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To the Scientific Committee of the Indian Ocean Tuna Commission for 2014

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In accordance with IOTC Resolution 10/02, final scientific data for the previous year was provided to the Secretariat by 30 June of the current year, for all fleets other than longline (e.g. for a National report submitted to the Secretariat in 2010, final data for the 2009 calendar year must be provided to the Secretariat by 30 June 2010).	YES 30/06/2014
In accordance with IOTC Resolution 10/02, provisional longline data for the previous year was provided to the Secretariat by 30 June of the current year (e.g. for a National report submitted to the Secretariat in 2010, preliminary data for the 2009 calendar year was provided to the Secretariat by 30 June 2010). REMINDER: Final longline data for the previous year is due to the Secretariat by 30 Dec of the current year (e.g. for a National report submitted to the Secretariat in 2010, final data for the 2009 calendar year must be provided to the Secretariat by 30 December 2010).	YES 30/06/2014

Contents

Summary

Pelagic longline and purse seine are the two main fishing methods used by Australian vessels to target tuna and billfish in the Indian Ocean Tuna Commission (IOTC) Area of Competence. In 2013, four Australian longliners from the Western Tuna and Billfish Fishery and zero longliners from the Eastern Tuna and Billfish Fishery operated in the IOTC Area of Competence. They caught 14.6 t of albacore (*Thunnus alalunga*), 90.6 t of bigeye tuna (*Thunnus obesus*), 40.5 t of yellowfin tuna (*Thunnus albacares*), 203.5 t of swordfish (*Xiphius gladius*) and 2.0 t of striped marlin (*Tetrapturus audax*). These catches represent approximately 11 per cent of the peak catches taken by Australian vessels fishing in the IOTC Area of Competence in 2001, for these five species combined. In addition, Australian vessels using minor line methods took a small amount of catch. The number of active longliners and levels of fishing effort have declined substantially in recent years due to reduced profitability, primarily as a result of lower fish prices and higher operating costs. The catch of southern bluefin tuna (*Thunnus maccoyii*) in the purse seine fishery was 4495 t in 2013. A small amount of skipjack tuna (*Katsuwonus pelamis*) was caught by purse seine fishing (0.5 t). In 2013, approximately 1 t of shark was landed by the Australian longline fleet operating in the IOTC Area of Competence and 5893 sharks were discarded/released. There was no observer coverage in the IOTC Area of Competence in the 2013 calendar year. Observers were deployed in late 2012 and early 2014 so that observer coverage requirements were fulfilled for the 2012–13 and 2013–14 financial years.

1 Background/general fishery information

Australian fisheries targeting tuna and billfish in the Indian Ocean Tuna Commission (IOTC) Area of Competence are the pelagic longline fisheries – Western Tuna and Billfish Fishery (WTBF) and Eastern Tuna and Billfish Fishery (ETBF) (Appendix 1) and the purse seine fisheries – Southern Bluefin Tuna Fishery (SBTF) and the Eastern and Western Skipjack Fisheries (SJF). These five fisheries are managed by the Australian Government through the Australian Fisheries Management Authority (AFMA). Other methods such as handline, dropline, trolling and gillnetting capture small amounts of tuna and related species in multi-purpose fisheries, which are managed by the Australian Government and Australian State Governments (e.g. Western Australia). Catches from the Southern Bluefin Tuna Fishery are included in this report, although this information is reported separately to the Commission for the Conservation of Southern Bluefin Tuna.

2 Fleet structure

Longline fleet

The number of Australian longline vessels operating in the IOTC Area of Competence has declined substantially since 2000 (61 vessels) with only four vessels operating in 2013 (Table 1). The main factor influencing the decline in fishing effort is reduced profitability, caused by lower export prices and higher operating costs, particularly fuel costs.

Historically, most of these vessels have operated in the WTBF (Appendix 1) with very little longline effort taking place in the area of the ETBF between 141°E and 150°E. In 2013, four vessels from the WTBF and zero from the ETBF fished in the IOTC Area of Competence. In recent years, the Australian longline fleet has fished mainly within Australia's Exclusive Economic Zone (EEZ) between 20°S and 35°S; 96.2 per cent of total effort in 2013.

Most Australian longline vessels range in length from 20 to 35 m and are less than 230 gross registered tonnes. Ice, ice slurry or brine spray systems are used to chill the catch. The majority of the fishing trips undertaken by Australian longline operators are less than 15 days in length (57 trips undertaken in the WTBF in 2013). Vessels fishing in the high seas undertake longer voyages of up to 62 days.

Purse seine fleet

The purse seine fleet has fluctuated from 5–14 vessels since 1998; 5 vessels operated in 2013 (Table 1). The purse seine vessels vary in length from 20 to 45 m. The focus has been on the capture of southern bluefin tuna (SBT; *Thunnus maccoyii*) for farm cage grow-out. Five vessels were active SBT vessels in 2013.

Table 1 Number of Commonwealth and Western Australian longline and purse seine vessels reporting one or more fishing trips in the IOTC Area of Competence from 1998 to 2013. For the purse seine fleet, the numbers in brackets represent the number of active SBT purse seine vessels from the total number of purse seiners. The number of vessels >24 metres in length (all methods combined) for each year is also indicated.

	Number of vessels		
Calendar Year	**Longline**	**Purse seine**	**> 24 m**
1998	37	5 (5)	n/a
1999	49	7 (7)	n/a
2000	61	8 (8)	n/a
2001	45	13 (8)	n/a
2002	44	9 (7)	25
2003	36	7 (7)	21
2004	22	7 (6)	17
2005	6	8 (8)	11
2006	4	14 (7)	10
2007	3	11 (6)	9
2008	5	10 (7)	8
2009	4	10 (8)	13
2010	4	9 (7)	13
2011	2	5 (5)	7
2012	4	5 (5)	8
2013	4	5 (5)	11

n/a = data not available

3 Catch and effort by species and gear

Longline fleet

Australian longline fishing activity and associated catches of tunas and billfishes in the eastern Indian Ocean increased rapidly between 1998 and 2001, especially off Australia's western coast, south of latitude 20°S. Catch and effort for all species then declined and have remained relatively stable since 2005, with some annual variation (Figure 1). Swordfish (*Xiphius gladius*) has been the main target species since 1999 (peak catch of 2136 t in 2001) with smaller amounts of albacore (*Thunnus alalunga;* peak catch of 94 t in 2001), bigeye tuna (*Thunnus obesus;* peak catch of 436 t in 2000), yellowfin tuna (*Thunnus albacares;* peak catch of 558 t in 2001) and striped marlin (*Tetrapturus audax;* peak catch of 23 t in 1999) landed each year.

