	1 486	453	2 732	1 125	992	-	-	402	236	231	311	430	11647
Bonito, Australian	128	7 308	839	971	944	510	581	509	94	60	-	-	117	69	23	35	16	12388
Bonito, leaping	2	619	133	79	140	151	244	37	0	0	-	-	-	-	-	12	1	1418
Tuna, bigeye	1	37	0	1	7	0	15	4	1	1	-	-	0	0	0	18	8	93
Tuna, dogtooth	6	195	47	13	46	17	6	8	22	7	-	-	10	2	1	0	2	382
Tuna, longtail	462	1 358	321	155	303	140	223	144	83	98	-	-	122	90	65	40	63	3667
Tuna, Mackerel (kawakawa)	313	6 627	546	761	931	662	498	610	366	514	-	-	570	671	655	523	592	14839
Tuna, Skipjack tuna	1 939	7 952	839	380	508	518	731	379	239	245	-	-	237	290	400	236	477	15370
Tuna, southern bluefin	20	385	161	184	218	73	18	137	73	336	-	-	65	77	24	19	90	1880
Tuna, yellowfin	521	7 043	1 104	1 761	2 011	1 261	1 825	3 717	1 659	513	-	-	480	1146	651	427	2117	26236
Total tunas	3 418	33 435	4 545	5 484	5 427	4 818	4 594	8 277	3 662	2 766	-	-	2003	2581	2050	1621	3796	88477
Total tunas & billfishes	5 592	49 832	8 574	8 723	9 134	7 685	6 745	11 593	10 283	7 978	-	-	3900	5218	4998	5496	8507	159256

*Most of the tuna and billfish tagged under the New South Wales Gamefish Tagging Program are released in NSW or Queensland. However, the numbers quoted here are based on data provided by Dr Mike Lowry (NSW Fisheries) that includes small numbers of fish released with NSW Gamefish Program tags in other States and in other countries, such as Papua New Guinea and Fiji.

Table 5: The number of interactions with seabirds, turtles and whales reported by observers on ETBF longliners for July–June annual time periods (Dambacher 2005) and 2006 calendar year (Dambacher pers. comm.). All live animals were released.

Group	Common Name	2001– 2002	2002– 2003	2003– 2004	2004– 2005	2006 calendar yr	Total
Seabirds	Flesh-footed shearwater	222	36	17	2	1	278
	Black-browed albatross	2	5	5	1	5	18
	Great-winged petrel	5	5	1	0	0	11
	Wandering albatross	0	2	1	7	1	11
	Short-tailed shearwater	2	2	5	0	0	9
	Wedge-tailed shearwater	2	0	6	0	0	8
	Westland petrel	0	1	4	0	0	5
	Cape petrel	0	0	0	4	0	4
	Shy albatross	1	0	2	1	2	6
	Petrels, prions and shearwaters	1	0	1	0	0	2
	Sooty shearwater	1	0	1	0	0	2
	Great skua	1	0	0	0	0	1
	Buller's albatross	0	0	1	0	1	2
	Grey-headed albatross	0	1	0	0	2	3
	Southern royal albatross	0	0	1	0	0	1
	Yellow-nosed albatross	0	0	1	0	1	2
Albatrosses (other)	0	1	0	0	1	2	
	Subtotal	237	53	46	15	14	365
Turtles	Leatherback turtle	0	2	5	10	8	25
	Green turtle	2	0	0	5	1	8
	Loggerhead turtle	1	0	3	1	2	7
	Pacific (or Olive) Ridley turtle	0	0	1	1	0	2
	Hawksbill turtle	0	0	1	0	0	1
	Turtles (other) ^{a,b}	–	–	–	–	1	1
	Subtotal	3	2	10	17	12	44
Whales	Short-finned pilot whale	0	0	0	1	0	1
Pinnipeds	Australian fur seal ^b	0	0	0	0	1	1
	Grand total	240	55	56	33	27	411

^a2006 calendar year: 'Turtles (other)' were unidentified turtles, possibly hard-shelled turtles (Olive Ridley, Hawksbill etc.).

^bThis category was not reported prior to 2006 calendar year.

Table 6: Total estimated interactions of seabird, turtle and marine mammals with longline fishing gear in ETBF, 2006 calendar year (Dambacher pers. comm.). All live animals were released.

Group	Common name	Catch percent of total for all species	Estimated interactions *	95% CI percent of estimate
Seabirds	Wandering albatross	0.002%	9	146%
	Buller's albatross	0.000%	1	90%
	Flesh-footed shearwater	0.004%	16	149%
	Black-browed albatross	0.005%	21	80%
	Grey-headed albatross	0.003%	10	125%
	Northern royal albatross	0.000%	1	90%
	Yellow-nosed albatross	0.000%	1	90%
	Shy albatross	0.001%	3	90%
Turtles	Leatherback turtle	0.028%	118	76%
	Green turtle	0.004%	19	122%
	Loggerhead turtle	0.006%	27	165%
	Turtles (other) ^a	0.004%	17	180%
Pinnipeds	Australian fur seal	0.002%	9	146%

*Estimate only for strata with sufficient observer coverage, i.e. ≥ 10 observed longline sets.

