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PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

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ABARES

Annual report to the Western and Central Pacific Fisheries Commission

Part 1: Information on fisheries, research and statistics 2012 Australia

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Scientific data were provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission on the 30th April 2013	YES

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Contents

Summary

Australian commercial fisheries for highly migratory species in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area are managed as part of the Eastern Tuna and Billfish Fishery (ETBF) (a mainly longline fishery with a small minor line component) and Eastern Skipjack Fishery (a purse seine fishery). The majority of fishing occurs in the longline sector of the ETBF and as such, this is the focus of the annual report.

Total catches reported in logbooks for the ETBF decreased from 4513 t in 2011 (4475 t longline, 38 t minor line) to 3717 t in 2012 (3703 t longline, 14 t minor line). This is a decline from a peak of 8229 t in 2002. Longline fishing effort has fallen from a peak of 12.40 million hooks in 2003 to 6.61 million hooks in 2012. The decrease in fishing effort from 2003 levels is the result of the strength of the Australian dollar, increased operating costs and the surrender of permits under the structural adjustment component of the Australian Government Securing Our Fishing Future package, as well as the introduction of a quota management system. Forty-four vessels reported longlining in the WCPFC Convention Area during 2012. Longline logbook catches of albacore decreased from 640 t in 2011 to 556 t in 2012. Longline catches of bigeye tuna increased from 362 t in 2011 to 465 t in 2012. In contrast, longline catches of yellowfin tuna decreased from 1811 t in 2011 to 1101 t in 2012. Longline catches of swordfish increased slightly from 888 t in 2011 to 991 t in 2012 (930 t caught south of 20°S). Longline catches of striped marlin decreased slightly from 282 t in 2011 to 228 t in 2012. Longline catches of skipjack increased from 2 t in 2011 to 4 t in 2012.

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. In 2012, there were 7 vessels actively targeting tuna and billfish species using minor line. The number of vessels reporting using minor line has steadily decreased from a peak of 52 vessels in 2001. This is partly due to the surrender of 49 per cent of permits under the structural adjustment component of the Australian Government Securing Our Fishing Future package, which was completed in 2006. Annual minor line effort decreased from 106 lines in 2011 to 73 lines in 2012. There were no active vessels in the Eastern Skipjack Fishery in 2012.

The Australian Fisheries Management Authority (AFMA) observer program has deployed observers on domestic longliners since 2001, initially as part of a program to test the efficacy 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 2012, observers monitored 406 827 hooks in the longline fishery (6.2 per cent of the total number of hooks deployed). AFMA conducted a trial of e-monitoring (i.e. on-board, fixed-mount digital video cameras) to evaluate the effectiveness of this technology for a range of fishery monitoring purposes and to conduct a cost–benefit analysis. E-monitoring will begin to be implemented in the fishery from 30 June 2013.

In January 2013, the AFMA Commission agreed on total allowable commercial catches (TACCs) for the commercial sector of the ETBF. These apply to the 2013–14 season which commenced on 1 March 2013. The TACCs for the five main target species are: albacore tuna (2500 t); bigeye tuna (1056 t); swordfish (1396 t); striped marlin (370 t); yellowfin tuna (2200 t).

1 Background

Australian commercial fisheries for highly migratory species in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area are managed as part of the Eastern Tuna and Billfish Fishery (ETBF) (a mainly longline fishery with a small minor line component) and Eastern Skipjack Fishery (a purse seine fishery).

Longline

Japanese longliners began fishing off Australia's east coast in the late 1950s. Sporadic domestic longlining for yellowfin tuna[1] commenced soon after in the early 1960s. The declaration of the Australian Fishing Zone (AFZ) in 1979 resulted in Japanese longliners being licensed to fish in Australian waters under bilateral agreements. In the early 1980s, longlining increased markedly after successful air freighting of fresh-chilled tuna to Japan. In the 1990s, effort expanded in the waters off northern Queensland, resulting in high catch rates of yellowfin and bigeye tuna.

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 swordfish. Japanese longliners were excluded from the AFZ from 1997. Longlining for swordfish has declined since early 2005 because of high fuel and bait costs, the introduction of a competitive total allowable catch (TAC) in 2006 (now an allocated individual transferable quota system) and changes in the exchange rate.

Increased operating costs and fluctuating market returns saw many longliners targeting lower-value albacore during the first half of 2006. However, decreases in the price of albacore and unfavourable export conditions over the past several years, such as a strengthening Australian dollar, have prompted some longliners to move back to targeting bigeye tuna and swordfish.

Pole-and-line, purse seine and minor line

The pole-and-line fishery expanded rapidly in the 1950s with the introduction of live-bait-and-pole techniques for southern bluefin tuna and sporadic catches of skipjack and yellowfin tuna. Pole-and-line fishing decreased in the late-1990s with little to no fishing by Australian fleets in the WCPFC Convention Area since then. The introduction of purse seining in the 1970s also increased catches. After peaking at 7000 t in the early 1990s, purse-seine effort and catches of skipjack have decreased dramatically, with zero to very low effort and catches in recent years.

Recreational fishing

Recreational and charter anglers have taken tuna and billfish off eastern Australia since the early 1900s. During the 1970s, recreational vessels capable of operating offshore became more readily available and angling for tuna and billfish grew in popularity. The continental shelf is less than 8 nm offshore in some places along the southeast coast of Australia, allowing anglers to fish for tuna from shore at several locations. The Game Fishing Association of Australia (GFAA) was formed in 1938. In 2012, GFAA reported a membership of more than 8000 anglers, most based on the east coast of Australia. Many gamefishers tag and release much of their catch, especially marlins.

[1] Scientific names found in Appendix 1

2 Flag state reporting

Domestic longlining catch and effort

Unless otherwise stated, all catch and effort levels in this report are derived from those reported in Australian Fisheries Management Authority (AFMA) logbooks. Forty four vessels reported longlining in the WCPFC Convention Area during 2012, down from a peak of 180 in 1997 (Figure 1). Total longline effort increased slightly from 6.59 million hooks in 2011 to 6.61 million hooks in 2012 (Table 1). Overall, effort has declined from the peak effort of 12.40 million deployed in 2003. This decline is mainly the result of the strength of the Australian dollar, increased operating costs, the surrender of permits under the structural adjustment component of the Australian Government Securing Our Fishing Future package, the introduction of hook limits in 2009 and the introduction of quota management in 2011. The number of vessels in 2012 fishing for striped marlin south of 15°S was 42. Forty vessels fished for albacore and 42 vessels fished for swordfish south of 20°S; there was no effort for albacore north of the equator.

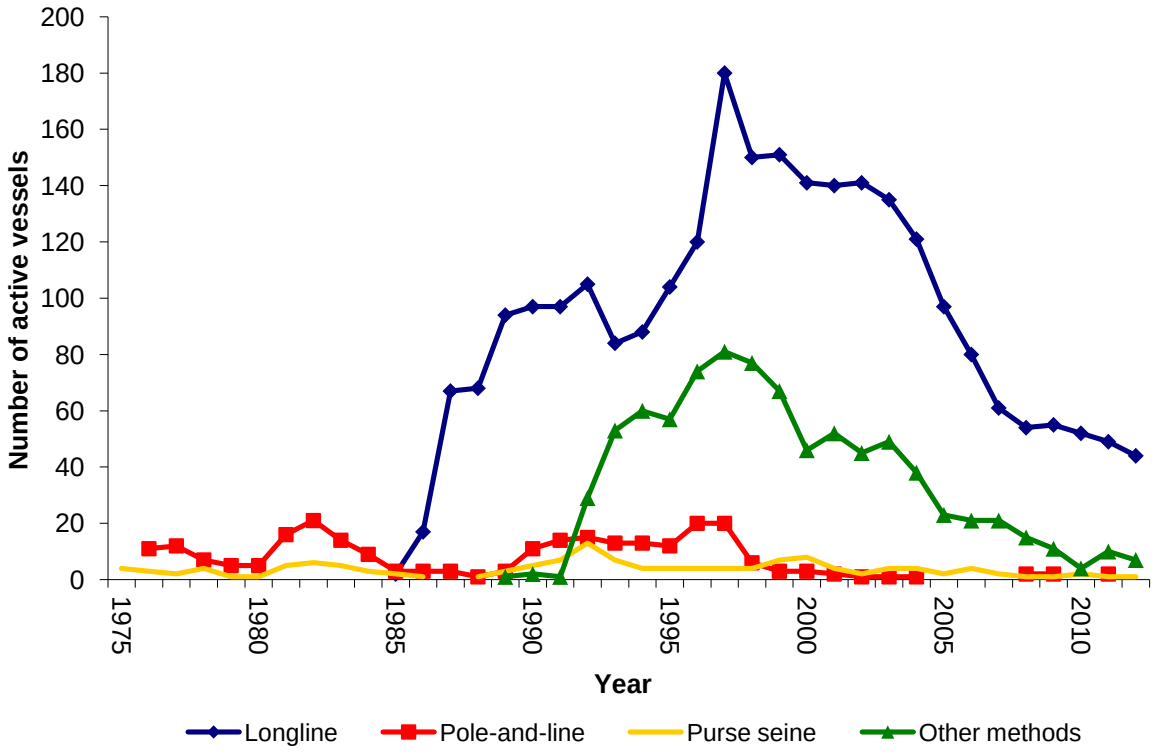


Figure 1. Historical annual vessel numbers for the Australian fleet, by gear (longline, purse seine, pole-and-line and other commercial methods [minor line including trolling, rod-and-reel and handline]) for the WCPFC Convention Area.

Table 1. Annual catch and effort estimates (whole weight) for the Australian fleet, by gear and primary species, for the WCPFC Convention Area, 2008–12.