Catch and effort in the fishery decreased in 2013 compared to 2012. The swordfish catch decreased from 209.3 t in 2012 to 203.5 t in 2013 (Table 2a). Similarly, bigeye catch decreased from 167.4 t to 90.6 t in 2013. Yellowfin tuna catch increased from 23.0 t to 40.5 t in 2013 (Table 2a). Effort also decreased from 672 398 hooks in 2012 to 609 995 hooks in 2013 (Table 2a). Figure 2a and Figure 2b map the footprint of Australian tuna fishing effort in the IOTC area of competence for 2013 and for 2009–13. Due to confidentiality restrictions that prevent the disclosure of fishing activity by fewer than five vessels, fine-scale effort distribution cannot be reported in the WTBF or ETBF. Figures 3a and 3b indicate the distribution of the catch in the IOTC Area of Competence. However, the longline catch from the WTBF and ETBF could not be mapped for 2013 due to confidentiality.

Figure 1 Australian annual catch of primary species in the longline sector of the WTBF, 1986 to 2013

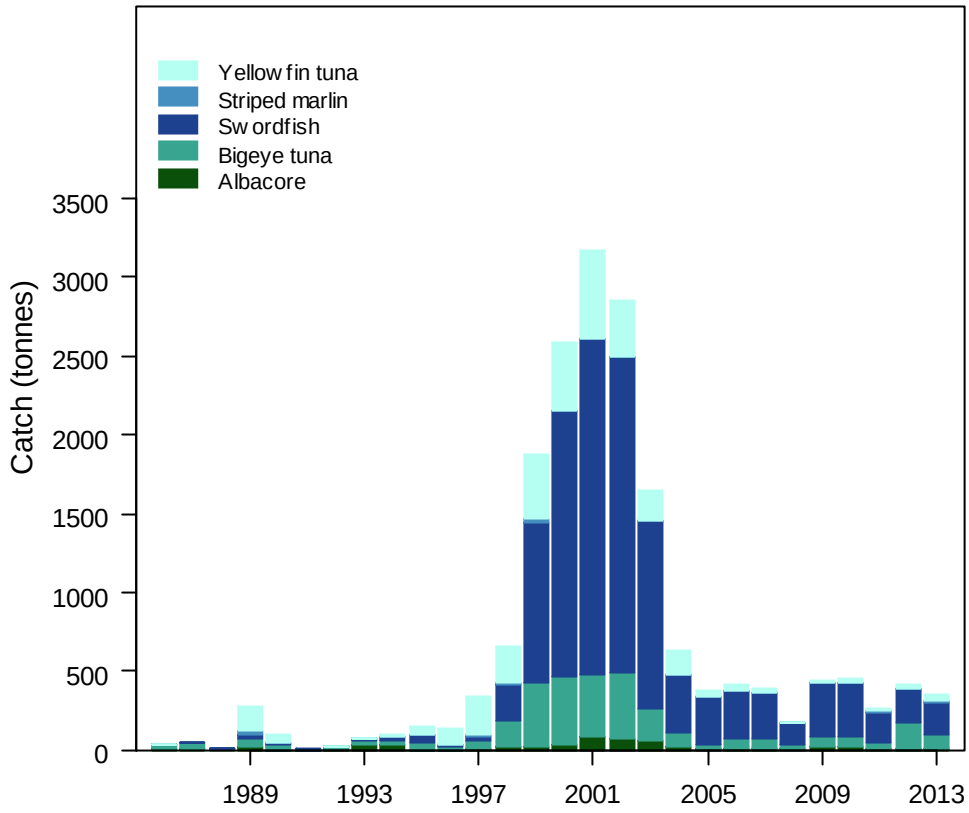


Figure 2a Fishing footprint (shown as 1 degree cells) in the Western Tuna and Billfish Fishery and Eastern Tuna and Billfish Fishery (longline) and in the Southern Bluefin Tuna Fishery (purse seine) for 2013

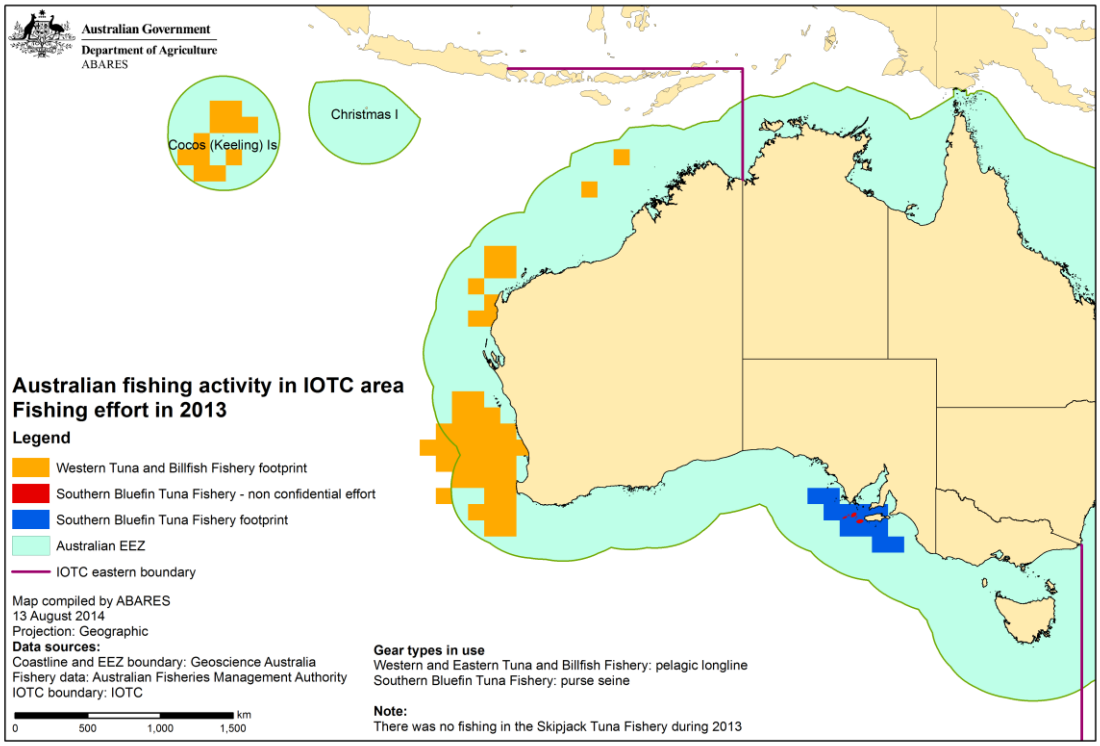


Figure 2b Aggregate fishing footprint (shown as 1 degree cells) in the Western Tuna and Billfish Fishery and Eastern Tuna and Billfish Fishery (longline) and in the Southern Bluefin Tuna Fishery (purse seine) for 2009–2013

