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ANNUAL REPORT TO THE COMMISSION
PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

WCPFC-SC5-AR/CCM-01

AUSTRALIA

Australian Government

Bureau of Rural Sciences

ANNUAL REPORT TO THE WESTERN AND CENTRAL PACIFIC FISHERIES COMMISSION

PART 1: INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

National Tuna and Billfish Fisheries Report 2008

AUSTRALIA

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Abstract

Total catches reported in logbooks for the Eastern Tuna and Billfish Fishery (ETBF) decreased from 5965 t in 2007 to 5505 t in 2008. This is down from a peak of 8229 t in 2002. Longline fishing effort in the fishery has fallen from a peak of 12.40 million hooks in 2003 to 8.04 million hooks in 2008. This is mainly a result of the surrender of permits under the 2006 structural adjustment component of the recent Australian Government *Securing Our Fishing Future* package, increased operating costs and unfavourable export conditions including the strength of the Australian dollar in 2008. Fifty-four vessels reported longlining in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area during 2008.

Logbook catch records for albacore tuna (*Thunnus alalunga*) decreased from 1834 t in 2007 to 1083 t in 2008. This was primarily a result of longliners switching from targeted albacore tuna techniques to the other target species, mainly due to market forces. As a consequence, logbook catch records for the other four main target species all increased in 2008 from those reported in 2007: bigeye tuna (*Thunnus obesus*)—900 t in 2008 (892 t in 2007); yellowfin tuna (*Thunnus albacares*)—1478 t in 2008 (1251 t in 2007); broadbill swordfish (*Xiphias gladius*)—1241 t (1202 t south of 20°S) in 2008 and 1133 t (1110 t south of 20°S) in 2007; striped marlin (*Tetrapturus audax*) —374 t in 2008 (331 t in 2007).

The Australian Fisheries Management Authority (AFMA) observer program has deployed observers 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 the aim of collecting additional fishery data, including information on fishing gear and the size and species composition of catches. In 2008, observers monitored 704 176 hooks in the fishery (8.8 per cent of the total number of hooks deployed in the fishery).

AFMA has agreed to manage the ETBF using output controls in the form of individually transferable quotas (ITQs). AFMA has commenced the process of drafting the necessary amendments to the ETBF Management Plan to implement ITQs.

Background

Australian fisheries for highly migratory species in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area are managed by the Eastern Tuna and Billfish Fishery (ETBF) (mainly longline fishery) and Eastern Skipjack Fishery (mainly purse seine fishery).

Domestic longline

In the mid 1990s, improved access to swordfish markets in the United States of America prompted many ETBF fishers to move to southern Queensland ports such as Mooloolaba to target broadbill swordfish (*Xiphias gladius*). Longlining for broadbill swordfish has declined since early 2005 because of high fuel and bait costs, changes in the exchange rate and depletion of broadbill swordfish associated with seamounts.

Increased operating costs and fluctuating market returns saw many longliners targeting low-value albacore tuna (*Thunnus alalunga*) during the first half of 2006. Recent decreases in the price of albacore tuna and unfavourable export conditions such as a strengthening Australian dollar has prompted some longliners to move back to targeting broadbill swordfish.

Pole and line, purse seine and minor line

With the introduction of live-bait-and-pole techniques for southern bluefin tuna (*Thunnus maccoyii*) and sporadic catches of skipjack (*Katsuwonus pelamis*) and yellowfin tuna (*Thunnus albacares*), the pole-and-line fishery expanded rapidly in the 1950s. The introduction of purse seining in the 1970s boosted catches further. In the eastern Australian Fishing Zone (AFZ), skipjack tuna are occasionally fished from southern New South Wales to north-eastern Tasmania, when sea surface temperatures are above 17°C.

Recreational fishing

Recreational and charter anglers have taken tuna and billfish off eastern Australia since the early 1900s. During the 1970s vessels 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 of Australia, 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.

Flag State Reporting

Domestic longlining catch and effort

All catches in this document are derived from those reported in Australian Fisheries Management Authority (AFMA) catch and effort logbooks, unless otherwise stated. Fifty four vessels reported longlining in the WCPFC Convention Area during 2008, down from a peak of 180 in 1997 (Figure 1). Longline fishing effort has fallen from a peak of 12.40 million hooks in 2003 to 8.04 million hooks in 2008 (Table 1). This is mainly a result of the strength of the Australian dollar, increased operating costs and the surrender of permits under the structural adjustment component of the recent Australian Government *Securing Our Fishing Future* package. Total catches reported in logbooks in the ETBF have decreased from 5965 t in 2007 to 5505 t in 2008. This is down from a peak of 8229 t in 2002. Historical annual catches for the Australian fleet, by primary species in the WCPFC Convention Area are shown in (Figure 2a–b). Catches of albacore tuna decreased from 1834 t in 2007 to 1083 t in 2008. This is a result of longliners switching from targeted albacore tuna fishing to other target species, mainly due to market forces. Catches of bigeye tuna (*Thunnus obesus*) increased slightly to 900 t in 2008 from 892 t in 2007. Catches of yellowfin tuna increased to 1478 t in 2008 from 1251 t in 2007. Catches of broadbill swordfish increased to 1241 t in 2008 (1202 t south of 20°S) from 1133 t (1110 t south of 20°S) in 2007. It is important to note that total allowable catches (TACs) are set on a financial year basis (1 July—30 June); catches of broadbill swordfish in the 2007–08 financial year were below the TAC of 1400 t. Catches of striped marlin (*Tetrapturus audax*) increased to 374 t in 2008 from 331 t in 2007. Annual catch distributions of the main target species by the Australian longline fleet for 2004–08 are shown in Figure 3a–e. Historically, the vast majority of the catch and effort by Australian longliners has been taken within the Australian AFZ with little effort on the adjacent high seas (Table 2).

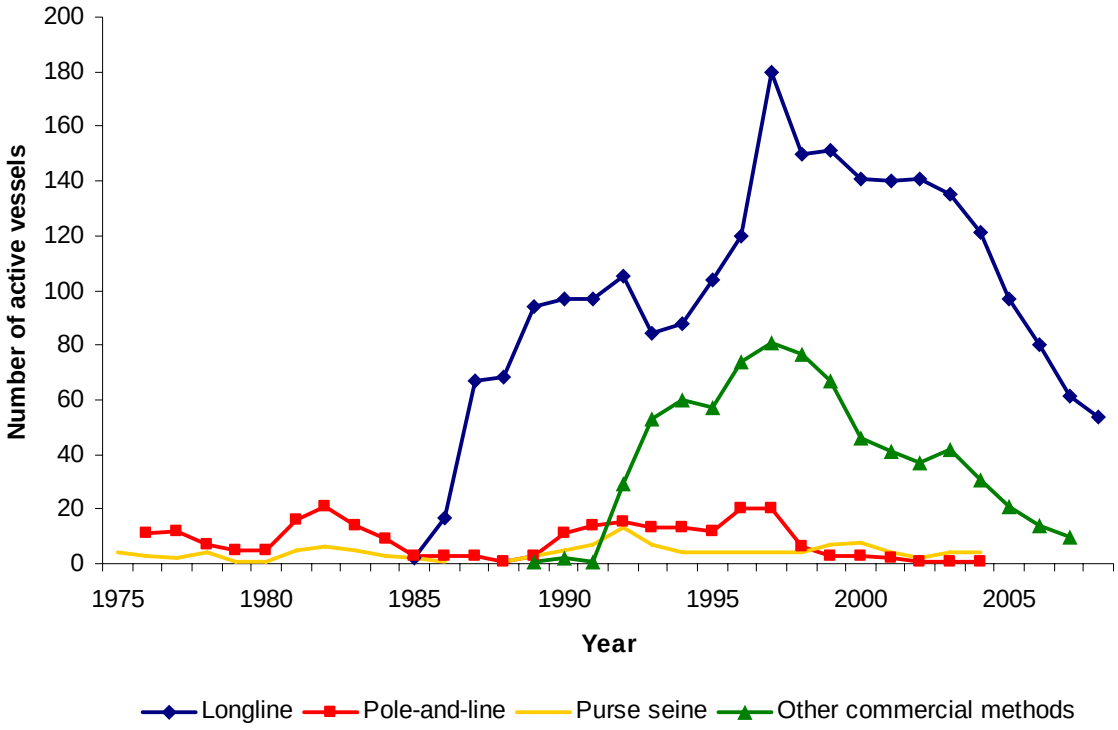


Figure 1. Historical annual vessel numbers for the Australian fleet, by gear (longline, purse seine and pole-and-line) for the WCPFC Convention Area.
Source: AFMA catch and effort logbook database

Table 1. Annual catch and effort estimates (whole weight) for the Australian fleet, by gear and primary species, for the WCPFC Convention Area, 2004–08.