Fishing method	Year	Effort (Longline–number of hooks (000's); purse seine–search hours; pole-and-line–days fished)	Primary species (t)					
			Albacore	Bigeye	Skipjack	Yellowfin	Striped marlin	Swordfish
All gears	2008	-	1085.1	899.7	46.2	1478.3	374.2	1240.7
	2009	-	1343.2	619.4	12.2	1203.0	325.9	1111.6
	2010	-	725.1	438.4	3.6	1315.3	248.5	921.4
	2011	-	640.2	381.7	1.9	1811.0	282.3	887.8
	2012	-	556.1	473.0	3.5	1100.7	227.8	991.2
Longline[2]	2008	8059	1085.1	899.7	30.6	1478.3	374.2	1240.7
	2009	8839	1343.2	619.4	10.5	1203.0	325.6	1111.8
	2010	7875	725.1	438.4	3.6	1315.3	248.5	921.4
	2011	6597	640.2	381.7	1.9	1811.0	282.3	887.8
	2012	6606	556.1	473.0	3.5	1100.7	227.8	991.2
Purse seine	2008	309	0.0	0.0	15.2	0.0	0.0	0.0
	2009	396	0.0	0.0	0.0	0.0	0.0	0.0
	2010	273	0.0	0.0	0.0	0.0	0.0	0.0
	2011	66	0.0	0.0	0.0	0.0	0.0	0.0
	2012	79	0.0	0.0	0.0	0.0	0.0	0.0
Pole-and-line	2008	8.0	0.0	0.0	0.4	0.0	0.0	0.0
	2009	15.0	0.0	0.0	1.7	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[2]Includes small catches from other commercial methods (minor line component including trolling, rod-and-reel and handline) to address issues of confidently.

Total ETBF longline catches reported in logbooks decreased from 4513 t in 2011 to 3717 t in 2012. This is down from a peak of 8229 t in 2002. Historical annual catches for the Australian fleet in the WCPFC Convention Area, by primary species, are shown in Figure 2. Longline catches of albacore decreased from 640 t in 2011 to 556 t in 2012 (462 t caught south of 20°S) while bigeye tuna longline catches increased from 382 t in 2011 to 473 t in 2012. Longline catches of yellowfin tuna decreased from 1811 t in 2011 to 1101 t in 2012, while longline catches of swordfish increased from 888 t in 2011 to 991 t in 2012 (930 t caught south of 20°S). Longline catches of striped marlin decreased from 282 t in 2011 to 228 t in 2012 (228 t caught south of 15°S). Longline catches of skipjack increased from 2 t in 2011 to 4 t in 2012. Annual catch distributions of the main target species by the Australian longline fleet for 2008– 12 are shown in Figure 3.

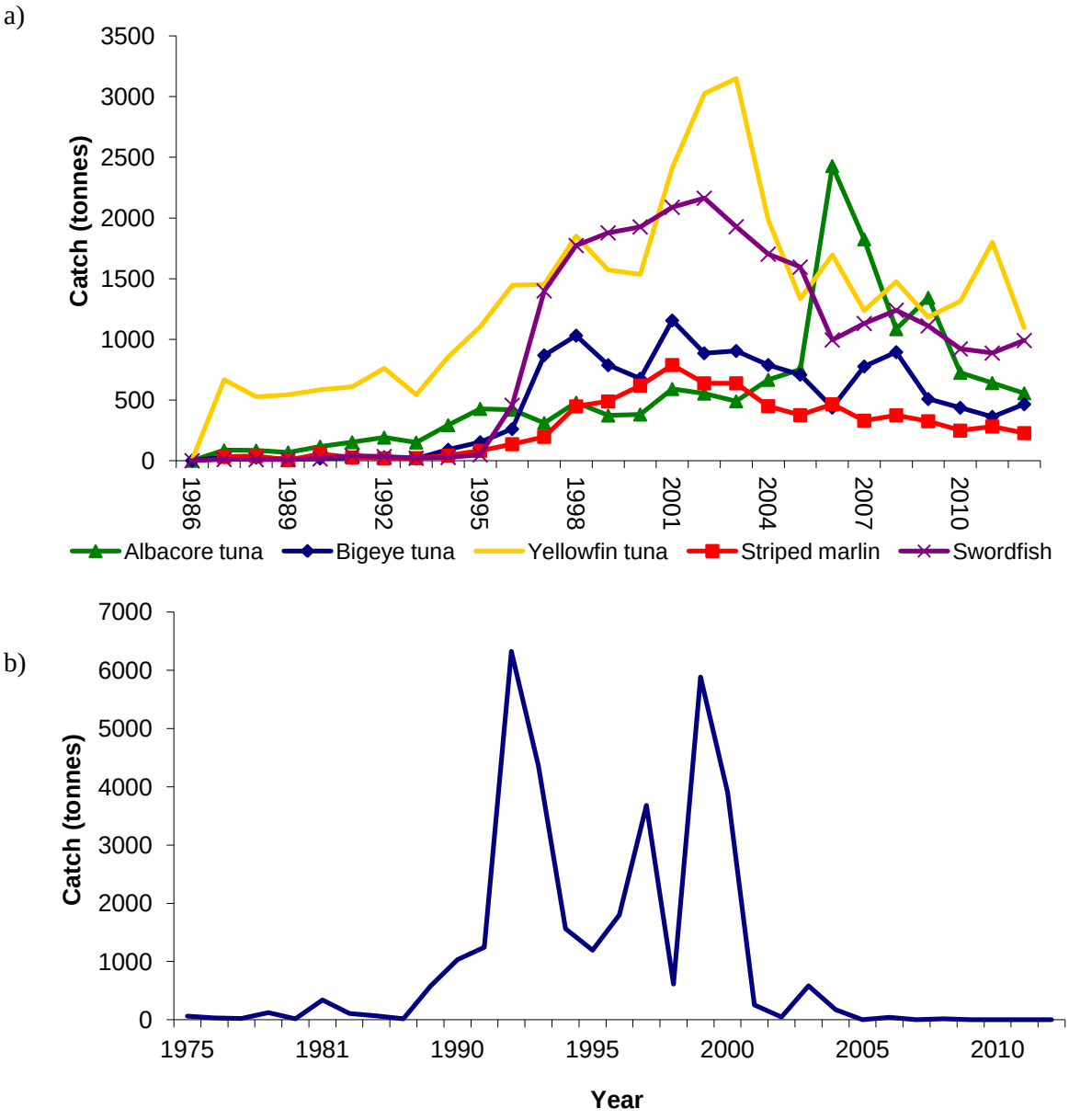
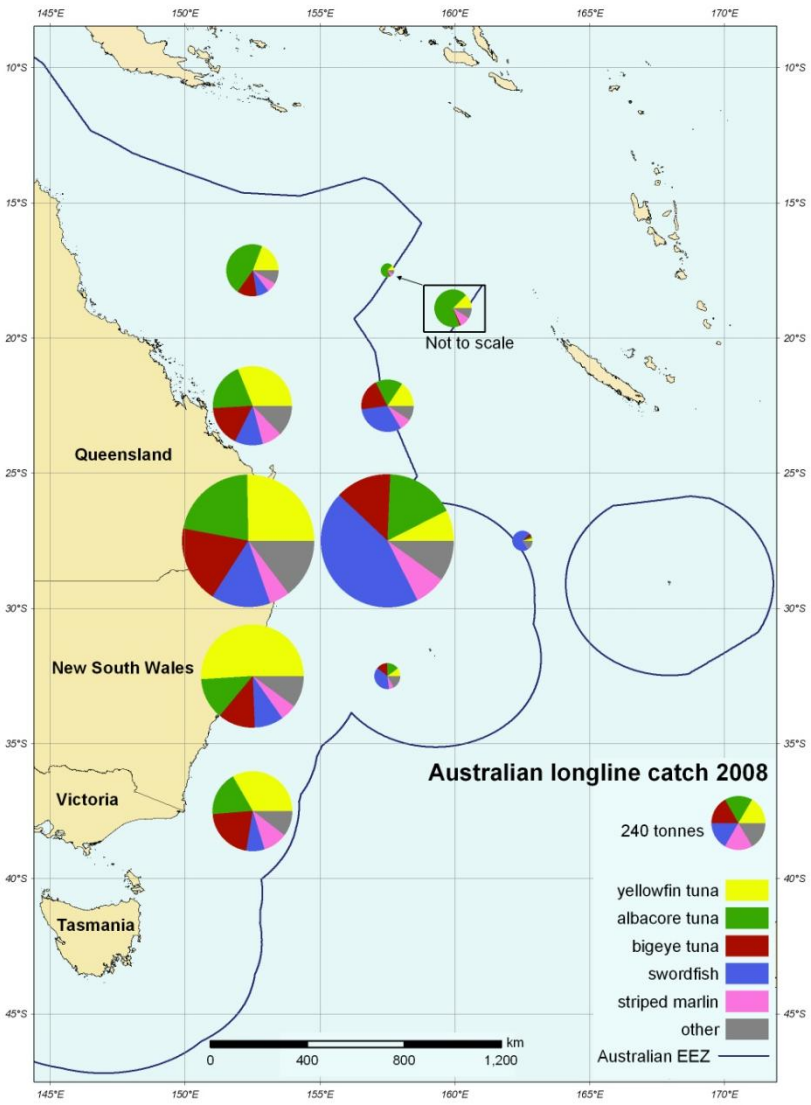


Figure 2 . Historical annual longline catch in the WCPFC Convention Area for (a) albacore, bigeye and yellowfin tuna, as well as striped marlin and swordfish, and (b) purse seine catch skipjack tuna.