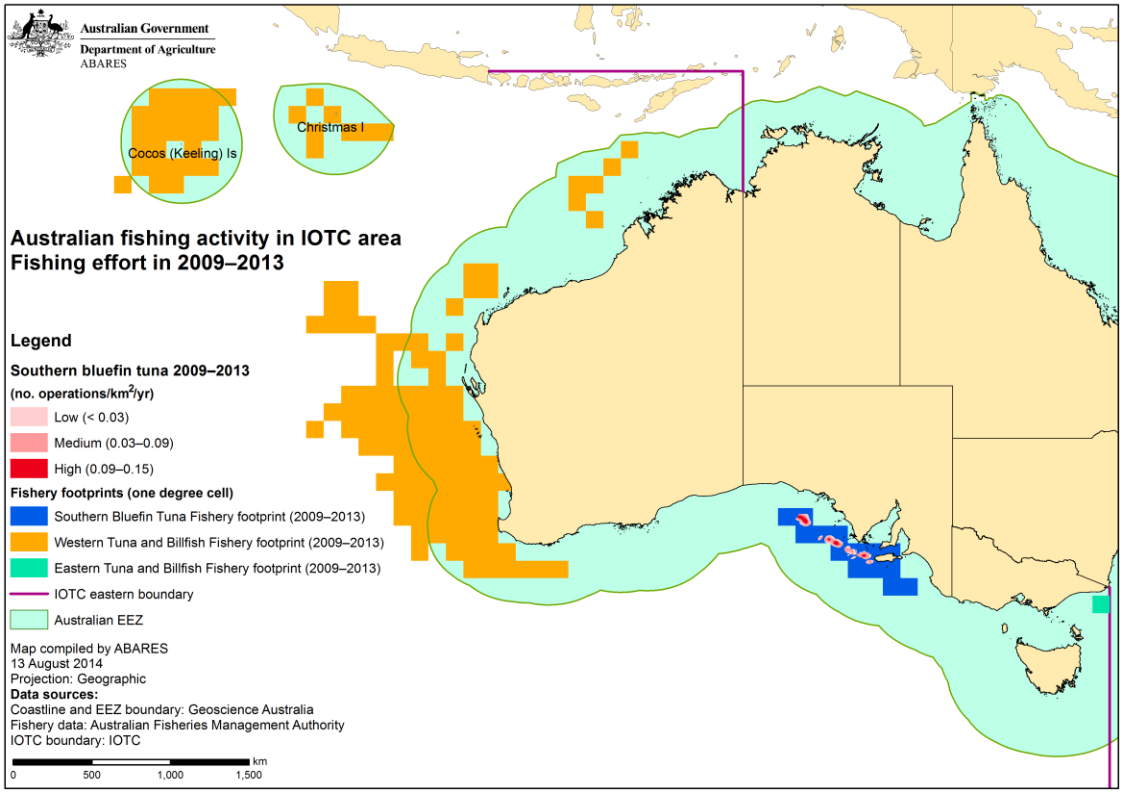


Figure 3a Distribution of catch in the Southern Bluefin Tuna Fishery (purse seine) for 2013. Note that due to the low effort in the longline fisheries, confidentiality rules prohibit the depiction of the 2013 WTBF and ETBF data

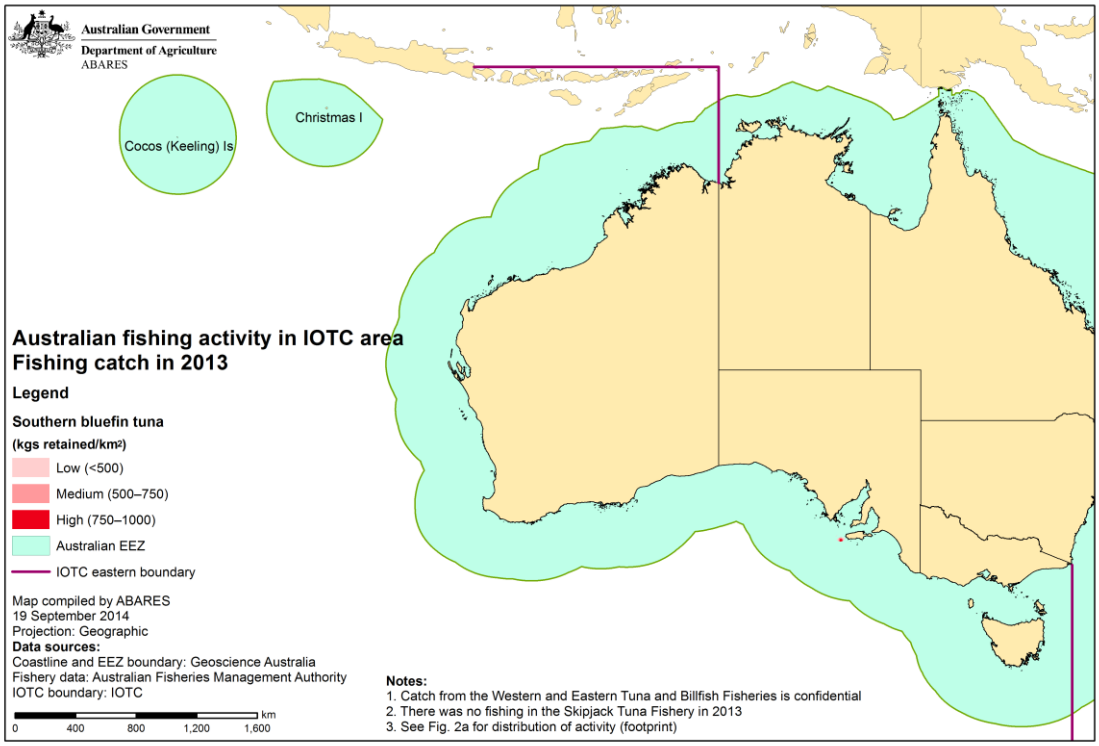
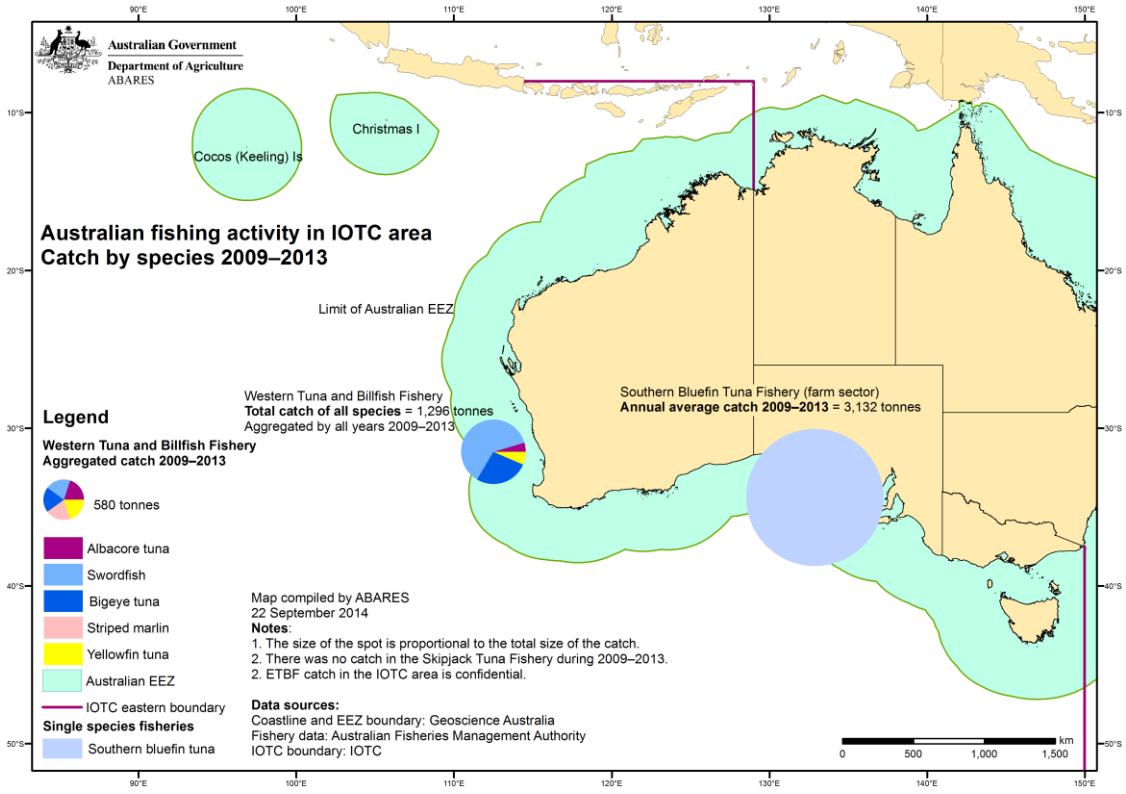