Fishing method	Year	Effort[a]	Primary species[b] (t)					
			Albacore	Yellowfin	Bigeye	Skipjack	Striped marlin	Broadbill swordfish
All gears	2004	-	663.8	2019.3	820	184.2	448.8	1700
	2005	-	756.4	1335.6	712.1	3.1	376.2	1596.4
	2006	-	2429.9	1703.1	452.8	94.2	465.5	995.5
	2007	-	1834.1	1251.2	891.9	13.4	331.0	1132.5
	2008	-	1083.9	1477.6	899.6	45.8	374.1	1240.6
Longline	2004	9961	660.3	1983.1	786.0	0.9	448.6	1699.5
	2005	8949	752.8	1334.4	709.0	2.1	375.5	1595.8
	2006	8821	2428.5	1695.4	437.9	48.7	465.3	995.4
	2007	8444	1825.1	1236.9	776.9	8.2	330.4	1131.0
	2008	8044	1083.1	1474.5	894.9	18.0	374.1	1240.3
Purse seine	2004	*	0.0	*	0.0	*	*	0.0
	2005	*	0.0	*	0.0	*	*	0.0
	2006	*	0.0	*	0.0	*	*	0.0
	2007	*	0.0	*	0.0	*	*	0.0
	2008	*	0.0	*	0.0	*	*	0.0
Pole-and-line	2004	70	0.0	0.0	0.0	11.1	0.0	0.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other commercial methods[c]	2004	-	3.5	15.2	34.0	0.2	*	0.5
	2005	-	3.6	1.2	*	1.0	*	0.6
	2006	-	1.4	7.7	*	1.5	*	*
	2007	-	9.0	14.3	115.0	5.2	*	1.5
	2008	-	0.8	3.1	*	12.6	0.0	*

Source: AFMA catch and effort logbook database

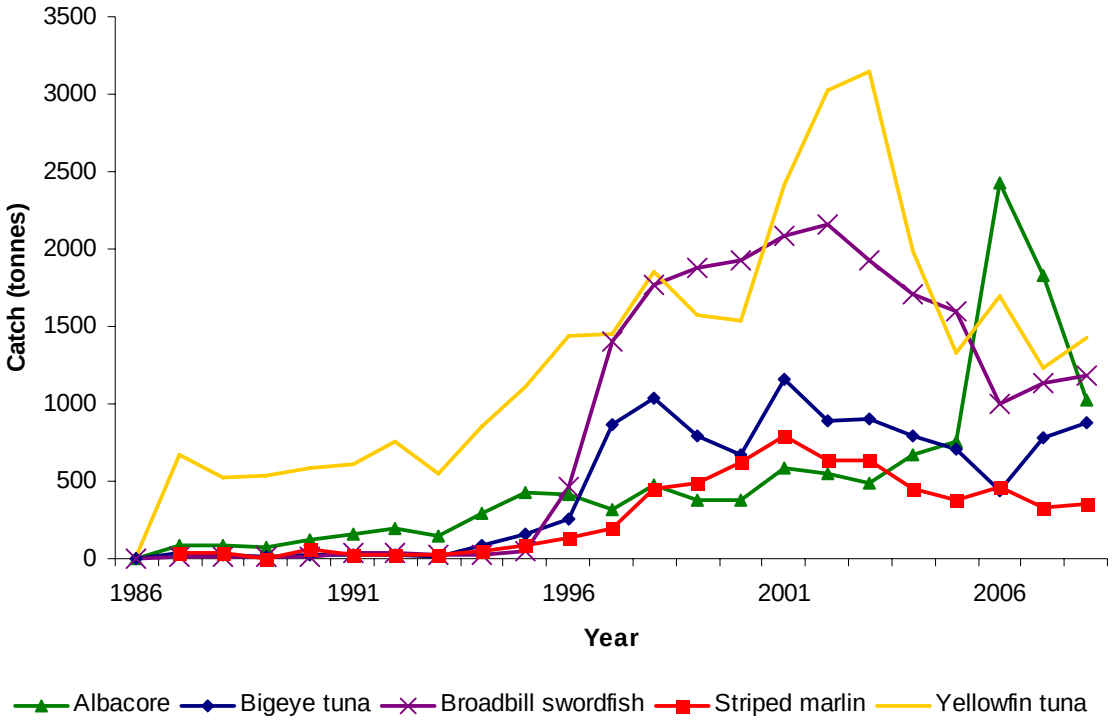
* Confidential data; less than five vessels.

[a] Units of effort are as follows: Longline—number of hooks (000's); Purse seine & Pole-and-line—search hours.

[b] There were no catches of blue and black marlin recorded in 2004–2008; commercial retention of both species by domestic longliners has been banned since 1998.

[c] Minor line component; includes trolling, rod-and-reel and handline.

a)



b)

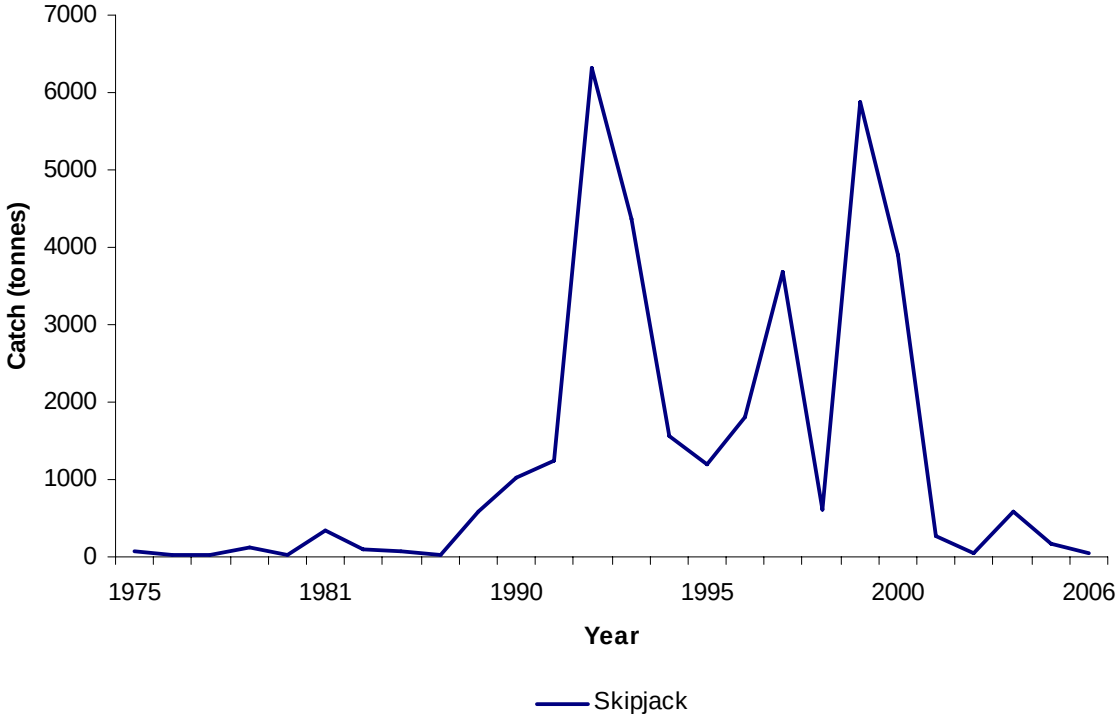
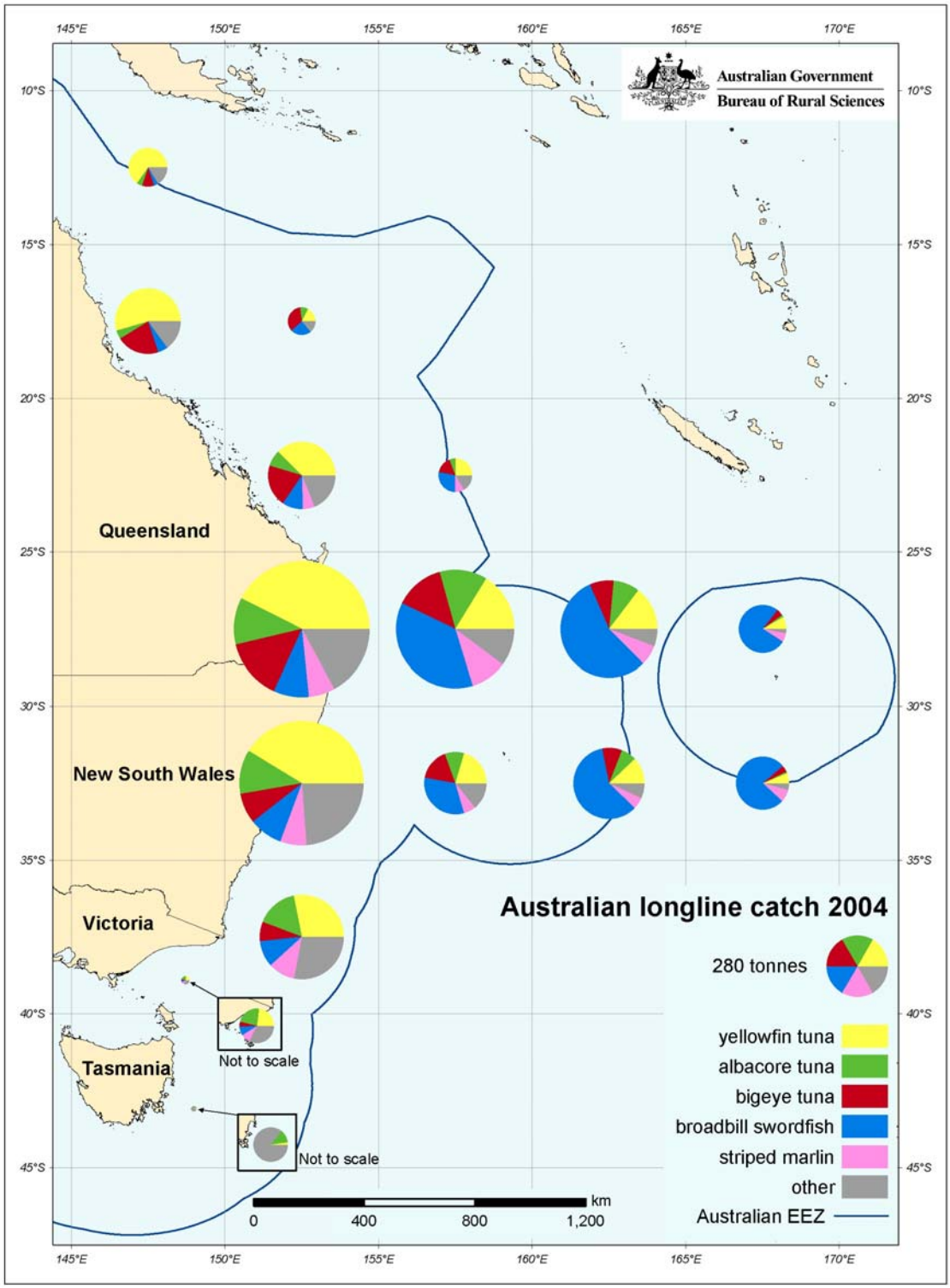