a)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Not to scale
Queensland
New South Wales
Victoria
Tasmania
Australian longline catch 2008
240 tonnes
yellowfin tuna
albacore tuna
bigeye tuna
swordfish
striped marlin
other
Australian EEZ
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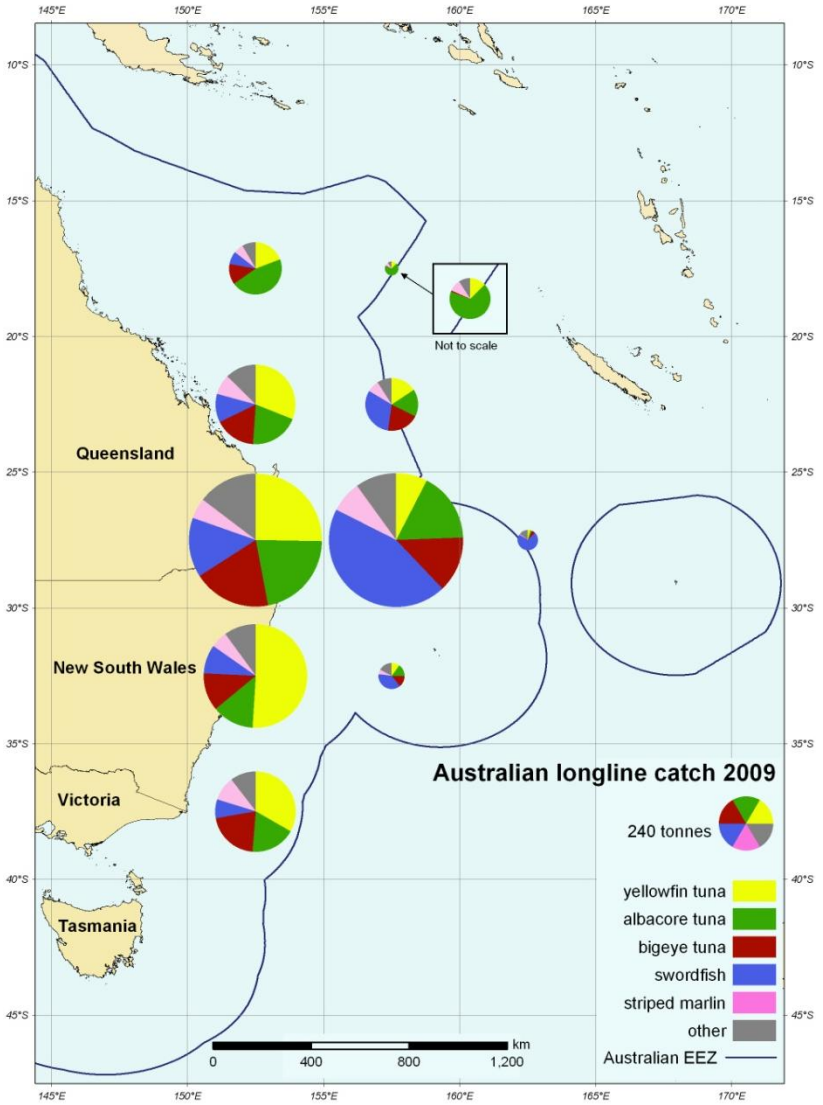
b)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Not to scale
Queensland
New South Wales
Victoria
Tasmania
Australian longline catch 2009
240 tonnes
yellowfin tuna
albacore tuna
bigeye tuna
swordfish
striped marlin
other
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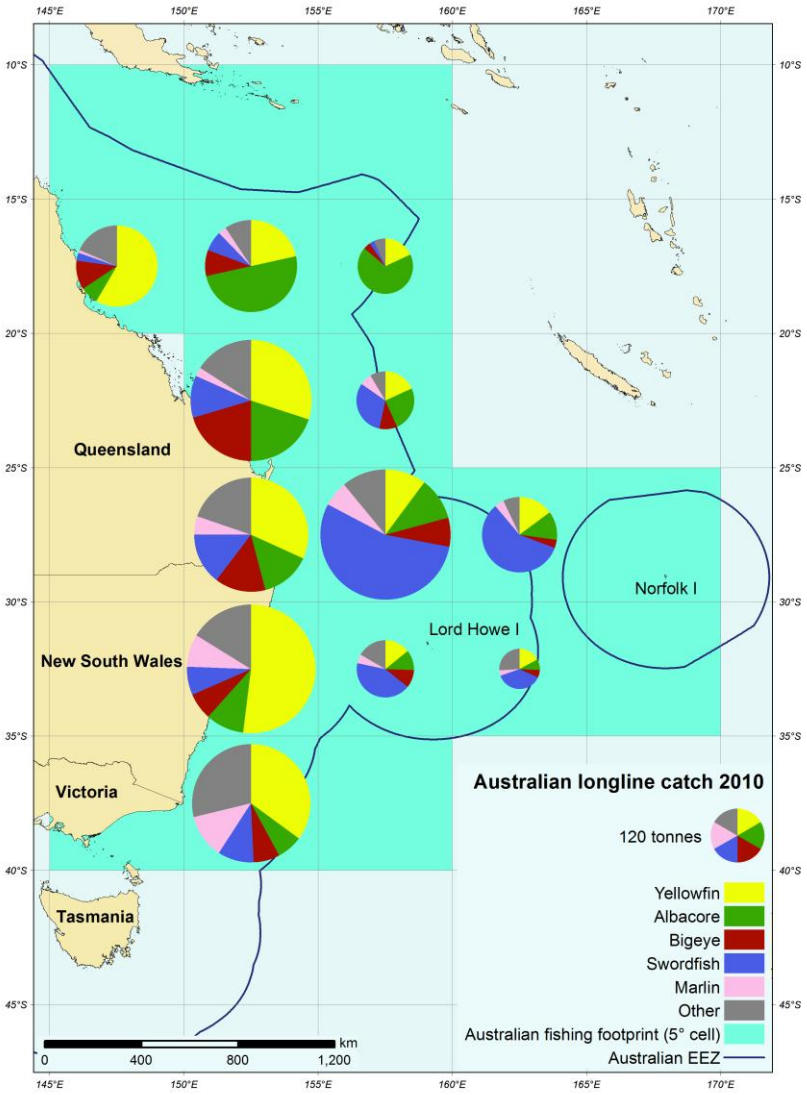
c)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Queensland
New South Wales
Victoria
Tasmania
Lord Howe I
Norfolk I
Australian longline catch 2010
120 tonnes
Yellowfin
Albacore
Bigeye
Swordfish
Marlin
Other
Australian fishing footprint (5° cell)
Australian EEZ
km
0
400
800
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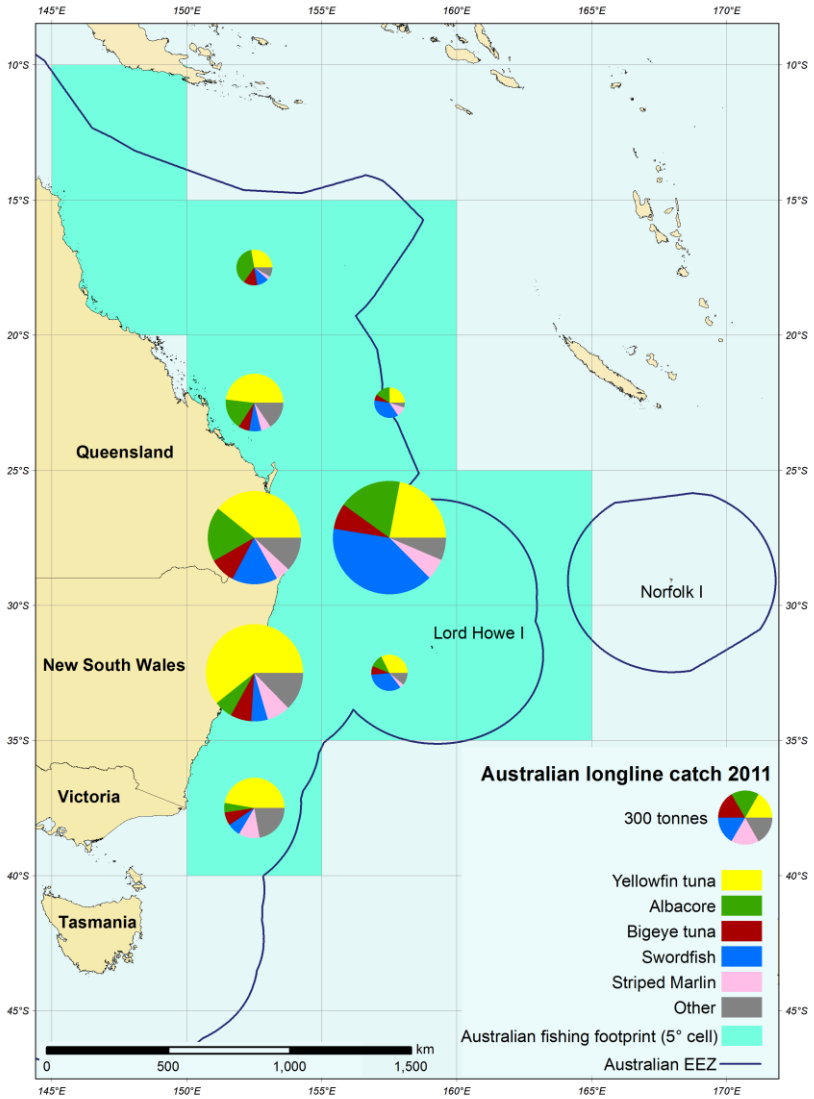
d)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Queensland
New South Wales
Victoria
Tasmania
Lord Howe I
Norfolk I
Australian longline catch 2011
300 tonnes
Yellowfin tuna
Albacore
Bigeye tuna
Swordfish
Striped Marlin
Other
Australian fishing footprint (5° cell)
Australian EEZ
km
0
500
1,000
1,500

e)