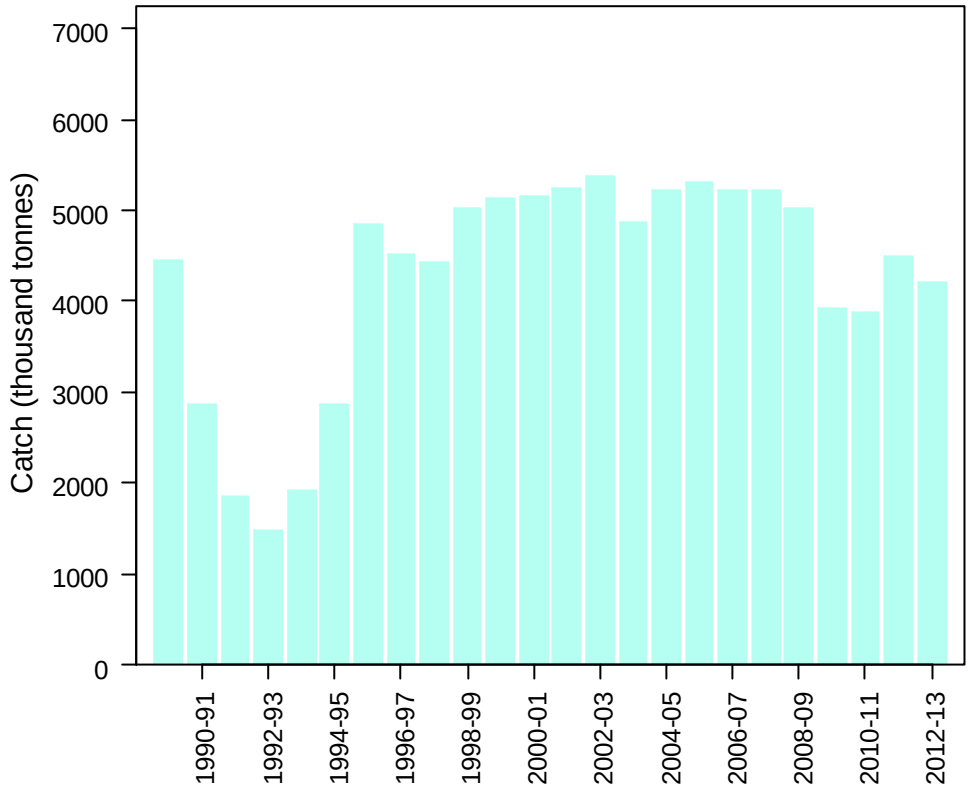
Figure 3b Distribution of catch in the Western Tuna and Billfish Fishery (WTBF; longline), Eastern Tuna and Billfish Fishery (ETBF; longline) and in the Southern Bluefin Tuna Fishery (purse seine) for 2009–2013



Purse seine fleet

Purse seine fishing operations by Australian vessels in the IOTC Area of Competence are dominated by targeting of SBT in the Great Australian Bight for grow-out in farm cages at Port Lincoln, South Australia. The actual catch of SBT taken in the purse seine fishery (derived from catch disposal data) in 2013 was 4495 t, while the actual catch for the 2012–13 fishing season (1 December 2012 to 30 November 2013) was 4198 t (Table 2b; Figure 4). In the 2013–14 fishing season (1 December 2013 to 30 November 2014) the actual catch taken was 5029 t (pending any further catch in November 2014; Table 2b). Distribution of the catch in the SBTF is shown for 2013 in Figure 3a and for 2009–13 in Figure 3b. In some fishing seasons, purse seine vessels also target skipjack tuna (*Katsuwonus pelamis*) late in the SBT season. There was a small amount of skipjack catch in 2013 (<1 t). Effort in the purse-seine sector declined from 110 sets in 2012–13 to 94 sets in the 2013–14 season (Table 2b). The distribution of this effort has remained relatively constant over time (Figure 2b).

Figure 4 Fishing season catches of southern bluefin tuna in the purse seine sector of the SBTF, 1989–90 to 2012–13



Multi-purpose fleets

The multi-purpose fisheries (dropline, gillnet, minor line, trawl and troll) typically target different species (e.g. Spanish mackerel) compared to the longline fishery. In 2013, total tuna catch and effort for gillnet, troll and line (mainly handline) from Western Australian fisheries decreased from 2012 (Tables 2c, 2d). In the WTBF, three vessels, two trolling vessel and one vessel using handline, operated in the IOTC Area of Competence in 2013. They caught 4.2 t of longtail tuna, 0.1 t of albacore and less than 1.0 t of bigeye tuna and skipjack tuna.

Table 2a Total numbers of Australian longline vessels, hooks set and total catch (tonnes live weight) of the five main tuna and billfish species taken by those vessels operating in the IOTC Area of Competence from 1998 to 2013

Calendar year	Vessel number	Hooks set (thousands)	Albacore	Bigeye tuna	Yellowfin tuna	Swordfish	Striped marlin	NEI[a]	Total catch
1998	37	1807	25.1	161.1	231.3	238.3	8.8	196.7	1031.4
1999	49	4031	29.2	411.6	406.2	1013.7	22.6	154.1	2586.0
2000	61	6246	30.9	436.2	429.1	1690.5	1.7	42.5	2726.5
2001	45	6175	93.9	386.0	557.5	2135.7	0.0	118.5	4702.4
2002	44	5956	72.1	419.5	355.2	2004.8	0.7	14.2	2866.3
2003	36	4000	65.7	205.5	191.3	1184.0	0.2	100.7	2526.3
2004	22	1593	26.6	90.9	152.3	370.0	0.4	46.9	1300.7
2005	6	773	7.3	31.3	35.9	301.4	4.1	12.3	380.6
2006	4	718	10.6	58.7	37.3	311.2	4.5	14.1	436.4
2007	3	738	12.1	69.1	29.3	281.2	1.6	15.3	404.1
2008	5	237	10.3	26.6	1.2	142.2	0.5	10.5	191.0
2009	4	529	19.9	61.7	11.7	349.3	0.3	11.3	454.3
2010	4	622	18.7	65.3	21.9	349.4	0.5	4.8	460.5
2011	2	360	5.8	50.0	14.1	189.9	0.7	1.4	261.9
2012	4	672	13.1	167.4	23.0	209.3	2.5	1.6	417.3
2013	4	610	14.6	90.6	40.5	203.5	2.0	1.0	352.2