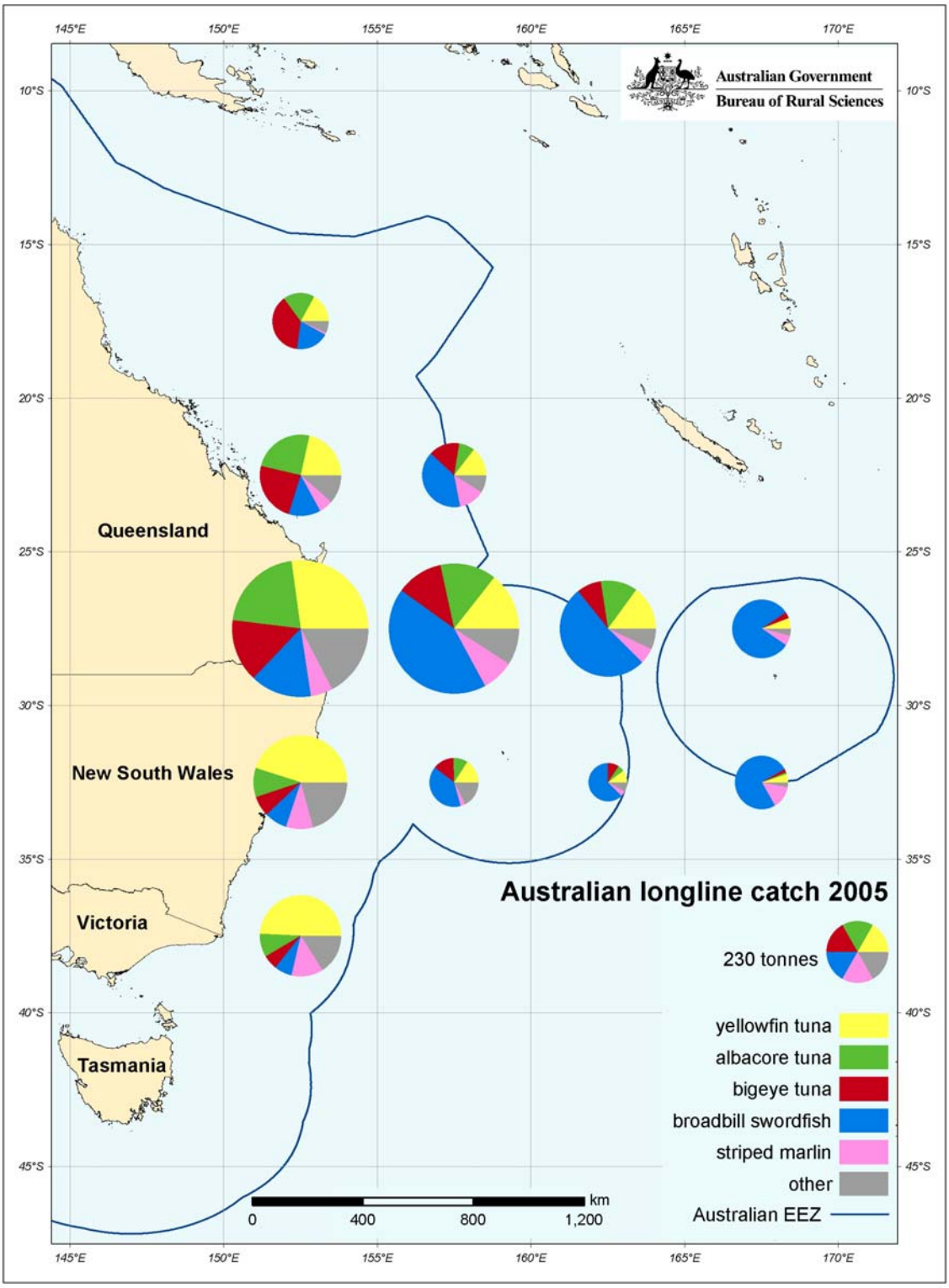
Figure 2 (a–b). Historical annual catch for the Australian fleet by primary species, for the WCPFC Convention Area. Confidential data (less than five vessels) have been omitted.

Source: AFMA catch and effort logbook database

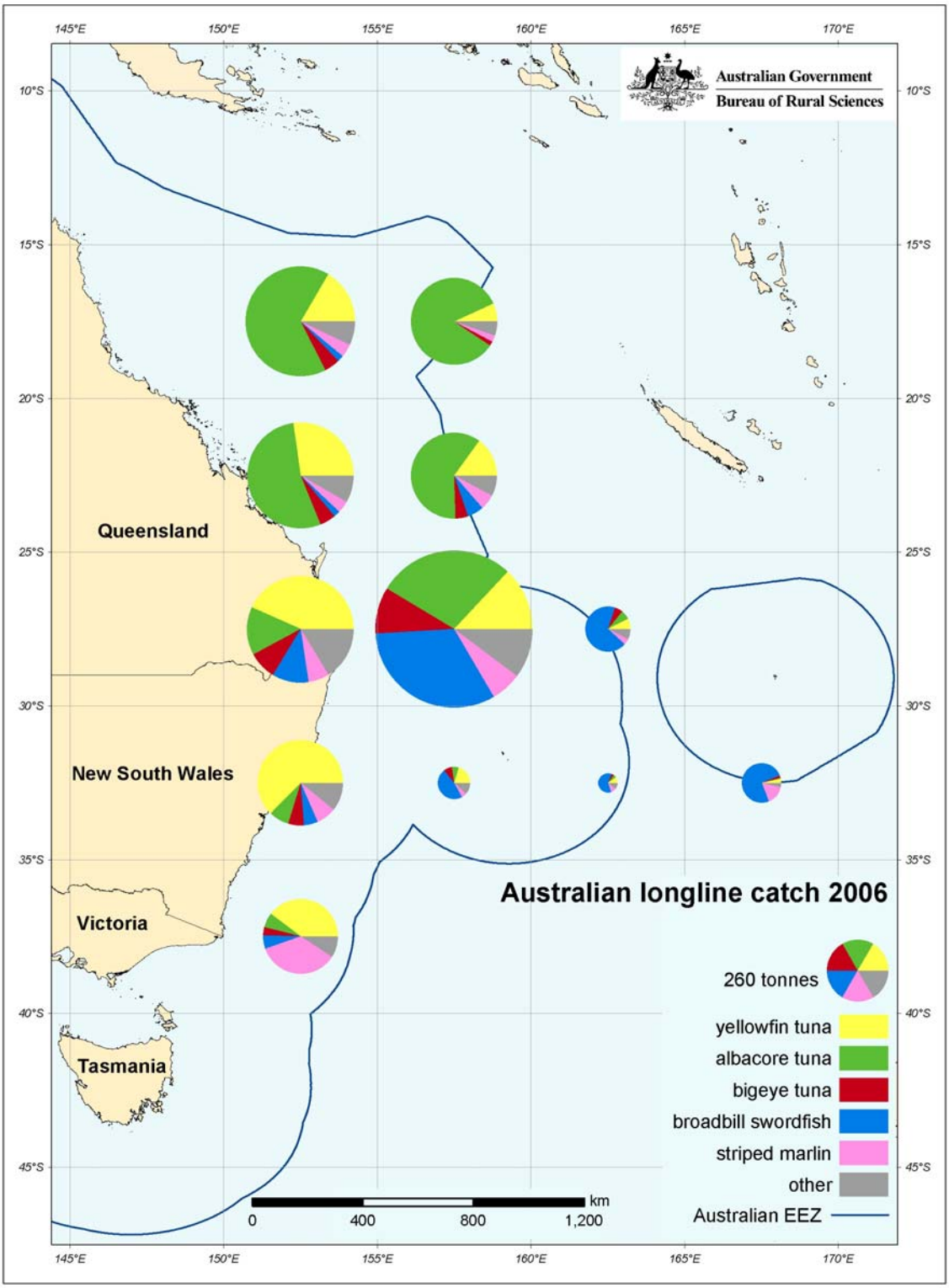
a)