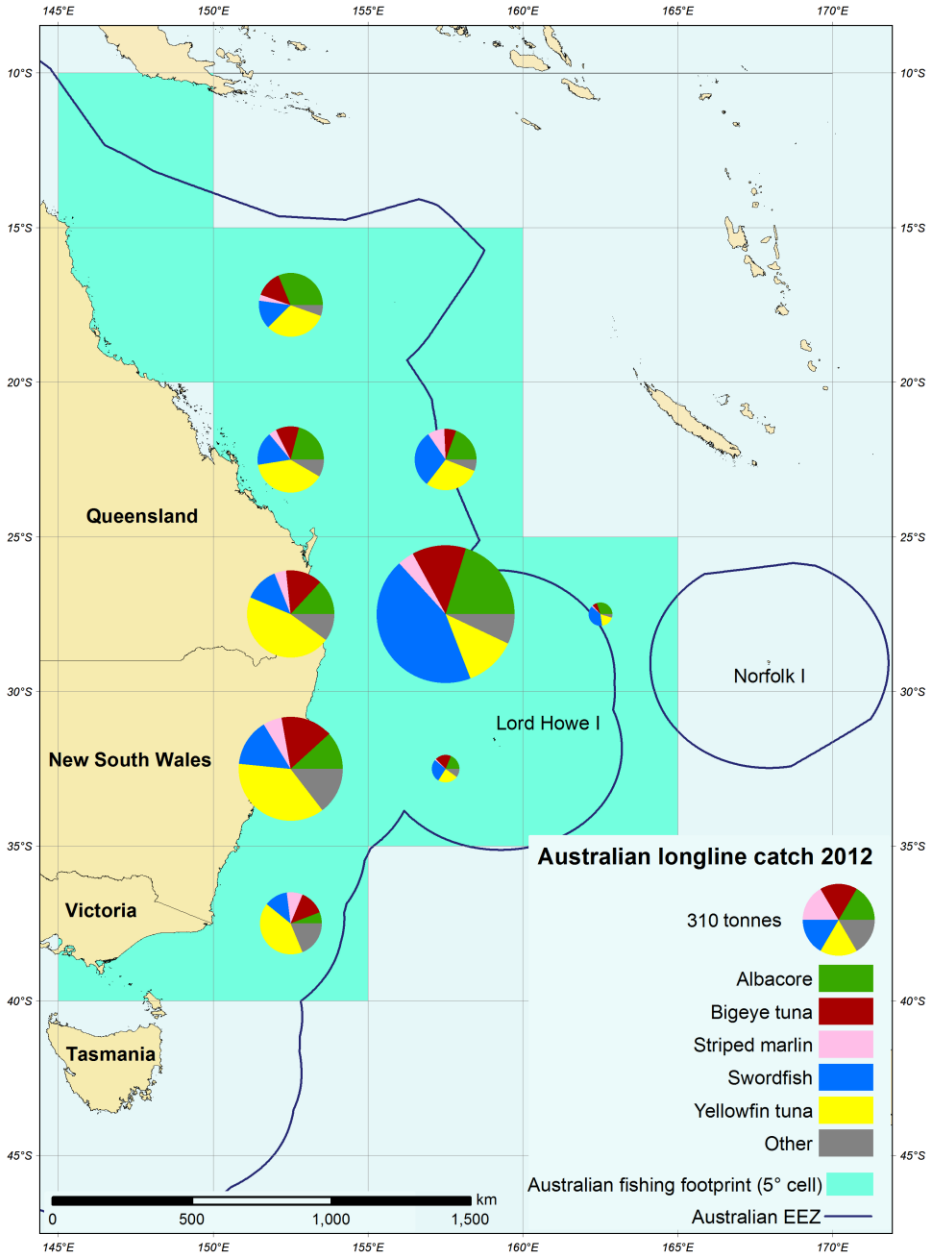


Figure 3 (a–e). Annual distributions of target species catch by the Australian longline fleet active in the WCPFC Convention Area, for 2008–12. Catches have been aggregated to five degree blocks to address issues of confidentiality and are scaled to the pie chart provided in the legend. Fishing footprint shows the total area of waters fished by all vessels in the fishery at a maximum spatial resolution of one degree square (111 x 111 km).

Retention of both blue marlin and black marlin by commercial longliners has been prohibited since 1998; no retained catches were recorded in 2012. Annual retained catch estimates of non-target, associated and dependent species, including sharks, by the Australian longline fleet from 2008–12 are presented in Table 2. Estimates of discards are in Table 3. Historically, the vast majority of the catch and effort by Australian longliners has been taken within the AFZ, with little effort on the adjacent high seas (Table 4).

Table 2. Annual retained catch estimates (tonnes) 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 2008–12.

Group	Species	Longliners (t)					Other methods combined (t)				
		2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Scalefish	Escolar	78.1	43.9	27.2	24.6	23.0	0.0	0.0	0.0	0.0	0.0
	Mahi mahi	160.5	131.6	259.2	207.1	61.5	0.0	0.1	0.0	0.1	0.0
	Moonfish	64.4	74.2	35.1	24.8	22.7	0.0	0.0	0.0	0.0	0.0
	Ocean sunfish	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Oilfish	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	1.1
	Ray's bream	39.2	34.9	13.0	4.2	20.1	0.0	0.9	1.3	0.6	3.3
	Rudderfish	169.0	147.7	88.9	40.1	58.6	5.7	9.7	7.4	6.6	3.4
	Sailfish	1.0	0.8	1.0	0.7	0.8	0.0	0.0	0.0	0.1	0.0
	Shortbill spearfish	10.9	13.8	16.6	13.1	6.6	0.0	0.0	0.0	0.0	0.0
	Southern bluefin tuna	22.4	194.8	151.8	84.3	56.7	0.0	10.0	0.0	1.1	0.0
	Wahoo	29.9	28.4	19.6	20.1	13.0	0.0	0.0	0.0	0.1	0.1
	Subtotal	575.4	670.4	612.4	419.0	263.1	5.7	20.8	8.7	8.7	7.9
Sharks	Blacktip shark	0.5	0.3	0.8	4.9	3.6	13.9	0.3	0.1	9.9	0.2
	Blue shark	5.8	23.1	13.2	8.6	11.7	0.4	0.4	0.7	0.6	0.3
	Bronze whaler	7.8	14.8	9.5	9.6	7.2	2.1	2.4	1.4	7.4	5.6
	Dusky shark	2.6	3.9	2.8	1.8	5.1	0.0	0.0	5.5	5.2	3.0
	Hammerhead	2.5	3.3	3.2	4.9	3.9	0.0	0.0	0.0	0.0	0.0
	Longfin mako	0.1	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Oceanic whitetip	2.0	3.7	2.9	1.9	2.7	0.0	0.0	0.0	0.0	0.0
	Porbeagle	0.1	0.1	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0
	Scalloped hammerhead	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0
	Shortfin mako	50.5	64.7	45.1	45.6	58.4	2.3	1.9	2.8	7.8	7.7
	Silky shark	0.7	0.1	0	0	0.2	0.0	0.0	0.0	0.0	0.0
	Smooth hammerhead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3
	Thresher shark	0.1	0.6	0.2	0.5	1.1	1.2	2.6	1.1	5.6	3.3
	Tiger shark	2.8	4.3	3.7	3.5	5.0	4.2	0.0	0.0	0.0	0.0
	Whale shark	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	75.5	119.3	82.0	81.7	99.2	25.8	7.6	11.6	37.3	20.4
	TOTAL	**650.9**	**789.7**	**694.4**	**500.7**	**362.3**	**31.5**	**28.4**	**20.3**	**46.0**	**28.3**

Table 3. Annual longline discard estimates (numbers) of non-target, associated and dependent species, including sharks, by the Australian fleet in the WCPFC Convention Area, for 2008–12.

Group	Species	2008	2009	2010	2011	2012
Scalefish	Escolar	121	117	40	176	399
	Mahi mahi	70	114	198	346	127
	Moonfish	6	4	3	3	4
	Ocean sunfish	200	206	273	396	522
	Oilfish	4	0	1	11	0
	Ray's bream	21	28	18	7	34
	Rudderfish	151	315	135	112	776
	Sailfish	6	49	2	5	12
	Shortbill spearfish	56	82	56	41	11
	Southern bluefin tuna	331	1755	1662	203	244
	Wahoo	172	51	19	49	51
	Subtotal	1138	2721	2407	1349	2180
Sharks	Blacktip sharks	61	2	9	14	7
	Blue shark	1807	2800	4441	3229	3180
	Bronze whaler	266	403	288	975	322
	Dusky shark	296	716	237	304	379
	Hammerhead*	8	41	33	140	180
	Longfin mako	0	1	1	1	3
	Oceanic whitetip	101	147	227	291	239
	Porbeagle	0	1	0	1	2
	Shortfin mako	150	468	326	355	400
	Silky shark	4	15	29	69	47
	Thresher shark	140	137	52	132	165
	Tiger shark	94	169	68	102	200
	Whale shark	0	0	0	0	0
	Subtotal	2927	4900	5711	5613	5124
	TOTAL	**4065**	**7621**	**8118**	**6962**	**7304**

*Note that hammerhead species are generally combined in the category "hammerhead".

Table 4. Catch and effort by Australian longliners, by primary species, within the AFZ and on the high seas, 2008–12. Proportions of catch and effort within the AFZ versus the high seas are provided in parentheses.

	Year	Effort ('000 hooks)	Primary species catch (t)					
			Albacore	Bigeye	Skipjack	Yellowfin	Striped marlin	Swordfish
Within AFZ	2008	8006 (99.3%)	1080.4 (99.6%)	891.0 (99.6%)	18.0 (100.0%)	1472.6 (99.8%)	371.7 (99.3%)	1221.7 (98.5%)
	2009	8794 (99.5%)	1338.7 (99.6%)	507.1 (99.6%)	9.9 (100.0%)	1182.1 (99.9%)	325.6 (99.6%)	1092.0 (98.2%)
	2010	7825 (99.4%)	724.9 (99.9%)	436.0 (99.8%)	3.3 (100.0%)	1309.8 (99.6%)	246.5 (99.2%)	900.4 (97.7%)
	2011	6561 (99.5%)	639.0 (99.9%)	360.3 (99.6%)	2.0 (100.0%)	1791.1 (99.5%)	279.4 (99.0%)	869.9 (98.5%)
	2012	6541 (99.0%)	550.5 (98.9%)	460.5 (99.0%)	2.6 (100%)	1088.7 (99.3%)	225.9 (99.2%)	976.2 (98.5%)
High seas	2008	53 (0.7%)	3.9 (0.4%)	4.0 (0.4%)	0.0 (0.0%)	2.6 (0.2%)	2.5 (0.7%)	18.7 (1.5%)
	2009	45 (0.5%)	4.9 (0.4%)	1.8 (0.4%)	0.0 (0.0%)	1.2 (0.1%)	1.4 (0.4%)	19.5 (1.8%)
	2010	50 (0.6%)	0.2 (0.1%)	1.0 (0.2%)	0.0 (0.0%)	5.3 (0.4%)	1.9 (0.8%)	20.9 (2.3%)
	2011	37 (0.5%)	0.9 (0.1%)	1.4 (0.4%)	0.0 (0.0%)	8.2 (0.5%)	2.9 (1.0%)	13 (1.5%)
	2012	65 (1.0%)	5.9 (1.1%)	4.8 (1.0%)	0.0 (0.0%)	7.2 (0.7%)	1.8 0.8%	14.6 (1.5%)

Pole-and-line, purse seine and minor line catch and effort

In 2012, there were no active purse-seine vessels in the Eastern Skipjack Fishery. Total minor line catches (including trolling, rod-and-reel and handline) decreased from 38 t in 2011 to 14 t in 2012. The number of vessels reporting using minor line has steadily decreased from a peak of 52 vessels in 2001 to 7 in 2012. Minor line effort decreased from 106 lines in 2011 to 73 lines in 2012. This is a decrease from a peak of 975 lines in 2007. Effort in the minor line sector does not follow the same declining trend over time as the number of active vessels, as the peak effort in 2007 was during a year with only 21 vessels active. Minor line catches comprised a small proportion of total catches and occurred inside the AFZ.

Fishing patterns

Fishing patterns vary with target species, location and season. The management area of the ETBF extends from Cape York, at the northern tip of Queensland, to the border between Victoria and South Australia, including waters around Tasmania (Figure 4). In the WCPFC Convention Area, skipjack tuna are fished from southern New South Wales to north-eastern Tasmania.