[a] NEI denotes species that are 'not elsewhere indicated'

Table 2b Purse seine effort and catch (tonnes live weight) of southern bluefin tuna (by fishing season) and skipjack tuna (by calendar year) by Australian vessels fishing in the IOTC Area of Competence

Southern bluefin tuna								Skipjack tuna
Fishing season	Search hours	No. of sets	Estimated catch [a]	Actual catch	Calendar year	Estimated catch	Actual catch	Estimated catch
1994–95	526	104	2179	2009	1995	n/a	1840	n/a
1995–96	631	89	2859	3442	1996	n/a	3121	n/a
1996–97	769	118	3134	2505	1997	n/a	2998	n/a
1997–98	671	143	3916	3629	1998	3290	3584	n/a
1998–99	972	129	4418	4991	1999	5120	5325	n/a
1999–00	764	107	4746	5131	2000	4616	5132	n/a
2000–01	799	129	5100	5162	2001	5319	4767	1039
2001–02	1309	159	5400	5234	2002	4920	4683	1144
2002–03	1276	150	5188	5375	2003	5587	5792	<1
2003–04	1202	160	5299	4874	2004	5178	4834	30
2004–05	1168	139	5225	5215	2005	5330	5210	<1
2005–06	1304	156	5463	5302	2006	5852	5629	446
2006–07	1459	160	5091	5230	2007	4822	4809	4
2007–08	1217	134	4530	5211	2008	4431	5010	877
2008–09	1156	139	4348	5015	2009	4316	4884	855
2009–10	417	78	3323	3931	2010	3660	4039	0
2010–11	835	106	3840	3872	2011	3909	4114	0[b]
2011–12	1150	156	4328	4485	2012	4423	4444	<1
2012–13	1021	110	4039	4198	2013	4210	4495	<1
2013–14[c]	728	94	4381	5029	2014	n/a	n/a	n/a

[a] Note that estimated catch is derived from logbook data while actual catch is derived from catch disposal data

[b] Note that there was no effort in the Skipjack Tuna Fishery since 2009–10

[c] Note that the catch data provided for 2013–14 is preliminary as the SBTF season does not conclude until 30 November 2014

n/a = data not available

Table 2c Numbers of fishing vessels and catch of tuna and tuna-like species (tonnes live weight) in Western Australian state fisheries by method

Year	Dropline		Gillnet		Line[a]		Trawl		Troll	
	Catch (t)	Vessels	Catch (t)	Vessels	Catch (t)	Vessels	Catch (t)	Vessels	Catch (t)	Vessels
2004	0.6	7	2. 7	9	36.8	46	3 .4	14	435.1	34
2005	0.04	6	2.6	8	46.3	30	5.0	4	310.4	22
2006	n/a	n/a	0.9	6	10.6[b]	30	23.4	10	283.6	18
2007	0.1	5	1.2	8	23.6	24	n/a	n/a	317.8	18
2008	n/a	n/a	5.0	9	12.6	22	n/a	n/a	333.6	26
2009	n/a	n/a	1.3	7	12.0	18	n/a	n/a	285.6	16
2010	n/a	n/a	0.8	6	27.1	13	n/a	n/a	269.4	15
2011	n/a	n/a	1.1	6	14.7	14	n/a	n/a	285.5	17
2012	n/a	n/a	1.5	6	16.4	17	n/a	n/a	316.4	17
2013	n/a	n/a	0.2	6	13.0	14	n/a	n/a	288.1	22

[a] Line consists mainly of handline

[b] Total includes dropline catches for this year as individual method data could not be presented because of state jurisdictional confidentiality reasons (i.e. <5 active vessels using each method)

n/a = data not available

Table 2d Catch of tuna and tuna-like species in Western Australian state fisheries, by method, for 2012 and 2013

Year	Species		Live weight (kg)			
	Common name	**Scientific name**	**Gillnet**	**Line[a]**	**Trolling**	**Total**
2012	Australia bonito	*Sarda australis*	26	97	530	653
	mackerel, grey	*Scomberomorus semifasciatus*	n/a	5	11 849	11 854
	mackerel, shark	*Grammatorcynus bicarinatus*	16	n/a	118	134
	mackerel, Spanish	*Scomberomorus commerson*	n/a	15 316	302 851	318 167
	mackerel, spotted	*Scomberomorus munroi*	n/a	n/a	71	71
	mackerels, general	*Scombridae*	28	n/a	n/a	28
	tuna, bigeye	*Thunnus obesus*	22	52	n/a	74
	tuna, northern bluefin	*Thunnus orientalis*	n/a	62	110	172
	tuna, longtail	*Thunnus tonggol*	n/a	14	387	401
	tuna, mackerel	*Euthynnus affinis*	n/a	14	22	36
	tuna, other	*Scombridae*	542	319	32	893
	tuna, skipjack	*Katsuwonus pelamis*	0	429	81	510
	tuna, yellowfin	*Thunnus albacares*	848	111	144	1103
	wahoo	*Acanthocybium solandri*	n/a	n/a	211	211
	TOTAL		**1482**	**16 417**	**316 406**	**334 305**

Table 2d (cont.) Catalog of tuna and tuna-like species in Western Australian state fisheries, by method, for 2012 and 2013

Year	Species		Live weight (kg)			
	Common name	**Scientific name**	**Gillnet**	**Line**[a]	**Trolling**	**Total**
2013	Australia bonito	*Sarda australis*	31	2181	14 956	17 168
	mackerel, grey	*Scomberomorus semifasciatus*	n/a	6 118	5 312	11 430
	mackerel, shark	*Grammatorcynus bicarinatus*	7	n/a	13	20
	mackerel, Spanish	*Scomberomorus commerson*	56	3 534	267 042	270 632
	mackerel, spotted	*Scomberomorus munroi*	n/a	2	52	54
	mackerels, general	*Scombridae*	3	849	18	870
	tuna, bigeye	*Thunnus obesus*	n/a	45	n/a	45
	tuna, northern bluefin	*Thunnus orientalis*	n/a	13	n/a	13
	tuna, longtail	*Thunnus tonggol*	n/a	n/a	331	331
	tuna, mackerel	*Euthynnus affinis*	n/a	n/a	70	70
	tuna, other	*Scombridae*	87	178	n/a	265
	tuna, skipjack	*Katsuwonus pelamis*	n/a	n/a	31	31
	tuna, yellowfin	*Thunnus albacares*	51	70	207	328
	wahoo	*Acanthocybium solandri*	n/a	n/a	41	41
	TOTAL		**236**	**12 989**	**288 073**	**301 298**

[a] Line consists mainly of handline
n/a = data not available

4 Recreational fishery

Recreational fishing is undertaken in Australian states and the Northern Territory. The Western Australian recreational gamefish fishery targets sailfish (*Istiophorus platypterus*), black marlin (*Makaira indica*) and yellowfin tuna with blue marlin (*Makaira mazara*) and striped marlin caught on occasions. There is a daily bag limit of one billfish (sailfish and marlins combined) in Western Australia but the majority of sailfish and marlins are tagged and released alive. There is also a combined daily bag limit of two fish for yellowfin tuna and SBT. In South Australia, Victoria and Tasmania, gamefishers mainly target albacore, skipjack tuna and SBT. Daily bag limits or possession limits also apply in those states. Estimates of total recreational catch for tuna and tuna-like species in Australia are currently not collected.