Australian Government
Bureau of Rural Sciences
Queensland
New South Wales
Victoria
Tasmania
Not to scale
Not to scale
Australian longline catch 2004
280 tonnes
yellowfin tuna
albacore tuna
bigeye tuna
broadbill swordfish
striped marlin
other
Australian EEZ
km
0
400
800
1,200
145°E
150°E
155°E
160°E
165°E
170°E
10°S
15°S
20°S
25°S
30°S
35°S
40°S
45°S

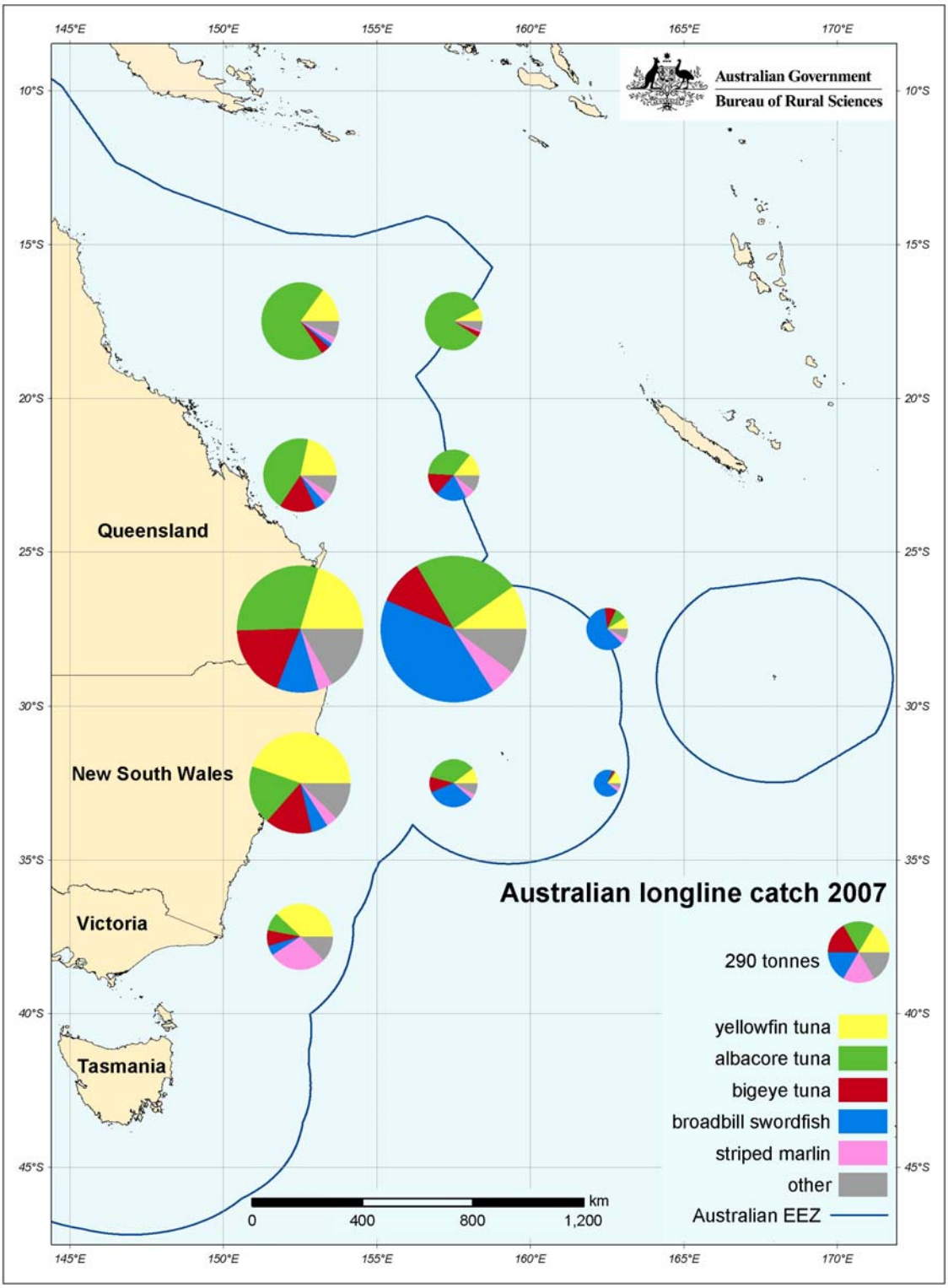
b)


Australian Government
Bureau of Rural Sciences
Queensland
New South Wales
Victoria
Tasmania
Australian longline catch 2005
230 tonnes
yellowfin tuna
albacore tuna
bigeye tuna
broadbill swordfish
striped marlin
other
Australian EEZ
km
0
400
800
1,200
145°E
150°E
155°E
160°E
165°E
170°E
10°S
15°S
20°S
25°S
30°S
35°S
40°S
45°S

c)


Australian Government
Bureau of Rural Sciences
Queensland
New South Wales
Victoria
Tasmania
Australian longline catch 2006
260 tonnes
yellowfin tuna
albacore tuna
bigeye tuna
broadbill swordfish
striped marlin
other
Australian EEZ
km
0
400
800
1,200
145°E
150°E
155°E
160°E
165°E
170°E
10°S
15°S
20°S
25°S
30°S
35°S
40°S
45°S

d)


Australian Government
Bureau of Rural Sciences
Queensland
New South Wales
Victoria
Tasmania
Australian longline catch 2007
290 tonnes
yellowfin tuna
albacore tuna
bigeye tuna
broadbill swordfish
striped marlin
other
Australian EEZ
km
0
400
800
1,200
145°E
150°E
155°E
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40°S
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e)