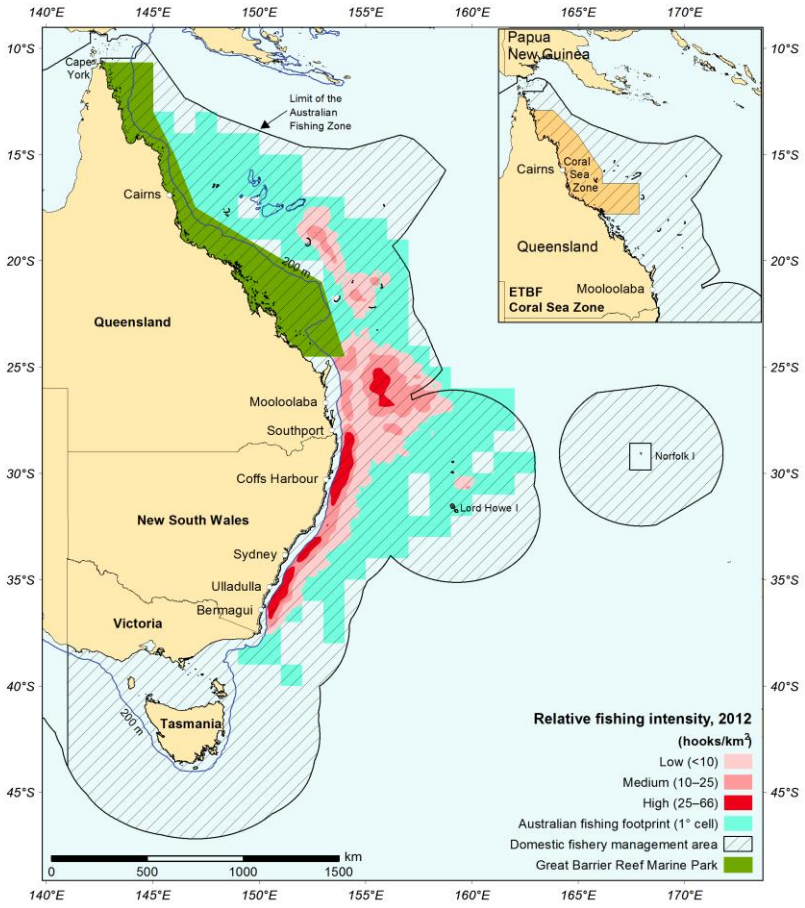


Figure 4. Longline effort distribution in the Eastern and Tuna Billfish Fishery (2012). Fishing footprint shows the total area of waters fished by all vessels in the fishery at a maximum spatial resolution of one degree square (111 x 111 km).

Fleet operations

Domestic longlining vessels are mostly 15–25 m long and use monofilament gear (Table 5). 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 around 150 days per year. Most trips are between 2 and 15 days; however, 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 (depending on species) and stored on ice, in ice slurry or in refrigerated brine. Almost no bigeye tuna or swordfish, and 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 were 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 5. Number of Australian vessels, by gear and size category, active in the WCPFC Convention Area, for 2008 to 2012. Gross registered tonnes (GRT) is the unit for vessel size.

Year	Longline				Purse seine	Pole-and-line	Troll	Total
Vessel size (GRT)	≤50	51–200	201–500	Subtotal	≤500	50–150	Unknown	
2008	25	28	1	54	1	2	0	57
2009	27	27	1	55	1	2	0	58
2010	26	25	1	52	2	0	0	54
2011	24	24	1	49	1	2	0	52
2012	22	21	1	44	1	0	0	45

Species of special interest

Seabirds and marine mammals

Australia implements a mandatory reporting scheme for fisheries interactions with protected species, which includes species of special interest. Interactions with these species are recorded by fishers in their logbooks and are reported to AFMA. These interactions are then forwarded to the Department of Sustainability, Environment, Water, Population and Communities on a quarterly basis. A summary of these interactions is presented in Table 6. Life status of the animal involved in the interaction is also recorded. In 2012, interactions were recorded with 4 green turtles (all alive), 5 leatherback turtles (4 alive and the status of 1 was unknown) and 1 unspecified turtle (dead). No interactions with seabirds were recorded. Seabird mitigation methods required in the ETBF are shown in Appendix I.

Fisheries interactions with seabirds, marine mammals and sea turtles in the ETBF, as recorded by AFMA observers, are presented in Table 7. In 2012, there were zero observed captures of marine mammals, 9 interactions with sea turtles (discussed in the section below) and three interactions with seabirds, one of which was observed to be dead. More specific seabird interaction information is presented in Table 8 and Table 9.

Table 6. Interactions with species of special interest recorded in logbooks for the Australian longline fleet in the WCPFC Convention Area, 2008–12. Interactions not identified to species level are noted as unspecified (unspec).

Group	Common name	2008	2009	2010	2011	2012
Seabirds	Black-browed albatross	5	4	0	0	0
	Shy albatross	1	0	0	0	0
	Wandering albatross	0	0	0	0	0
	Yellow-nosed albatross	0	0	1	0	0
	Albatrosses (unspec)	2	0	1	0	0
	Sooty shearwater	0	0	2	0	0
	Shearwater (unspec)	1	0	0	0	0
	Subtotal	9	4	4	0	0
Turtles	Green turtle	0	1	7	6	4
	Hawksbill turtle	0	1	1	0	0
	Leatherback turtle	3	3	11	2	5
	Loggerhead turtle	3	5	4	0	0
	Pacific (Olive) Ridley	2	0	0	0	0
	Turtles (unspec)	0	3	2	1	1
	Subtotal	8	13	25	9	10
Mammals	False killer whale	0	0	0	0	0
	Humpback whale	0	1	0	0	0
	Melon-headed whale	1	0	1	0	0
	Short-finned pilot whale	0	4	2	2	0
	Whale (unspec)	0	2	1	0	0
	Seal (unspec)	1	0	0	0	0
	Subtotal	2	7	4	2	0
	TOTAL	**19**	**24**	**33**	**11**	**10**

Table 7. Observed captures of species of special interest for the Australian longline fleet in the WCPFC Convention Area, 2008–12. Interactions not identified to species level are noted as unspecified (unspec).

Group	Common name	2008	2009	2010	2011	2012
Seabirds	Black-browed albatross	2	3	0	0	1
	Shy albatross	1	1	0	0	2
	Southern royal albatross	0	0	0	0	0
	Wandering albatross	1	0	0	0	0
	Yellow-nosed albatross	0	0	1	0	0
	Albatrosses (other)	2	1	0	0	0
	Flesh-footed shearwater	0	0	0	0	0
	Short-tailed shearwater	0	0	0	0	0
	Sooty shearwater	0	0	0	0	0
	Wedge-tailed shearwater	0	0	0	0	0
	Petrels, prions and shearwaters	0	0	0	0	0
	Cape petrel	0	0	0	1	0
	Great skua	0	0	0	0	0
	Subtotal	7	5	1	1	3
Turtles	Green turtle	1	1	1	10	5
	Hawksbill turtle	0	1	1	0	0
	Leatherback turtle	3	5	2	2	3
	Loggerhead turtle	2	4	1	0	0
	Pacific (Olive) Ridley	2	0	0	1	0
	Turtles (unspec)	0	0	0	0	1
	Subtotal	8	11	5	13	9
Mammals	Common dolphin	0	0	0	0	0
	Humpback whale	0	0	0	0	0
	Short-finned pilot whale	0	0	3	0	0
	Australian fur seal	4	0	0	0	0
	Subtotal	4	0	3	0	0
	TOTAL	**19**	**16**	**9**	**14**	**12**

Table 8a and 8b. Effort and observed seabird captures by fishing year for Australia south of 30°S (a) and 23°N – 30°S (b) . For each year, the table gives number of longline vessels, total number of hooks (000's), number of observed hooks (000's), observer coverage (percentage of hooks that were observed), number of observed captures and the capture rate (captures per thousand hooks). Mitigation methods provided in Appendix I.

a) South of 30°S

Year	Fishing effort (000's hooks)				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Capture number	Capture rate
2008	35	1742	353	20.2	6	0.017
2009	38	2019	217	10.8	4	0.018
2010	35	2441	109	4.5	1	0.009
2011	39	2228	143	6.4	1	0.007
2012	35	2069	158	7.6	3	0.02

b) 23°N – 30°S

Year	Fishing effort (000's hooks)				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Capture number	Capture rate
2008	49	6317	392	6.4	1	0.002
2009	49	6820	346	5.2	1	0.003
2010	45	5434	176	3.2	0	0.0
2011	45	4369	275	6.4	0	0.0
2012	39	4537	249	5.8	0	0.0

Table 9. Number of observed seabird captures in Australian longline fisheries, 2012, by species and area. Source: AFMA observer database.

Species	South of 30°S	North of 23°N	23°N–30°S	Total Captures
Shy albatross	2	0	0	2
Black-browed albatross	1	0	0	1
Total	**3**	**0**	**0**	**3**

Sea turtles

In December 2008, the WCPFC passed CMM 2008-03 (Conservation and Management of Sea Turtles), which promotes sea turtle bycatch mitigation in shallow-set pelagic longline fisheries targeting swordfish. Under section 6 of this CMM, longline vessels must carry and use line cutters and dehookers to handle and promptly release sea turtles caught or entangled, in accordance with WCPFC guidelines.

Section 7 of this CMM requires longline vessels that fish for swordfish in a shallow-set manner to use at least one of the following three mitigation methods:

i. Use only large circle hooks

ii. Use only whole finfish for bait

iii. Use any other mitigation measure that has been reviewed by the Scientific Committee (SC) and the Technical and Compliance Committee (TCC) and approved by the Commission.

In 2009, Australia formally submitted The Eastern Tuna and Billfish Fishery Sea Turtle Mitigation Plan (the mitigation plan) (AFMA 2009) and it took effect 1 January 2010. The observed sea turtle interaction rates for 2010–12 under the mitigation plan are presented in Table 10. These data show that there were 9 observed interactions in the ETBF in 2012 (5 green turtles, 3 leatherbacks and 1 unidentified turtle) and the minimal levels for green turtles and leatherbacks were exceeded, as was the minimal level for 'all species combined'. Of the 9 turtles involved in the interactions, 7 were released alive, while 2 green turtles were recorded dead.