5 Ecosystem and bycatch issues

In Australia, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary legislation that covers environmental issues, including the ecologically sustainable use of marine resources. The EPBC Act requires that:

- all Commonwealth and State/Northern Territory wild capture marine fisheries with an export component be assessed to determine the extent to which management arrangements will ensure each fishery is being managed in an ecologically sustainable way;
- all Commonwealth fisheries are also assessed to determine the impact of actions taken under a fishery management plan on matters of national environmental significance; and
- all Commonwealth fisheries and any State/Northern Territory-managed fisheries that operate in Commonwealth waters must also be assessed to determine the impacts of fishing operations on cetaceans, listed threatened species and ecological communities, migratory species and listed marine species under the EPBC Act.

The assessments consider the impacts of the fishery on target and non-target species caught and the impacts of fishing on the broader marine environment. Initial and subsequent assessments have been completed for the WTBF, ETBF, SJF and SBTF, and continue to guide the development of improved management arrangements to reduce the ecological impacts of Australian tuna and billfish fisheries (see http://environment.gov.au/coasts/fisheries/commonwealth/index.html).

Measures to reduce the ecological impacts of these fisheries rely initially on the analysis of fishery-dependent and -independent data collected through observer programs, logbooks and targeted research activities. As data are collected and the impacts of fishing operations on ecologically related species become clearer, strategies to reduce these impacts continue to be developed and refined.

In this context, Australia has:

- continued to use catch and effort logbooks to collect data on the catch of target and non-target species
- introduced and maintained observer programs in the WTBF, ETBF, SJF and SBTF, which include specific reporting requirements for threatened, endangered and protected (TEP) species
- initiated a range of at-sea programs to trial strategies to reduce the incidental mortality of seabirds caught during longlining operations (e.g. increasing line sink rates)
- introduced detailed strategies to reduce bycatch and impacts on ecologically related species, performance measures to monitor progress, and reporting and review targets to assess the effectiveness of these strategies, and refine them where necessary. An important part of these strategies is the development of fishing industry codes of practice to reduce impacts on ecologically related species (see below).

AFMA has carried out an Ecological Risk Assessment (ERA) for each of its fisheries. AFMA's Ecological Risk Management (ERM) process responds to the ERAs for major fisheries managed by the Australian Government and develops a framework for future risk assessments as additional information becomes available. The ERA/ERM framework aims to inform government agencies and stakeholders of priorities for research, data collection, monitoring and management, and ensure there is a high level of confidence in verifiable results. For more

information on the ERM framework see: http://www.afma.gov.au/wp-content/uploads/2010/06/Ecological-Risk-Management-Further-Information.pdf

The ERAs rely on existing biological and catch information and consider five ecosystem components: target species, byproduct and bycatch species, TEP species, habitats, and communities. The assessments categorise various species as being at high, medium or low relative risk on the basis of a range of factors, including their susceptibility to capture by the various fishing methods, their distribution, and the ability for populations to recover from fisheries impacts. The aim of the ERA process is to help prioritise research, data collection and monitoring needs and management actions for fisheries, and ensure that they are managed both sustainably and efficiently. There are three levels at which an ERA may be conducted: Level 1 (Scoping); Level 2 (Productivity and Susceptibility Assessment); Level 3 (Sustainability Assessment for Fishing Effects).

AFMA, in conjunction with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), has completed ERAs for the WTBF (Webb et al. 2007a, AFMA 2009e, Zhou et al. 2009, AFMA 2010b), ETBF (Webb et al. 2007b, AFMA 2009a), SBTF (Hobday et al. 2007, AFMA 2009b, Zhou et al. 2009) and SJF (Daley et al. 2007, Zhou et al. 2009, AFMA 2010a). These reports are available at: (http://www.afma.gov.au/managing-our-fisheries/environment-and-sustainability/Ecological-Risk-Management/).

Western Tuna and Billfish Fishery

The ERA examined 187 species in the WTBF (38 chondrichthyans and 149 teleosts), none of which were classified as at risk of potential overfishing, based on the Level 3 analysis (Zhou et al. 2009). However, an increase in fishing effort could potentially move some species into a higher risk category, particularly sharks that are more vulnerable to fishing pressure. Therefore, a priority action identified in the WTBF ERM report (AFMA 2010b) is to monitor the catch and interaction level with sharks. Management of shark interactions in this fishery will be reviewed if the landed amount of any one species exceeds 50 t within a year (AFMA 2010b). Given the connectivity of highly migratory fish stocks beyond the EEZ, the ERM response may need to take into account broader Indian Ocean issues in the future.

A summary of priority issues for managing the ecological effects of fishing in the WTBF, arising from the three levels of ERA, is described in AFMA (2010b), and available at: http://www.afma.gov.au/managing-our-fisheries/environment-and-sustainability/Ecological-Risk-Management/.

Eastern Tuna and Billfish Fishery

AFMA, in conjunction with the CSIRO, has undertaken three levels of ecological risk assessment (ERA) for the ETBF (Webb et al. 2007b, AFMA 2009c, Zhou et al. 2009). A total of 390 species were initially assessed in the ERA process (Webb et al. 2007b). After a Level 3 assessment for fish species only, three shark species (crocodile shark, longfin mako and pelagic thresher) were identified as being at high risk due to the effects of fishing in the ETBF (Zhou et al. 2007). The priority of the management response is to reduce interactions with TEP species (AFMA 2009a). The ETBF ERM report also aims to decrease the capture and mortality of sharks.

A summary of priority issues for managing the ecological effects of fishing in the ETBF, arising from the three levels of ecological risk assessment is described in AFMA (2009a), and available at: http://afma.gov.au/environment/eco_based/eras/docs/ETBF_ERM_May09.pdf.

Southern Bluefin Tuna Fishery

The Level 2 assessment indicated that only two species, of the 193 assessed, were considered to be at high risk: SBT and white shark (Hobday et al. 2007). A Level 3 assessment was also conducted on 83 non-target species (6 chondrichthyans and 77 teleosts) to determine the impact of SBT fishing on these species (AFMA 2009d). It was determined that the risk to these non-target species was low (Zhou et al. 2009).