^a2006 calendar year: 'Turtles (other)' were unidentified turtles, possibly hard-shelled turtles (Olive Ridley, Hawksbill etc.).

Table 7: Life status of observed seabirds, turtles and whales in the ETBF, 2006 calendar year (Dambacher pers. comm.).

Group	Common name	Number				
		observed	Dead	Just-alive	Sluggish-alive	Vigorous-alive
Seabirds	Wandering albatross	1	0%	0%	0%	100%
	Buller's albatross	1	0%	0%	0%	100%
	Flesh-footed shearwater	1	100%	0%	0%	0%
	Black-browed albatross	5	0%	0%	0%	100%
	Grey-headed albatross	2	0%	0%	0%	100%
	Northern royal albatross	1	0%	0%	0%	100%
	Yellow-nosed albatross	1	0%	0%	0%	100%
	Shy albatross	2	50%	0%	0%	50%
Turtles	Leatherback turtle	8	0%	0%	0%	100%
	Green turtle	1	0%	0%	0%	100%
	Loggerhead turtle	2	0%	0%	0%	100%
	Turtles (other) ^a	1	0%	0%	0%	100%
Pinnipeds	Australian fur seal	1	0%	0%	0%	100%

^a2006 calendar year: 'Turtles (other)' were unidentified turtles, possibly hard-shelled turtles (Olive Ridley, Hawksbill etc.)

Table 4 (revised): Summary of the number of tunas and billfishes tagged and released and reported by anglers to the NSW Gamefish Tagging Program¹

Common name	1973-1979	1980-89	1990-99	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
Marlin, black	1495	9586	20072	2519	1577	2425	1185	590	1340	4434	1951	3413	1427	632	1117	1044	1418	2749	1696
Marlin, Blue marlin	116	355	1884	111	125	92	139	170	146	178	265	441	347	224	273	193	371	234	533
Marlin, Striped marlin	374	483	6927	179	181	220	345	429	1014	1269	1260	1740	1987	697	994	835	1152	1223	861
Sailfish	116	5090	11781	871	1251	954	1193	946	843	1044	2026	1541	1120	727	595	952	924	576	718
Spearfish, shortbill	1	6	119	2	8	16	12	32	10	1	17	17	10	8	44	19	15	22	25
Swordfish, broadbill	0	9	62	3	2	12	3	4	9	2	5	6	13	6	1	0	0	0	1
Total billfishes	2102	15529	40845	3685	3144	3719	2877	2171	3362	6928	5524	7158	4904	2294	3024	3043	3880	4804	3834
Albacore	39	2767	9698	536	1166	319	1487	454	2704	1281	1159	354	276	457	183	231	311	436	472
Bonito, Australian	104	7718	5063	825	969	948	515	613	483	161	68	141	89	127	91	24	35	16	9
Bonito, leaping	1	597	794	133	79	139	151	250	37	0	0	1	1	0	0	1	12	1	0
Tuna, bigeye	0	55	45	0	1	7	0	17	4	1	1	8	6	0	0	0	18	8	0
Tuna, dogtooth		227	194	46	13	46	17	6	8	22	7	12	7	10	5	1		2	27
Tuna, longtail	245	1484	1662	323	155	303	140	223	129	102	99	66	36	139	111	66	40	66	66
Tuna, Mackerel (kawakawa)	204	6340	6343	516	741	932	671	504	597	397	550	756	636	618	677	674	523	604	569
Tuna, Skipjack tuna	1501	8450	4753	826	375	509	519	742	383	248	252	513	224	288	331	402	236	496	538
Tuna, southern bluefin	47	385	1352	147	176	218	73	17	120	90	380	119	224	151	172	27	22	90	469
Tuna, yellowfin	416	7238	16722	1054	1729	2015	1263	1828	3680	1903	546	1623	571	542	1477	655	431	2115	1804
Total tunas	2557	35261	46626	4406	5404	5436	4836	4654	8145	4205	3062	3593	2070	2332	3047	2081	1628	3834	3954
Total tunas & billfishes	4659	50790	87471	8091	8548	9155	7713	6825	11507	11133	8586	10751	6974	4626	6071	5124	5508	8638	7788

¹ Most of the tuna and billfish tagged under the New South Wales Gamefish Tagging Program are released in NSW or Queensland. However, the numbers quoted here (provided by NSW DPI) includes small numbers of fish released with NSW Gamefish Program tags in other States and in other countries, such as Papua New Guinea, and Fiji. All figures provided here are the most up to date as of July 2007. Decadal figures provided are based on calendar years. All other figures are based on financial year. Please note that figures for Australian bonito may also include a small proportion of leaping bonito and oriental bonito as these species are commonly recorded as 'bonito' on tag and release cards.