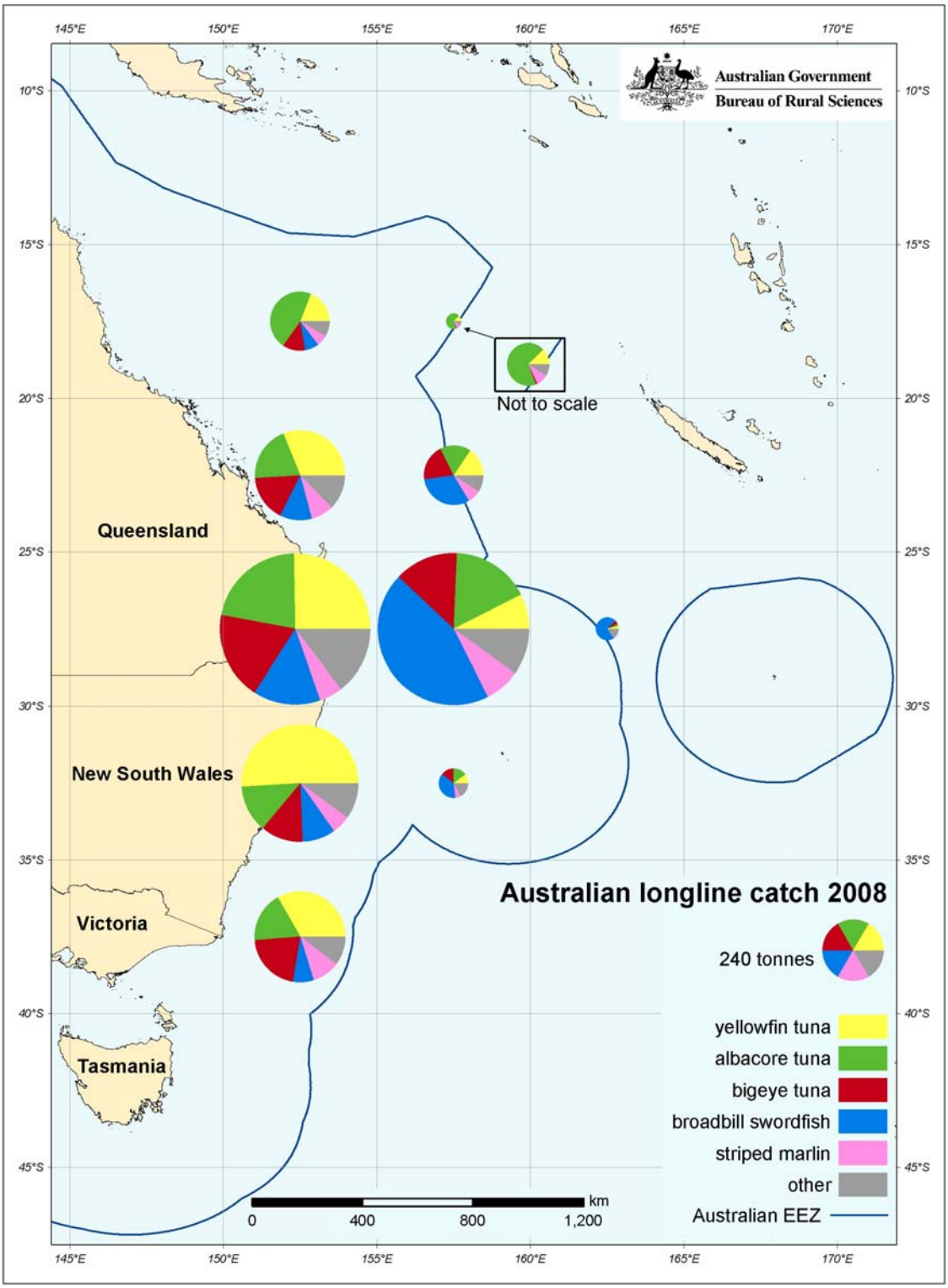


Figure 3 (a–e). Annual distribution of target species catch by the Australian longline fleet active in the WCPFC Convention Area, for 2004–08. Catches have been aggregated to five degree blocks to address issues of confidentiality (less than five vessels) and are scaled to the pie chart provided in the legend.

Source: AFMA catch and effort logbook database

Table 2. Catch and effort by Australian longliners, by primary species, within the AFZ and on the high seas. Proportions of catch and effort within the AFZ versus the high seas are provided in parenthesises.

	Year	Effort (000 hooks)	Primary species catch (t)					
			Albacore	Yellowfin	Bigeye	Skipjack	Striped marlin	Broadbill swordfish
Within AFZ	2004	9481	652.0	1947.0	761.0	0.9	422.5	1397.2
		(95.2%)	(97.8%)	(98.1%)	(96.5%)	(100.0%)	(94.0%)	(82.1%)
	2005	8587	740.5	1311.6	692.8	2.1	350.4	1401.3
		(96.0%)	(98.4%)	(98.3%)	(97.7%)	(100.0%)	(93.3%)	(87.8%)
	2006	8553	2406.8	1666.1	423.5	48.3	446.2	901.4
		(97.0%)	(99.1%)	(98.3%)	(96.7%)	(99.2%)	(96.0%)	(90.6%)
	2007	8327	1815.6	1229.3	770.5	8.2	327.8	1083.9
		(98.6%)	(99.5%)	(99.4%)	(99.2%)	(100.0%)	(99.2%)	(95.8%)
	2008	7991	1021.8	1424.5	869.3	18.0	350.1	1166.6
		(99.3%)	(99.6%)	(99.5%)	(98.4%)	(100.0%)	(99.3%)	(99.8%)
High seas	2004	480	14.8	37.5	28	0.0	27.1	305.4
		(4.8%)	(2.2%)	(1.9%)	(3.5%)	(0.0%)	(6.0%)	(17.9%)
	2005	362	12.3	22.8	16.2	0.0	25.1	194.5
		(4.0%)	(1.6%)	(1.7%)	(2.3%)	(0.0%)	(6.7%)	(12.2%)
	2006	268	21.7	29.3	14.4	0.4	18.8	94.0
		(3.0%)	(0.9%)	(1.7%)	(3.3%)	(0.8%)	(4.0%)	(9.4%)
	2007	117	9.5	7.6	6.4	0.0	2.6	47.1
		(1.4%)	(0.5%)	(0.6%)	(0.8%)	(0.0%)	(0.8%)	(4.2%)
	2008	53	3.9	2.6	4.0	0.0	2.5	18.7
		(0.7%)	(0.4%)	(0.2%)	(0.5%)	(0.0%)	(0.7%)	(1.6%)

Purse seine, pole-and-line and minor line catch and effort

In the 2007–08 fishing season, there was one active vessel in the Eastern Skipjack Fishery; therefore, catches cannot be reported for confidentiality reasons. There has been no pole-and-line fishing by Australian fleets in the WCPFC Convention Area since 2004. Minor line catches (including trolling, rod-and-reel and handline) made up a small proportion of total catches (see Table 1). All purse seine, pole-and-line and minor catches occurred within the AFZ.

Recreational fishing catch and effort

The 2008–09 heavy tackle fishery for large black marlin (*Makaira indica*) off Cairns was the worst on record. It was suggested that this was a result of seasonal variability and strong currents from the south. The traditional run of small black marlin appeared in reasonable numbers, as expected, off Townsville in July–August. However, this run did not continue off New South Wales the following January–March. Anecdotal evidence suggests the abundance of most target species have been low in waters covered by gamefish tournament anglers off New South Wales. Poor recruitment of juvenile yellowfin tuna to New South Wales is apparent. However, charter vessel operators have reported reasonable numbers of striped marlin off New South Wales. Reasonable numbers of yellowfin tuna in the 30–70 kg range and mahi mahi (*Coryphaena hippurus*) have been taken. Albacore tuna catches reported during tournaments were higher than in previous years.

Fishing patterns

Fishing patterns vary with target species, location and season. The ETBF extends from the top of Queensland to the Victoria–South Australia border; including waters around Tasmania (see Figure 4). In the WCPFC Convention Area, skipjack tuna are fished from southern New South Wales to north-eastern Tasmania.

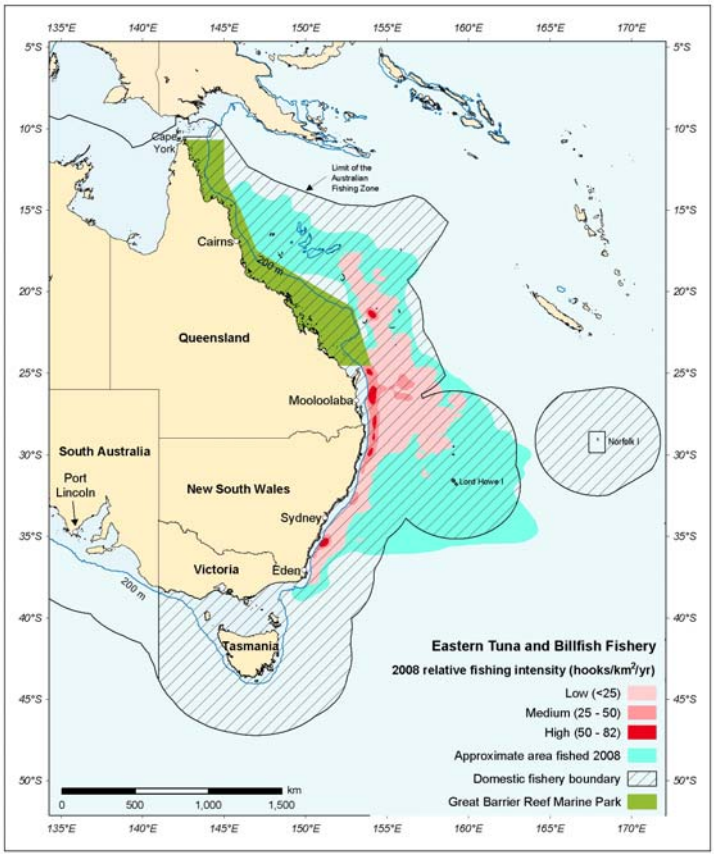


Figure 4. Longline effort distribution in the Eastern and Tuna Billfish Fishery (2008).

Fleet operations

Domestic longliner vessels are mostly 15–25 m long and use monofilament gear (Table 3). Vessels usually conduct one longline operation per day, or night, depending on the target species. A typical longline set will comprise about 1200 hooks. Fishers commonly operate on around 107 days per year. Most trips are between two and 15 days but occasionally trips may extend up to 30 days. Typical fishing trips range from 40–300 nm from port, though some vessels may range up to 1000 nm or further to fish. The catch is gilled and gutted and stored on ice, in ice slurry or in refrigerated brine. Almost no bigeye tuna or broadbill swordfish, and probably less than five per cent of the yellowfin tuna catch, are taken by methods other than longlining.

Historically, most purse-seiners were 20–25 m long, but several were 40–45 m. Most poling vessels are 15–20 m long. Purse seine and pole-and-line fishers often use satellite thermal imagery and spotters in aircraft to locate schools of fish. There are no dedicated minor line vessels; most minor line catches are reported by vessels (e.g. longline) on their way to and from fishing grounds.

Table 3. Number of Australian fleet vessels, by gear and size category, active in the WCPFC Convention Area, for 2004–08. Gross registered tonnes (GRT) is the unit for vessel size.