In response to the recent turtle interaction rates in the ETBF, the AFMA has revoked the mitigation plan and from the start of the 2013 fishing season (1 March 2013) require the use of large circle hooks in Australia's shallow-set pelagic longline fisheries targeting swordfish, consistent with CMM2008-03. Large circle hooks must be used if less than 8 hooks per bubble are set. Each vessel must also carry one dehooking device and one line-cutting device at all times (http://www.afma.gov.au/wp-content/uploads/2010/06/ETBF-management-arrangements-booklet-2013-FINAL.doc).

Table 10. Observed numbers of interactions and interaction rates of sea turtles per 1000 observed hooks for the Australian longline fleet, in the WCPFC Convention Area for 2010–12. Minimal levels are from WCPFC CMM 2008-03. Source: AFMA observer database.

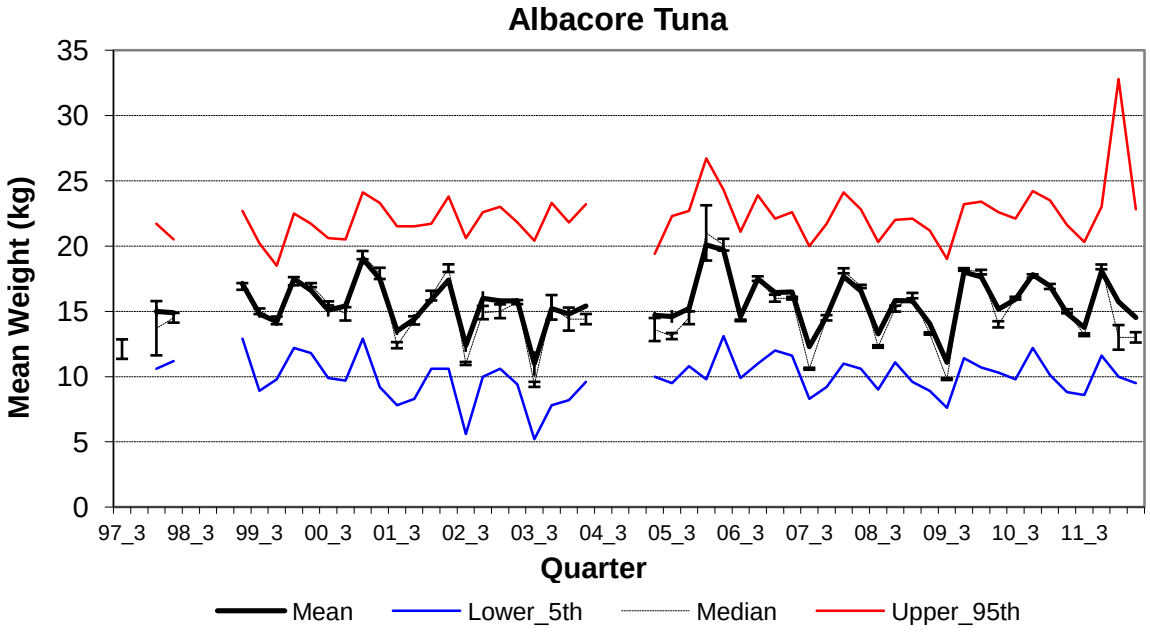
Species	Minimal levels	Number (Rate) 2010	Number (Rate) 2011	Number (Rate) 2012
Green turtle	0.0048	1 (0.0025)	10 (0.0239)	5(0.0123)
Leatherback turtle	0.0040	2 (0.0070)	2 (0.0048)	3(0.0074)
Loggerhead turtle	0.0040	1 (0.0035)	0 (0.0000)	0(0.0000)
Other*	0.0040	1 (0.0035)	1 (0.0024)	1(0.0025)
TOTAL	**0.0168**	**5 (0.0176)**	**13 (0.0311)**	**9(0.0221)**

*Combination of hawksbill, flatback and Pacific (olive) Ridley turtles

Trends in size composition of retained catch

The size composition (based on processed weights) of yellowfin tuna shows both seasonal and interannual variation with the 8-quarter running mean remaining between 31–36 kg during the decade from 1997 to 2006 before decreasing to be below 30 kg between 2007 and 2009. Since the start of 2010 this mean shows a consistent increase, being 36 kg during the first quarter of 2012. The 8-quarter running mean processed weight of bigeye tuna decreased from around 39 kg in the late 1990s to around 28 kg in 2004 then increased to 32 kg in late 2006 before decreasing again to 27 kg by late 2007. It increased again to around 34 kg by 2010 and has remained stable around this weight since. The mean processed weight of swordfish shows a steady decline from around 53 kg in the late 1990s to around 40 kg in late 2007, but since then has shown a small increase reaching 44 kg by the start of 2012. The mean processed weights of both albacore and striped marlin have remained relatively constant over time.

a)



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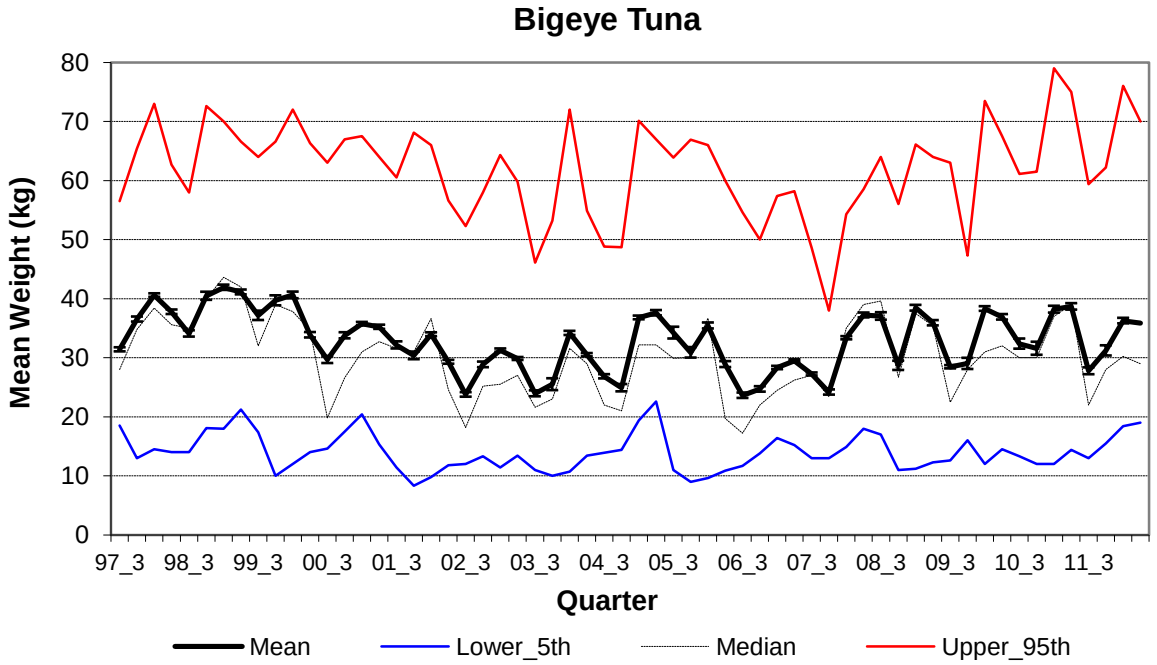
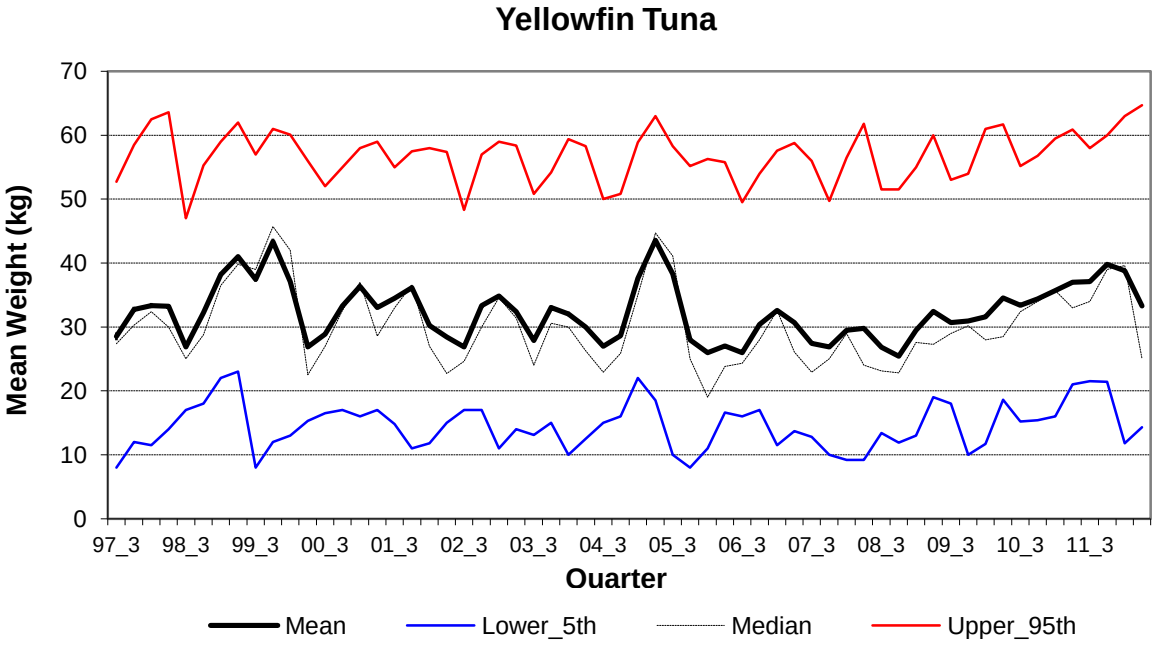
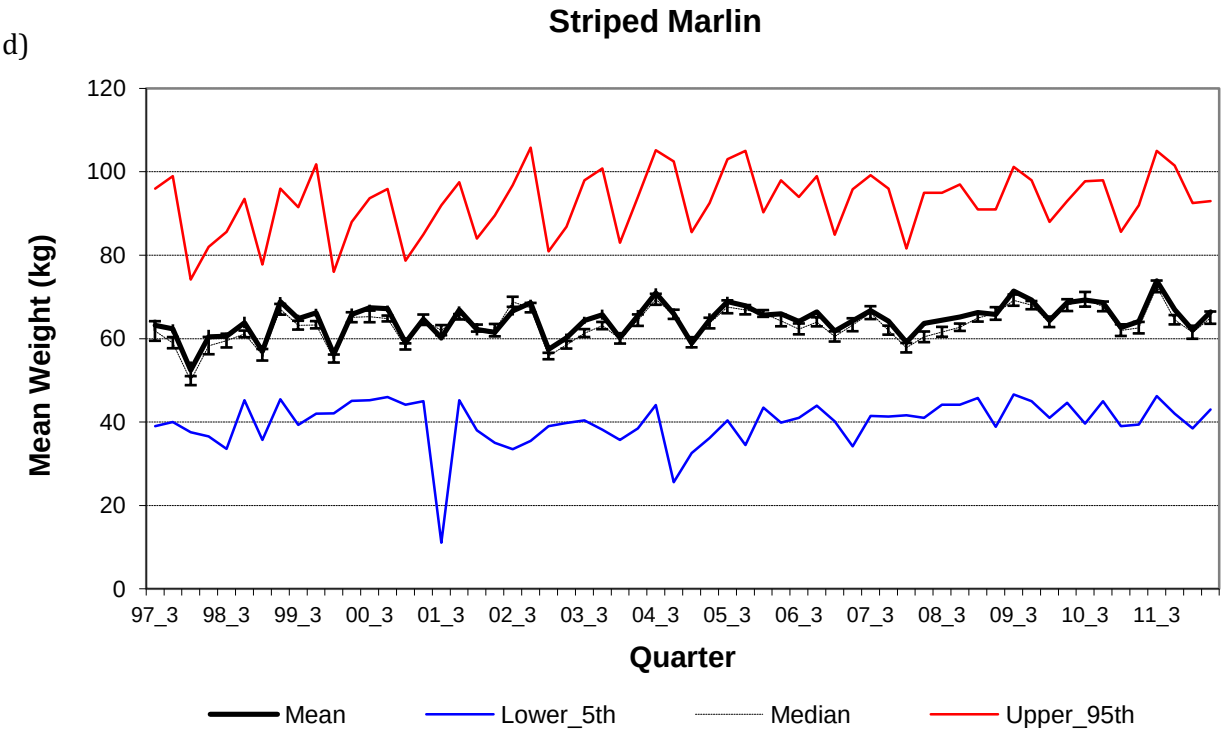