A summary of priority issues for managing the ecological effects of fishing in the SBTF arising from the three levels of ERA, including monitoring interactions with threatened species, is described in AFMA (2009b), and available at: http://www.afma.gov.au/wp-content/uploads/2010/06/sbt_erm.pdf

Skipjack Tuna Fishery

For the Level 2 assessment 328 species were assessed. After the residual risk assessment was applied, 25 species, mostly TEP species, were deemed to be at high risk. However, after the Level 3 assessment no species was assessed as high risk (Daley et al. 2007, Zhou et al. 2009, AFMA 2010a).

Ecological risk management for the SJTF is designed to achieve an adequate level of monitoring to establish the level of interaction that may occur if effort increases and to quantify the effect that the fishery is having on the species identified as being at high risk from the effects of fishing (AFMA 2010a).

Bycatch and discard work plan

In response to bycatch issues, AFMA has formulated a Bycatch and Discard Work Plan for both the WTBF and ETBF (AFMA 2008). The work plan outlines a series of measures to improve the monitoring of, and reduce fishery impacts on, the bycatch species identified in the ERA process as being at high risk from fishing operations. AFMA has reviewed the Bycatch and Discard Workplan, which commenced in 2008, and an updated plan for 2014–2016 commenced in 2014 (AFMA 2014) and can be found at: http://www.afma.gov.au/wp-content/uploads/2010/06/ATB-Bycatch-and-Discarding-Workplan-2014-2016-FINAL.pdf

Sharks

NPOA-Sharks

Australia's National Plan of Action for Conservation and Management of Sharks (NPOA-Sharks), first released in 2004, was reviewed and revised in July 2012 (Shark-plan 2) (DAFF 2012). Consistent with the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks), Shark-plan 2 incorporates scientific information and issues identified in the 2009 Shark Assessment Report (Bensley et al. 2010). Shark-plan 2 aims to coordinate action on shark conservation and management by prioritising issues and identifying actions to address them. A copy of Shark-plan 2 can be found at:
http://www.daff.gov.au/fisheries/environment/sharks/sharkplan2

Shark catch and finning regulation

The Australian Commonwealth prohibits the possession or landing of fins separate from shark carcasses. There is a landing limit of 20 sharks per longline vessel per fishing trip, and a ban on wire traces in order to decrease the likelihood of retaining shark. Longline vessels undertaking

single jurisdiction high seas trips may apply for a permit to retain 100 sharks per fishing trip, of which only 80 can be blue sharks.

Shortfin mako, longfin mako and porbeagle sharks were listed under the Convention on Migratory Species (CMS) in 2008, which triggered a mandatory legal obligation to list them for protection under the EPBC Act. Listing under the EPBC Act came into effect on 29 January 2010. As a consequence, in February 2010 all Australian fisheries that interact with these species in Commonwealth waters were assessed under the EPBC Act. The management arrangements for each fishery were reaccredited on the basis that the arrangements in place required all reasonable steps to be taken to ensure that shortfin and longfin makos and porbeagles are not killed or injured as a result of fishing activities. These species may be retained in accredited fisheries if the sharks have come onboard dead. Live caught specimens must be released unharmed and fishers are required to report interactions. Australia requires all tuna longline vessels to carry line cutters and de-hookers to ensure the safe release of shark and turtle species in the water, which may help improve their chances of survival.

Interactions

Western Tuna and Billfish Fishery & Eastern Tuna and Billfish Fishery

Total interactions by the Commonwealth Australian longline fleet with shark species in the IOTC Area of Competence are provided in Tables 3a, 3b and 4. In 2013, 58 individual sharks were landed (Table 3a) weighing less than 1 t (Table 3b), while 5893 individuals were discarded/released (Table 4). No information is currently available from logbooks on the life status of discarded/released sharks, other than those considered to be threatened species under the EPBC Act. There was no observer coverage in the WTBF in 2013 (calendar year). Observers were deployed in late 2012 and early 2014 so that observer coverage requirements were fulfilled for the 2012–13 (11.6 per cent) and 2013–14 (5.7 per cent preliminary estimate) financial years.

Southern Bluefin Tuna Fishery

No interactions with sharks were reported by observers in the IOTC Area of Competence relevant to the SBTF in 2013. All interactions with ecologically related species are reported to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT).

Minor line fisheries

Other fisheries in Western Australia use a variety of minor line gear types (e.g. Tables 2c, 2d) which take small incidental catches of tuna and tuna-like species. No data is available on the interaction of these minor line fisheries with sharks. However, given the nature of the fishing and the small catches in these fisheries, they likely have negligible impacts on shark populations.

Table 3a Total number of sharks, by species, retained by Australian longline vessels in the IOTC Area of Competence from 2005 to 2013 (source: AFMA logbook data)

Common name	Scientific name	2005	2006	2007	2008	2009	2010	2011	2012	2013
Blacktip shark	*Carcharhinus* spp.	1	5	2	0	0	0	0	0	0
Blue shark	*Prionace glauca*	309	406	612	309	366	148	2	2	0
Bronze whaler	*Carcharhinus brachyurus*	1	0	0	0	0	0	0	1	0
Cookie-cutter shark	*Isistius brasiliensis*	0	0	0	0	0	0	0	0	0
Crocodile shark	*Pseudocarcharias kamoharai*	0	0	6	0	51	105	0	16	20
Dusky shark	*Carcharhinus obscurus*	0	0	0	0	0	0	0	0	0
Hammerhead	*Sphyrna* spp.	0	8	0	0	0	0	13	0	3
Oceanic whitetip	*Carcharhinus longimanus*	10	19	14	24	11	7	11	10	1
Porbeagle	*Lamna nasus*	0	1	2	9	0	3	0	0	0
Roughskin shark	*Centroscymnus* spp.; *Deania* spp.	0	0	0	0	0	0	0	0	0
Sandbar shark	*Carcharhinus plumbeus*	0	0	0	0	0	0	0	0	0
Scalloped hammerhead	*Sphyrna lewini*	1	0	0	0	0	0	0	0	0
Shortfin mako	*Isurus oxyrinchus*	19	56	21	8	16	20	43	6	34
Longfin mako	*Isurus paucus*	0	0	0	0	0	0	0	0	0
Silky shark	*Carcharhinus falciformis*	2	0	0	0	1	0	0	0	0
Smooth hammerhead	*Sphyrna zygaena*	0	0	0	0	0	0	0	0	0
Thresher shark	*Alopias vulpinus*	0	0	1	0	1	1	0	0	0
Tiger shark	*Galeocerdo cuvier*	2	0	0	2	0	0	0	0	0
Shark - other	-	0	0	0	0	0	0	0	0	0
TOTAL		**345**	**495**	**658**	**352**	**446**	**284**	**69**	**35**	**58**

Table 3b Total weight (tonnes trunked weight) of shark species retained by Australian longline vessels in the IOTC Area of Competence from 2005 to 2013 (source: AFMA logbook data)