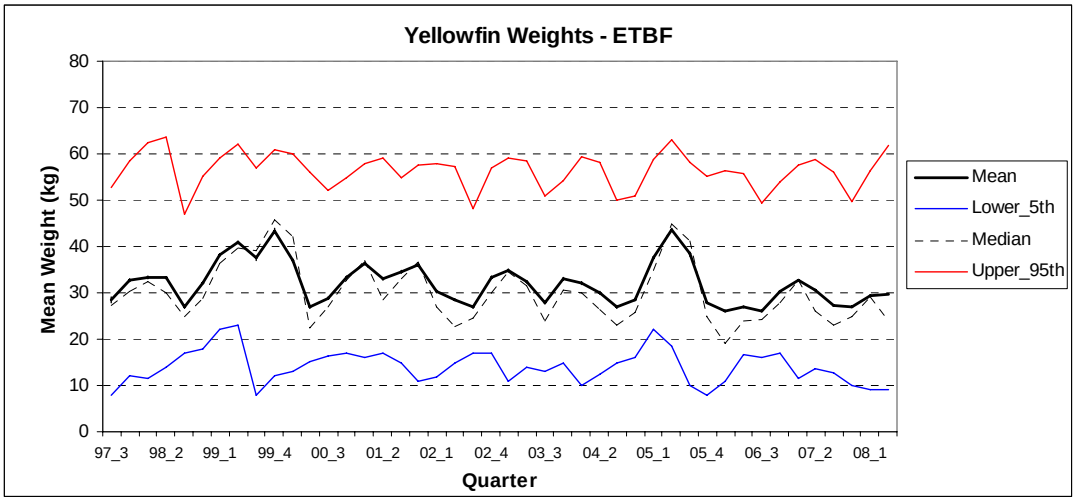
Year	Longline					Purse seine	Pole-and-line	Troll	Total
Vessel size (GRT)	000–050	051–200	201–500	Unknown	Subtotal	000–500	050–150	Unknown	
2004	51	57	0	16	124	3	1	20	148
2005	47	50	0	0	97	3	0	0	100
2006	37	43	0	0	80	3	0	0	83
2007	27	33	1	0	61	2	0	0	63
2008	25	28	1	0	54	1	0	0	55

Source: AFMA catch and effort logbook database

Trends in size composition

The size composition (based on processed weights) of yellowfin tuna, albacore tuna and striped marlin has remained relatively constant over time (Figure 5a–e). However, the mean processed weight of bigeye tuna decreased from around 37 kg in the late 1990s to around 30 kg in 2002. Since then it has remained relatively constant. The mean processed weight of broadbill swordfish has decreased from around 52 kg in the late 1990s to around 43 kg in recent years.

a)



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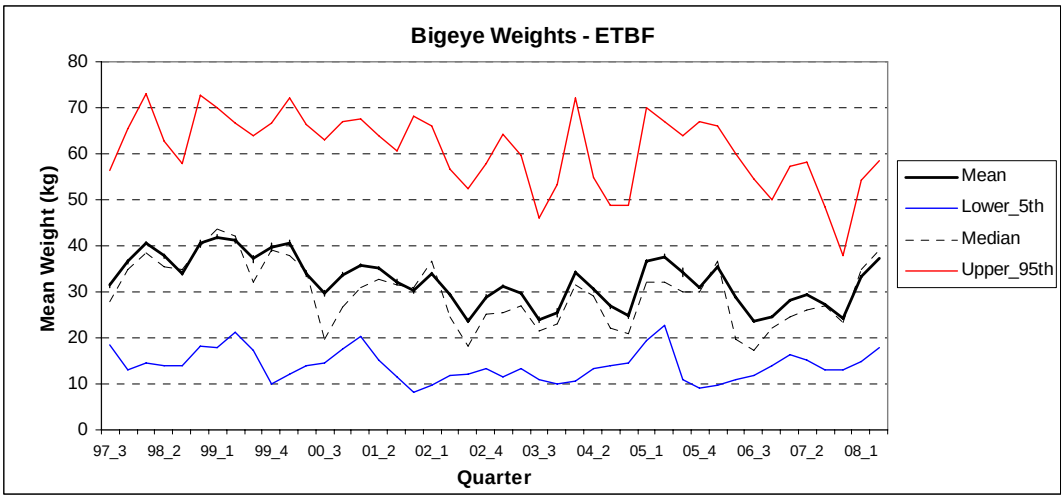
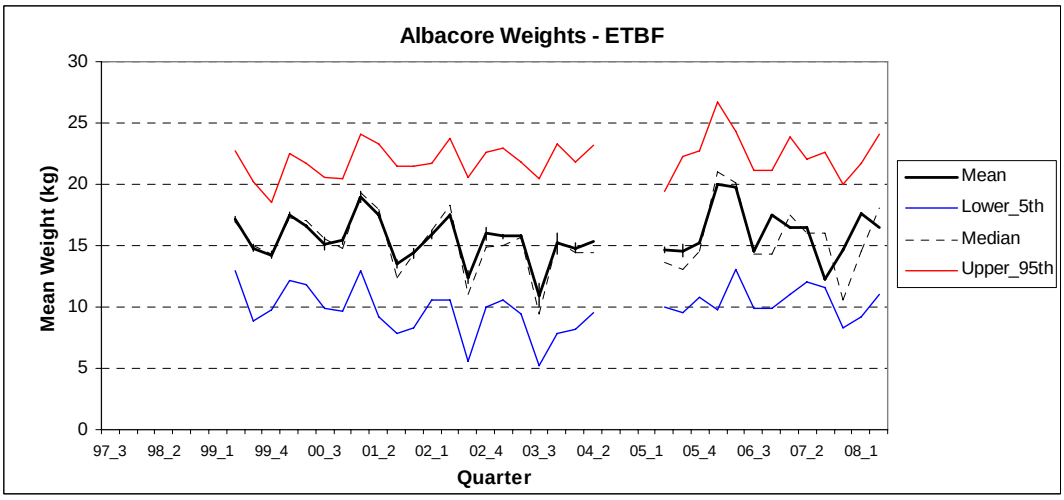
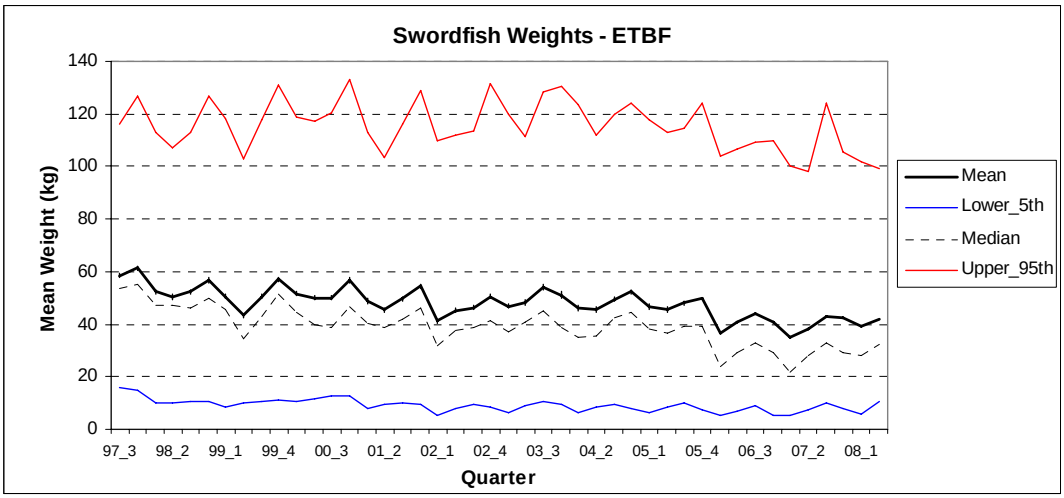

Bigeye Weights - ETBF
Mean Weight (kg)
80
70
60
50
40
30
20
10
0
97_3
98_2
99_1
99_4
00_3
01_2
02_1
02_4
03_3
04_2
05_1
05_4
06_3
07_2
08_1
Quarter
Mean
Lower_5th
Median
Upper_95th

c)


Albacore Weights - ETBF
Mean Weight (kg)
30
25
20
15
10
5
0
97_3
98_2
99_1
99_4
00_3
01_2
02_1
02_4
03_3
04_2
05_1
05_4
06_3
07_2
08_1
Quarter
Mean
Lower_5th
Median
Upper_95th

d)



e)