Bigeye Tuna
Mean Weight (kg)
0
10
20
30
40
50
60
70
80
97_3
98_3
99_3
00_3
01_3
02_3
03_3
04_3
05_3
06_3
07_3
08_3
09_3
10_3
11_3
Quarter
Mean
Lower_5th
Median
Upper_95th

c)


Yellowfin Tuna
Mean Weight (kg)
0
10
20
30
40
50
60
70
97_3
98_3
99_3
00_3
01_3
02_3
03_3
04_3
05_3
06_3
07_3
08_3
09_3
10_3
11_3
Quarter
Mean
Lower_5th
Median
Upper_95th

d)



e)

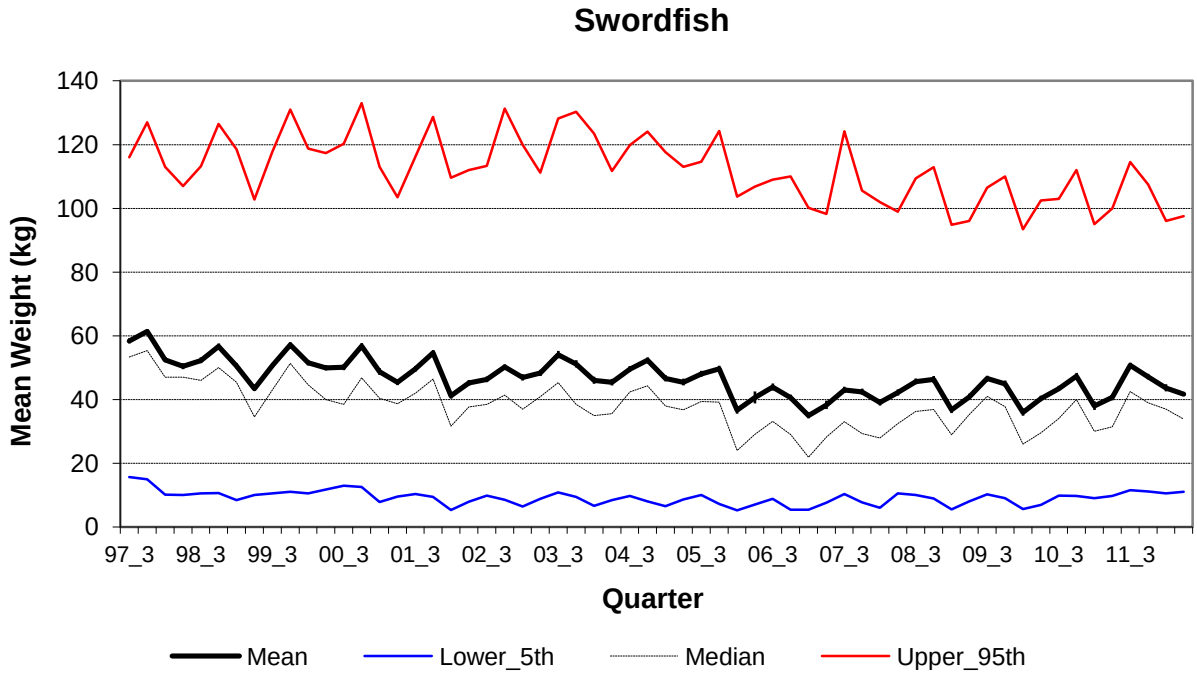


Figure 5 (a–e). Time series of quarterly mean, medium, lower 5th and upper 95th percentiles processed weights of a) albacore tuna, b) bigeye tuna, c) yellowfin tuna, d) striped marlin and e) swordfish sampled across the entire ETBF based on the data collected from the port sampling program in the ETBF.

3 Coastal state reporting

There are currently no foreign fishing vessels licensed to operate in the AFZ. Japanese longliners were licensed to operate in the eastern AFZ from the late 1950s until November 1997.

4 Socio-economic factors

The gross value of production (GVP) for the ETBF decreased from $31.6 million in 2010–11 to $28.0 million in 2011–12 (2011–12 dollars), representing an 11 per cent decline. Yellowfin tuna remains the largest contributor to the total GVP of the fishery, accounting for $12.6 million or 45 per cent. Historically, yellowfin tuna has been the dominant species in the fishery in gross value terms, with the exception of 2007–08, when bigeye tuna was the dominant species following a historical high catch in that year. In 2011–12, the production volume of yellowfin tuna fell by 28 per cent, which more than offset a 5 per cent increase in the unit value. This resulted in a 24 per cent decline in the gross value of yellowfin tuna production in the ETBF. In 2011–12, swordfish GVP was $5.8 million, accounting for approximately 21 per cent of total fishery GVP. This represents a 5 per cent increase compared with the previous year, with the volume increasing by 21 per cent and the price falling by 11 per cent. The volume of bigeye tuna also increased in 2011–12, which was the main factor underpinning an increase in GVP for that species (27 per cent to $5.4 million).

5 Dispatch of catch

The principal destination for Australian exports of tuna and swordfish is Japan, which received 55 per cent of total tuna and swordfish exports (in volume terms; excluding southern bluefin tuna) in 2011–12. Other markets of Australian tuna and swordfish exports in 2011–12, in volume terms, included Thailand (20 per cent), the United States (11 per cent), and New Zealand (8 per cent). In value terms, Japan received approximately two-thirds of Australian exports of tuna and swordfish in 2011–12, with the United States and Thailand accounting for 12 per cent and 9 per cent, respectively. Japan is the main export market for bigeye and fresh yellowfin tuna. In 2011–12, the main export markets for fresh albacore were Japan and the United States; the main export market for frozen albacore was Thailand. Historically, skipjack tuna has mostly been canned and sold domestically; however, the sole remaining cannery in Australia (Port Lincoln) closed in early 2010. In 2011–12, the main export destination for skipjack tuna was New Zealand.

6 Onshore developments

As part of the Australian Government Securing Our Fishing Future package, there was a substantial investment in onshore development, some of which benefited fishers in the ETBF. 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, some of which benefited fishers in the ETBF. This package was finalised in 2006.

7 Future prospects for the fishery

Commercial operators view the Australian skipjack fisheries as an important development opportunity because significant catching capacity exists in Port Lincoln, South Australia. Currently, catches are low as a result of variability in the availability of skipjack tuna in the AFZ, variable participation levels, low profit margins and the closure of the Port Lincoln cannery; however, there is room for development in this fishery. Current business conditions are less than favourable, but activity and catches could increase, within management restrictions, if these conditions change.

In January 2013, the AFMA Commission agreed on total allowable commercial catches (TACCs) for the commercial sector of the ETBF. These apply to the 2013–14 season which commenced on 1 March 2013. The TACCs for the five main target species are: albacore (2500 t); bigeye tuna (1056 t); swordfish (1396 t); striped marlin (370 t); yellowfin tuna (2200 t).

8 Status of 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 close to 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 are verified; weights recorded on logbooks are an estimate only.

Observer program

AFMA observers have been deployed on domestic longliners since 2001. From 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 2012, observers monitored 406 827 hooks in the fishery (6.2 per cent of the total number of hooks deployed in the fishery) (Table 11).

AFMA also implemented a trial of e-monitoring (i.e. on-board, fixed-mount digital video cameras) to evaluate the effectiveness of this technology for a range of fishery monitoring purposes and to conduct a cost–benefit analysis (Piasente et al. 2012). E-monitoring was made available as a voluntary option for boats in the ETBF from 1 July 2011 and will begin to be implemented as compulsory equipment on boats working in the ETBF starting from 30 June 2013.

Port sampling program

The collection of individual processed fish weights from processors receiving longline caught fish from the ETBF commenced in mid-1997. The program mainly focuses on the five principal target species in the fishery (yellowfin tuna, bigeye tuna, albacore, 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). During the 15 year period from July 1997 to June 2012 over 1.48 million individual fish weights pertaining to the five main target species have been collected. Coverage rates (percent of landed fish sampled) for the target species are generally high, totalling around 67 per cent for yellowfin tuna, 80 per cent for bigeye tuna, 81 per cent for swordfish, 22 per cent for albacore and 60 per cent for striped marlin (Table 11). Individual fish weights for another 239 900 fish from 41 non-target species have also been collected. Bulk weights for binned albacore (covering between 45–68 per cent of the catch since 2006) and some other species are also collected. Where both the total binned weight and the number of fish have been recorded, these bulk weights cover 650 000 fish (including 423 000 albacore).

Table 11. Estimated annual coverage of operational catch and effort (logbooks), observer data (% hooks) and port sampling (% coverage rate for the five main target species of individual fish weights collected from processors receiving longline caught fish in the ETBF) for the Australian fleet, active in the WCPFC Convention Area, 2008–12.

Gear	Year	Operational catch & effort coverage	Observer coverage	Port sampling coverage					
				YFT	BET	ALB	SWO	STM	SKJ
Longline[a]	2008	100	10.4	62	74	15	82	76	0
	2009	100	6.4	78	87	23	87	82	0
	2010	100	3.6	81	98	24	95	83	0
	2011	100	6.3	83	95	22	96	83	0
	2012[b]	100	6.2	69	89	7	81	66	0
Purse seine	2008	100	0	0	0	0	0	0	0
	2009	100	2.3	0	0	0	0	0	0
	2010	100	2.6	0	0	0	0	0	0
	2011	100	0	0	0	0	0	0	0
	2012	100	0	0	0	0	0	0	0

[a] includes fish taken by minor line
[b] sampling rates for all species (except skipjack) pertain only to January–June in 2012
Abbreviations: yellowfin tuna (YFT), bigeye tuna (BET), albacore (ALB), striped marlin (STM), swordfish (SWO) and skipjack (SKJ)
Sources: Robert Campbell (CSIRO) and AFMA observer database

Unloading/transhipment

Catch disposal records are the formal method for monitoring unloads, and were implemented in the ETBF in January 2006 (Table 12). 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 domestic 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.

There was no transhipment in the ETBF in 2012.

Table 12. Annual catch estimates (converted whole weights) for the Australian longline fleet, for 2008–12 derived from catch disposal records. Estimates are in tonnes.

Year	Albacore	Yellowfin	Bigeye	Striped marlin	Swordfish	Other	Total
2008	1276.7	1650.3	1026.5	425.3	1483.2	822.4	6684.4
2009	1522.8	1386.8	726.4	360.6	1315.0	775.0	6086.6
2010	872.3	1549.0	521.9	278.6	1176.1	839.1	5237.0
2011	771.0	2156.5	445.1	330.2	1080.5	616.3	5399.6
2012	708.5	1258.9	552.7	261.8	1156.8	423.0	4361.7

Other

AFMA introduced the compulsory requirement for all Commonwealth endorsed fishing vessels to be fitted with Integrated Computer Vessel Monitoring Systems (ICVMS) in 2007. For the 2012 calendar year, there was a 96.4 per cent compliance rate of all Commonwealth nominated vessels that had a fully operational and functioning unit. Compliance with ICVMS requirements has increased markedly since mid 2008. AFMA uses the ICVMS to assist in planning inspections and operations, to assist the observer program in deploying scientific observers and to actively monitor compliance with closed areas.

A range of data is also collected via individual research projects (see the Research Activities section for more information).

9 Research activities

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 research over the last ten years and ongoing research include:

Biological research projects

- Reproductive dynamics of swordfish in the domestic longline fishery off eastern Australia (Young & Drake 2002)
- Age and growth of bigeye tuna from the eastern and western AFZ (Farley et al. 2003)
- Age and growth of swordfish from Australian waters (Young & Drake 2004)
- Population biology and habitat preferences of striped marlin in eastern Australia (Keller & Davie 2009)
- Population biology of albacore tuna in the Australian region (Farley et al. 2012)
- Spatial dynamics of swordfish in the south Pacific Ocean (Evans et al. 2012)
- Defining regional connections in south-west Pacific swordfish (Wilcox 2012)

Assessment-related research projects

- Dynamics of the interactions of the fishery and swordfish on seamounts off eastern Australia (Campbell & 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 & Dowling 2008)
- Updating the stock assessment of 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 & Young 2010)
- Integrated evaluation of management strategies for tropical multi-species long-line fisheries (Kolody et al. 2010)
- Eastern Tuna and Billfish size monitoring program (Williams et al. ongoing)
- Integrated analysis and assessment supporting implementation of the management and harvest strategy framework within the ETBF (Campbell 2011)

- Predicting the impact of hook decrementation on the distribution of fishing effort in the ETBF (Wilcox et al. 2011)
- Analysis of recreational fishing catch and effort data to support the striped marlin stock assessment (Ghosn et al. 2012)
- Standardisation of commercial catch and effort data to support the stock assessment of striped marlin (Campbell 2012)
- Changes in fishing strategies in the ETBF in response to the introduction of quota management (Preece et al. 2012)

Ecological research projects

- Ecological risk assessment for the effects of fishing (Webb et al. 2007)
- Rapid quantitative assessment (Zhou et al. 2007)
- Determining the ecological impacts of longline fishing in the ETBF (Young et al. 2009)

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 (Robins 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)
- Effect of line shooters on the sink rates of pelagic longlines and the affect on seabird interactions (Robertson et al. 2010a)
- Factors affecting the sink rates of baited hooks and the impact on seabird interactions in pelagic longline fisheries (Robertson & van den Hoff 2010; Robertson et al. 2010b; Robertson & Candy 2013)
- Branch line weighting regimes to reduce the incidental catch of seabirds in pelagic longline fisheries (Robertson et al. 2013)
- Estimating turtle bycatch rates in the ETBF (Tennant et al. ongoing)

References

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Appendix I

Mandatory seabird mitigation measures in the ETBF 2013

(Source: AFMA website: http://www.afma.gov.au/wp-content/uploads/2010/06/ETBF-management-arrangements-booklet-2013-FINAL.doc*)*

At all times you must:

• Carry an assembled tori line on board

• Carry either:

  o 1000 weighted swivels each weighing at least 60 g; or

  o 1000 weights each weighting at least 40 g

• Not discharge offal while setting

• Not discharge offal while hauling. An exemption for small boats may be given by AFMA.

When you are fishing south of 25°S you must:

• Deploy a tori line before commencing a shot

• Use only thawed bait

• Weight longlines with either a minimum of:

  1.) 60 g swivels at a distance of no more than 3.5 m from each hook ; or

  2.) 98 g swivels at a distance of no more than 4 m from each hook; or

  3.) 40 g weights at each hook with dead, non-frozen baits.

• At all times carry 1000 weighted swivels each weighing at least 60 g or 1000 weights to be used at each hook each weighing at least 40 g

• Not discharge offal while setting

• Not discharge offal while hauling. An exemption for small boats may be given.

When you are fishing north of 25°S you must:

• Carry an assembled tori line onboard

• At all times carry 1000 weighted snoods each weighing at least 60 g or 1000 weights to be used at each hook each weighing at least 40 g.

Your tori line must be:

• At least 100 m long;

• Set up from a position on the boat that allows it to stay above the water for at least 90 m;

• Have streamers attached at least every 3.5 m;

  o Streamers should be maintained ensuring that their lengths are as close to the water as possible.

• Have a drogue at the end of the line to give sufficient drag to meet the 90 m aerial coverage criteria.

Appendix II

Common and scientific names

Common names	Scientific names
Albacore	*Thunnus alalunga*
Albatrosses (other)	*Diomedeidae* spp.
Australian fur seal	*Arctocephalus pusillus doriferus*
Australian sea lion	*Neophoca cinerea*
Bigeye tuna	*Thunnus obesus*
Black marlin	*Makaira indica*
Black-browed albatross	*Thalassarche melanophrys*
Blacktip sharks	*Carcharhinus* spp.
Blue marlin	*Makaira nigricans*
Blue shark	*Prionace glauca*
Bronze whaler shark	*Carcharhinus brachyurus*
Buller's albatross	*Thalassarche bulleri*
Cape petrel	*Daption capense*
Common dolphin	*Delphinus delphis*
Dusky shark	*Carcharhinus obscurus*
Escolar	*Lepidocybium flavobrunneum*
False killer whale	*Pseudorca crassidens*
Flatback turtle	*Natator depressa*
Flesh-footed shearwater	*Puffinus carneipes*
Great skua	*Catharacta skua*
Great-winged petrel	*Pterodroma macroptera*
Green turtle	*Chelonia mydas*
Grey-headed albatross	*Thalassarche chrysostoma*

Hammerhead shark	*Sphyrna* spp.
Hawksbill turtle	*Eretmochelys imbricata*
Humpback whale	*Megaptera novaeangliae*
Leatherback turtle	*Dermochelys coriacea*
Loggerhead turtle	*Carretta carretta*
Mahi mahi	*Coryphaena hippurus*
Melon-headed whale	*Peponcephala electra*
Moonfish (opah)	*Lampris guttatus*
Northern bluefin tuna	*Thunnus orientalis*
Ocean sunfish	*Mola mola*
Oceanic whitetip shark	*Carcharhinus longimanus*
Oilfish	*Ruvettus pretiosus*
Pacific (olive) ridley turtle	*Lepidochelys olivacea*
Petrels, prions and shearwaters	*Procellariidae* spp.
Ray's bream	*Brama brama*
Rudderfish	*Centrolophus niger*
Sailfish	*Istiophorus platypterus*
Scalloped hammerhead	*Sphyrna lewini*
Shortbill spearfish	*Tetrapturus angustirostris*
Shortfin mako	*Isurus oxyrinchus*
Short-finned pilot whale	*Globicephala macrorhynchus*
Short-tailed shearwater	*Puffinus tenuirostris*
Shy albatross	*Thalassarche cauta*
Silky shark	*Carcharhinus falciformis*
Skipjack tuna	*Katsuwonus pelamis*
Smooth hammerhead	*Sphyrna zygaena*
Sooty shearwater	*Puffinus griseus*
Southern bluefin tuna	*Thunnus maccoyii*
Southern royal albatross	*Diomedea epomophora*

Striped marlin	*Tetrapturus audax*
Swordfish	*Xiphias gladius*
Thresher shark	*Alopias vulpinus*
Tiger shark	*Galeocerdo cuvier*
Wahoo	*Acanthocybium solandri*
Wandering albatross	*Diomedea exulans*
Wedge-tailed shearwater	*Puffinus pacificus*
Westland petrel	*Procellaria westlandica*
Yellowfin tuna	*Thunnus albacares*
Yellow-nosed albatross	*Thalassarche chlororhynchos*