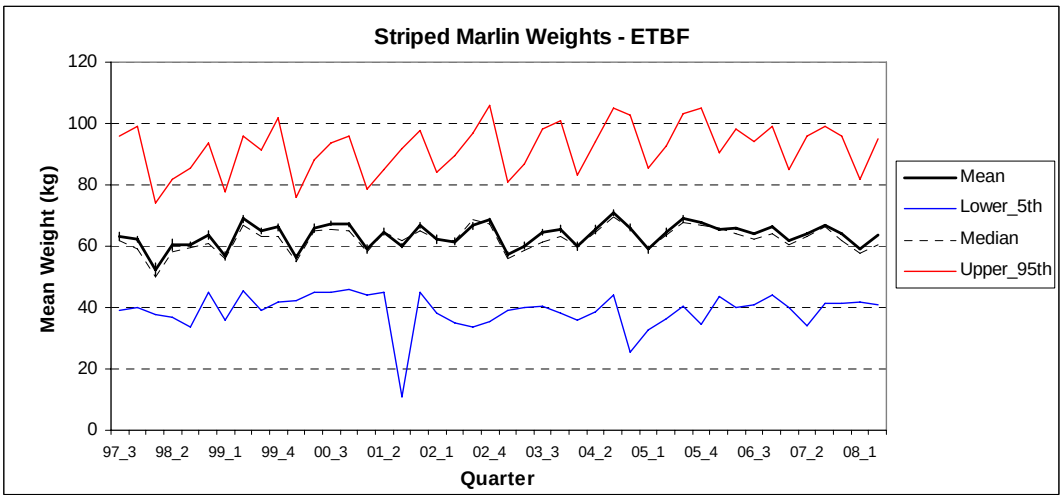


Figure 5 (a–e). Time series of quarterly mean, medium, lower 5th and upper 95th percentiles processed weights of a) yellowfin tuna, b) bigeye tuna, c) albacore tuna, d) broadbill swordfish and e) striped marlin sampled across the entire ETBF based on the data collected from the port sampling program in the ETBF.

Coastal State Reporting

There are currently no foreign fishing vessels operating in the eastern AFZ. Japanese longliners operated in the eastern AFZ from the late 1950s until November 1997.

Socio-economic Factors

Total gross value of production for the ETBF decreased slightly from A$33.7 million in 2006–07 to A$32.0 million in 2007–08, and remains substantially below the peak recorded in 2001–02 of A$93.0 million (2007–08 dollars). In 2007–08, there was a substantial shift in the contribution to gross value of production by species with a reduced contribution from yellowfin tuna, albacore tuna and broadbill swordfish being replaced with an increased contribution from high value bigeye tuna and to a lesser extent, striped marlin. Increased operating costs (such as fuel, crew costs, freight, marketing, repairs and maintenance), declining catch rates and the surrender of 99 longlining permits under the structural adjustment component of the recent Australian Government *Securing Our Fishing Future* package are believed to have had an impact on effort in the ETBF.

Catch and value data for the Eastern Skipjack Fishery have been confidential since 2005–06 due to the small number of active vessels in the fishery. The real gross value of production in the skipjack tuna fishery has been highly variable in recent years, due to fluctuating catch levels. Both of these factors are believed to be a result of high variability of skipjack tuna in the south-eastern AFZ, which is most likely impacted by recruitment from lower latitudes, rather than declining stock levels. Variable participation levels, low profit margins and the 1999 closure of the Eden cannery are the main socio-economic factors responsible for recent low catches in the Eastern Skipjack Fishery.

Disposal of catch

The principal destination for Australian tuna is Japan, which received 58 per cent of total tuna exports (excluding southern bluefin tuna) in 2007–08, mostly comprised of bigeye and yellowfin tuna. Other important markets of Australian tuna exports in 2007–08 included New Zealand (10 per cent), American Samoa (9 per cent), Thailand (9 per cent) and the United States of America (USA) (7 per cent).

Approximately 70 per cent of broadbill swordfish catch is exported to the USA, although sales to Japan are increasing. Most of the striped marlin catch is exported to Japan. Albacore tuna is mainly exported to canneries in American Samoa, Thailand and Indonesia.

Approximately 50 per cent of yellowfin tuna is sold domestically, mainly fresh for sashimi markets; however, this amount can depend on prices and quality. There are also small domestic markets developing for striped marlin and broadbill swordfish, but these fluctuate substantially based on price. Skipjack tuna is mostly canned and sold domestically.

Onshore developments

As part of the recent Australian Government *Securing Our Fishing Future* package, there has been a substantial investment in onshore development. Funding was available through the Onshore Business Assistance and Fishing Community Assistance components of the package to assist businesses and communities affected by the reductions in fishing activity as a result of the package. Investments include the purchasing of new equipment, redevelopment and upgrade of facilities, diversification and expansion of operations and the development of programs aimed at increasing consumer awareness.

Future prospects of the fishery

The structural adjustment component of the recent Australian Government *Securing Our Fishing Future* package resulted in the removal of 99 longlining and 112 minor line permits from the ETBF. AFMA has agreed to manage the ETBF using output controls in the form of individually transferable quotas (ITQs). AFMA has commenced the process of drafting the necessary amendments to the ETBF Management Plan to implement ITQs.

Commercial operators view the Australian Skipjack Fisheries as important developing fisheries as significant catching capacity exists in Port Lincoln, South Australia. Locally sourced skipjack tuna, from the area of the Indian Ocean Tuna Commission (IOTC), are an important raw product for the Port Lincoln cannery. Currently, catches are low as a result of variability in the availability of skipjack tuna in the AFZ, variable participation levels and low profit margins; however, there is room for development in this fishery.

Status of tuna fishery data collection systems

Logbook data collection and verification

AFMA introduced a logbook for domestic longliners in 1986. The logbook has been revised on several occasions. The latest (AL06—Australian Pelagic Longline Daily Fishing Log) was introduced in 2007; vessels began submitting AL06 logbooks in November 2007. Return of logbooks by Australian longliners improved when, in 1995, it became a condition of fishing permits and has been virtually 100 per cent in recent years. Logbooks have also been introduced for the skipjack tuna purse-seine fisheries; PS01—Australian Purse Seine Daily Fishing Log was distributed in July 2002 with the first skipjack tuna catch recorded in this logbook in December 2003. Weights from catch disposal records (*see Unloading/Transhipment*) are verified; weights recorded on logbooks are classified as an estimate only.

Catch and effort logbooks have been introduced for charter operators in both Queensland (Queensland Charter Fishery logbook) and New South Wales (New South Wales Charter Fishing Boat Logbook Monitoring Program). The New South Wales Department of Primary Industries 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.

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 and reporting of releases.

Observer program

AFMA observers have been deployed on domestic longliners since 2001. 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. In 2008, observers monitored 704 176 hooks in the fishery (8.8 per cent of the total number of hooks deployed in the fishery) (Table 4).

Table 4. Estimated annual coverage of operational catch and effort (logbooks), port sampling (coverage rate for the five main target species of individual fish weights collected from processors receiving longline caught fish in the ETBF) and observer data for the Australian fleet, active in the WCPFC Convention Area, 2004–08.

Gear	Year	Operational catch & effort coverage[d] (%)	Observer coverage (%)	Port sampling coverage (%)					
				YFT	BET	ALB[e]	SWO	STM	SKJ
Longline	2004	100	4.6	65	82	28	75	63	0
	2005	100	5.6	55	84	17	92	75	0
	2006	100	5.8	63	79	11	76	68	0
	2007	100	5.3	68	98	13	83	70	0
	2008	100	8.8	52[f]	67[f]	17[f]	80[f]	62[f]	0
Purse-seine	2004	100	0	0	0	0	0	0	0
	2005	100	0	0	0	0	0	0	0
	2006	100	0	0	0	0	0	0	0
	2007	100	4.6	0	0	0	0	0	0
	2008	100	5.7	0	0	0	0	0	0

Sources: Campbell (2004), Dambacher (2005), Dambacher & Moeseneder (2006) and AFMA observer database.

Observed annual estimated catches/interactions of species of special interest (seabird, turtle and marine mammals) and non-target, associated and dependent species, including sharks, by the Australian longline fleet from 2004–08 are presented in Tables 5 and 6 respectively.

[d] Via logbook returns

[e] Bulk weights also collected for albacore

[f] First six months only

Table 5. Observed annual estimated catches/interactions of species of special interest (seabird, turtle and marine mammals) for the Australian longline fleet, in the WCPFC Convention Area, for 2004–08.

Group	Common name	2004	2005	2006	2007	2008
Seabirds	Black-browed albatross	1	0	1	2	2
	Buller's albatross	0	0	1	0	1
	Grey-headed albatross	0	1	0	0	0
	Shy albatross	1	0	2	0	1
	Southern royal albatross	1	0	0	0	0
	Wandering albatross	7	1	1	3	1
	Yellow-nosed albatross	0	0	0	0	0
	Albatrosses (other)	0	1	0	0	2
	Flesh-footed shearwater	4	2	1	0	0
	Short-tailed shearwater	4	0	0	0	0
	Sooty shearwater	0	0	0	0	0
	Wedge-tailed shearwater	1	1	0	0	0
	Petrels, prions and shearwaters	0	1	0	0	0
	Cape petrel	0	4	0	3	0
	Great-winged petrel	0	1	0	0	0
	Westland petrel	0	0	0	0	0
	Great skua	0	0	0	3	0
	Subtotal	19	12	6	11	7
Turtles	Green turtle	0	6	1	5	1
	Hawksbill turtle	1	0	0	1	0
	Leatherback turtle	9	8	8	3	3
	Loggerhead turtle	1	1	2	2	2
	Pacific (or Olive) Ridley turtle	1	3	0	0	2
	Turtles (other)[g h]	0	0	1	0	0
	Subtotal	12	18	12	11	8
Whales	Common dolphin	1	0	0	0	0
	Humpback whale	0	1	0	0	0
	Short-finned pilot whale	1	0	0	1	0
	Subtotal	2	1	0	1	0
Pinnipeds	Australian fur seal[d]	0	0	1	0	2
	Australian sea lion	0	0	0	0	2[i]
	Subtotal	0	0	1	0	4
	Grand total	**33**	**31**	**19**	**23**	**19**

Source: AFMA observer database

[g] This category was not reported prior to 2006 calendar year

[h] 2006 calendar year: 'Turtles (other)' were unidentified turtles, possibly hard-shelled turtles (e.g Olive Ridley, Hawksbill).

[i] Likely misidentified as Australian sea lions are not found within the range of the ETBF

Table 6. Annual estimated catches of non-target, associated and dependent species, including sharks, by the Australian fleet, by gear (longliners and other methods combined), in the WCPFC Convention Area, for 2004–08.

Group	Species	Longliners (t)					Other methods combined (t)				
		2004	2005	2006	2007	2008	2004	2005	2006	2007	2008
Scalefish	Black oilfish	79.0	84.4	64.0	101.1	75.3	0.0	0.0	0.0	0.1	0.0
	Mahi mahi	304.5	189.1	117.6	101.8	148.7	0.3	0.1	0.1	0.1	0.0
	Indo-Pacific sailfish	1.3	2.6	2.3	2.0	0.0	0.0	0.0	0.0	0.0	0.0
	Moonfish	9.5	11.1	97.8	112.8	58.6	0.0	0.0	0.0	0.0	0.0
	Northern bluefin tuna	10.3	13.0	5.5	3.8	2.7	0.5	0.0	0.0	0.0	0.0
	Ocean sunfish	0.0	0.0	1.7	0.0	0.0	0.1	0.3	0.1	0.1	0.0
	Oilfish	3.9	7.9	6.8	2.5	0.0	0.1	0.3	0.1	0.1	0.0
	Ray's bream	6.3	29.1	6.9	60.4	39.0	0.3	0.0	0.0	0.0	0.0
	Rudderfish	195.5	154.4	125.0	146.7	166.9	2.9	6.7	38.2	4.4	5.7
	Shortbilled spearfish	16.9	13.5	25.8	13.0	10.6	0.0	0.0	0.0	0.0	0.0
	Southern bluefin tuna	213.7	37.3	6.3	6.9	20.8	0.0	0.0	0.0	0.0	0.0
	Wahoo	12.3	12.4	43.7	32.7	25.9	0.0	0.0	0.0	0.1	0.0
	Subtotal	853.2	554.8	503.4	583.7	548.5	4.2	7.4	38.5	4.9	5.7
Sharks	Blacktip sharks	6.0	3.2	3.9	2.6	0.0	0.0	0.0	0.0	0.1	13.9
	Blue shark	21.9	10.6	10.3	9.0	5.7	2.1	3.5	0.5	0.3	0.4
	Bronze whaler	30.4	20.0	15.2	10.8	7.5	2.6	1.9	3.2	1.2	2.1
	Dusky shark	3.2	0.0	2.3	0.0	2.1	0.0	0.0	0.0	0.0	0.0
	Hammerhead shark	1.5	0.0	6.9	2.4	2.5	0.0	0.0	0.0	0.0	0.0
	Oceanic whitetip shark	8.6	5.9	4.4	3.7	2.0	0.5	0.0	0.0	0.0	0.0
	Scalloped hammerhead	8.5	4.5	0.0	0.0	0.0	0.0	0.0	1.1	0.0	1.7
	Shortfin mako	73.2	63.9	43.5	35.7	49.2	4.9	4.0	2.7	0.8	2.3
	Silky shark	0.0	0.0	2.3	1.7	0.0	0.0	0.0	0.1	0.0	0.0
	Smooth hammerhead	0.0	2.0	0.0	0.0	0.0	1.0	0.4	0.6	0.2	0.0
	Thresher shark	1.2	1.4	0.0	0.0	0.0	3.9	4.2	3.3	0.4	1.2
	Tiger shark	8.5	6.2	4.5	2.8	2.6	0.1	0.0	5.9	0.0	4.2
	Subtotal	163	117.7	93.3	68.7	71.6	15.1	14	17.4	3.0	25.8
	TOTAL	**1,016.2**	**672.5**	**596.7**	**652.4**	**620.1**	**19.3**	**21.4**	**55.9**	**7.9**	**31.5**

Source: AFMA catch and effort logbook database

Port sampling program

The collection of individual processed fish weights in the ETBF from processors receiving longline caught fish commenced in mid-1997. The program mainly focuses on the five principal target species in the fishery (yellowfin tuna, bigeye tuna, albacore tuna, broadbill swordfish and striped marlin) though data on a range of other species have also been collected. Data are collated on a financial year basis (July–June the following year) and during the 11 years that the program has been run, over 1.14 million individual fish weights pertaining to the five target species have been collected together with around 200 000 weights for the other species. Coverage rates for the target species are high, averaging around 61 per cent for yellowfin tuna, 76 per cent for bigeye tuna and broadbill swordfish, 22 per cent for albacore tuna and 54 per cent for striped marlin. Bulk weights for binned albacore tuna and some other species are also collected.

Unloading/Transhipment

Catch disposal records are the formal method for monitoring unloads, which were implemented in the ETBF in January 2006 (Table 7). Catch disposal records are completed by both the fisher and licensed fish receiver at the point of unload to obtain accurate data on fish numbers and verified weight by species. Skippers tend to under-estimate the weights reported in logbooks for most species, so the catch disposal record data have been reported in official statistics since 2007. Compliance checks are conducted on unloads as part of a risk based compliance program. 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. A small amount of transhipment occurs in the ETBF between domestic vessels, with the catch verified in catch disposal records.

Table 7. Annual catch estimates (converted whole weights) for the Australian longline fleet, for 2006–08, derived from catch disposal records. Estimates are in tonnes. Totals may not be exact due to rounding.

Year	Albacore	Yellowfin	Bigeye	Striped marlin	Broadbill swordfish	Other	Total
2006	2591.3	1830.3	498.6	441.2	1136.1	762.9	7260.5
2007	1924.6	1389.6	1007.5	358.7	1352.7	833.5	6866.6
2008	1275.0	1647.5	1026.4	424.8	1483.0	828.9	6685.7

Source: AFMA Catch disposal records

Other

A range of data is also collected via individual research projects. Please see *Research activities covering target & non-target species* for more information.

Research activities covering target & non-target species

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

Biological Research Projects

- Reproductive dynamics of broadbill swordfish in the domestic longline fishery off eastern Australia (Young and Drake, 2002)
- Age and growth of bigeye tuna from the eastern and western AFZ (Farley, 2003)
- Age and growth of broadbill swordfish from Australian waters (Young and Drake, 2004)
- Population biology and habitat preferences of striped marlin in eastern Australia (Davie, ongoing)
- Integrated study of albacore population biology and biogeography in the area of influence in the ETBF (Farley, ongoing)
- Defining regional connections in south-west Pacific broadbill swordfish (Wilcox, ongoing)

Assessment-related Research Projects

- Dynamics of the interactions of the fishery and broadbill swordfish on seamounts off eastern Australia (Campbell and Hobday, 2003).
- Migration and habitat preferences of bigeye tuna on the east coast of Australia (Gunn et al., 2005)
- Stock assessment of striped marlin in the south-western Pacific Ocean (Langley et al., 2006)
- Developing harvest strategies for the ETBF (AFMA, 2007)
- Developing robust stock-status indicators (Basson and Dowling, 2008)
- Updating the stock assessment of broadbill swordfish in the south Pacific Ocean (Kolody et al., 2008)
- Determining the depths fished and the effective longline effort targeted at various species in the ETBF (Campbell, ongoing)
- Conducting integrated assessment, and developing and evaluating an assessment framework for the ETBF (Campbell, ongoing)
- Integrated evaluation of management strategies for multi-species long-line fisheries (Davies, ongoing)
- Predicting the impact of hook decrementation on the distribution of fishing effort in the ETBF (Wilcox, ongoing)

Ecological Research Projects

- Determining the ecological impacts of longline fishing in the ETBF (Young, 2008)

Bycatch Research Projects

- A review of byproduct interactions and economics in Australia's tuna and billfish fisheries (Bromhead et al., 2005)
- Marine turtle mitigation in Australia's pelagic longline fishery (Robbins et al., 2007)
- The effects of bycatch mitigation measures, such as circle hooks and wire leaders, on target and non-target catches (Ward et al., 2008)
- Estimating turtle bycatch rates in the ETBF (Tennant et al., ongoing)

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