Common name	Scientific name	2005	2006	2007	2008	2009	2010	2011	2012	2013
Blacktip shark	*Carcharhinus* spp.	0.04	0.2	0.05	0	0	0	0	0	0
Blue shark	*Prionace glauca*	9.9	10.8	15.1	9.2	10.2	3.9	0.04	0.05	0
Bronze whaler	*Carcharhinus brachyurus*	0.04	0	0	0	0	0	0	0.02	0
Cookie-cutter shark	*Isistius brasiliensis*	0	0	0	0	0	0	0	0	0
Crocodile shark	*Pseudocarcharias kamoharai*	0	0	0.03	0	0.1	0.3	0	0.03	0.04
Dusky shark	*Carcharhinus obscurus*	0	0	0	0	0	0	0	0	0
Hammerhead	*Sphyrna* spp.	0	0.1	0	0	0	0	0.2	0	0.04
Oceanic whitetip	*Carcharhinus longimanus*	0.4	0.6	0.3	0.7	0.3	0.1	0.2	0.3	0.02
Porbeagle	*Lamna nasus*	0	0.05	0.06	0.2	0	0.05	0	0	0
Roughskin shark	*Centroscymnus* spp.; *Deania* spp.	0	0	0	0	0	0	0	0	0
Sandbar shark	*Carcharhinus plumbeus*	0	0	0	0	0	0	0	0	0
Scalloped hammerhead	*Sphyrna lewini*	0.07	0	0	0	0	0	0	0	0
Shortfin mako	*Isurus oxyrinchus*	0.9	1.9	0.6	0.2	0.2	0.4	0.6	0.1	0.5
Longfin mako	*Isurus paucus*	0	0	0	0	0	0	0	0	0
Silky shark	*Carcharhinus falciformis*	0.06	0	0	0	0.04	0	0	0	0
Smooth hammerhead	*Sphyrna zygaena*	0	0	0	0	0	0	0	0	0
Thresher shark	*Alopias vulpinus*	0	0	0.03	0	0.04	0.03	0	0	0
Tiger shark	*Galeocerdo cuvier*	0.1	0	0	0	0	0	0	0	0
Shark - other	-	0	0	0	0	0	0	0	0	0
TOTAL		**11.5**	**13.7**	**16.2**	**10.3**	**10.9**	**4.8**	**1.1**	**0.5**	**0.6**

Table 4 Total number of sharks, by species, released/discarded by Australian longline vessels in the IOTC Area of Competence from 2005 to 2013 (source: AFMA logbook data)

Common name	Scientific name	2005	2006	2007	2008	2009	2010	2011	2012	2013
Blacktip shark	*Carcharhinus* spp.	1	6	0	0	0	0	0	0	0
Blue shark	*Prionace glauca*	3 329	3 717	7 213	4 044	8 596	7 073	5 148	5 315	3 345
Bronze whaler	*Carcharhinus brachyurus*	7	2	14	3	2	0	1	39	27
Cookie-cutter shark	*Isistius brasiliensis*	1	0	0	0	0	0	0	0	0
Crocodile shark	*Pseudocarcharias kamoharai*	4 197	4 079	3 650	900	4 651	5 861	7 167	4 880	2 124
Dusky shark	*Carcharhinus obscurus*	3	3	0	0	0	0	0	1	0
Hammerhead	*Sphyrna* spp.	0	55	79	32	3	2	6	96	7
Oceanic whitetip	*Carcharhinus longimanus*	55	117	85	19	66	171	51	131	12
Porbeagle	*Lamna nasus*	6	7	2	0	0	0	0	0	0
Roughskin shark	*Centroscymnus* spp.; *Deania* spp.	0	0	0	0	0	0	0	0	0
Sandbar shark	*Carcharhinus plumbeus*	0	0	0	0	0	0	0	1	2
Scalloped hammerhead	*Sphyrna lewini*	30	0	0	0	0	0	0	0	0
Shortfin mako	*Isurus oxyrinchus*	74	158	356	50	575	756	525	758	290
Longfin mako	*Isurus paucus*	0	0	0	0	0	0	0	3	1
Silky shark	*Carcharhinus falciformis*	19	2	0	0	0	0	0	0	0
Smooth hammerhead	*Sphyrna zygaena*	2	0	0	0	0	0	0	0	0
Thresher shark	*Alopias vulpinus*	9	2	0	4	1	1	4	14	84
Tiger shark	*Galeocerdo cuvier*	10	8	131	0	0	0	0	1	1
Shark - other	-	0	2	0	0	0	0	0	132	0
TOTAL		**7 743**	**8 158**	**11 530**	**5 052**	**13 894**	**13 864**	**12 902**	**11 371**	**5 893**

Seabirds

Seabirds are opportunistic feeders and are attracted to longline vessels, particularly during line setting, but also during line hauling, when the seabirds are at risk of being caught or entangled in the fishing gear. Seabirds are also attracted to discarded offal and are at risk of ingesting discarded hooks still attached to discarded baits. The design of purse-seine nets and the way this fishing gear is deployed, means that the risk of seabird bycatch during purse seine fishing operations is very low.

Threat Abatement Plan

The adverse impact of longline fishing activities on seabirds was not fully realised until the 1980s. The incidental catch of seabirds during pelagic longline fishing operations was listed as a key threatening process on 24 July 1995. Threat abatement plans for this key threatening process have been in place since 1998 with the current plan, *Threat Abatement Plan 2014 for the incidental catch (or bycatch) of seabirds during longline fishing operations*, made on 14 August 2014 (Commonwealth of Australia 2014). Copies of this plan may be obtained from the Department of the Environment: http://www.environment.gov.au/biodiversity/threatened/tap-approved.html. The ultimate aim of this plan is to achieve zero bycatch of seabirds from longline fishing in Commonwealth fisheries. The plan is subject to review within five years.

Considerable progress has been made under successive threat abatement plans to reduce the impact of pelagic longlining on seabirds. This has been achieved through the combined efforts of the fishing industry, researchers and non-governmental stakeholders working with government to reduce seabird bycatch in longline fisheries in a feasible, effective and efficient way. The prescriptions in this plan recognise this success and seek to further reduce the incidental capture of seabirds.

Over the life of the previous threat abatement plans, substantial progress has been achieved towards reducing the key threatening process. The incidental bycatch rates for several fisheries are well below the 0.01 or 0.05 birds per 1000 hooks, the maximum permissible levels set as a performance indicator under the current and previous plan. The prescriptions in the current plan recognise this success and seek to further reduce the incidental capture of seabirds.

Information on the level and nature of interactions between seabirds and fishing gear has increased significantly since 1995 and there is now extensive information available upon which to base decision-making. Considerable research and development activities have been undertaken into seabird bycatch mitigation measures including at sea trials. This work could not have been achieved without the continued engagement and support of industry. The prescriptions in this threat abatement plan also draw on best and improving practices in seabird bycatch mitigation for pelagic longline fishing developed under the *Agreement on the Conservation of Albatrosses and Petrels* (ACAP). This international agreement, to which Australia is a Party, aims to achieve and maintain a favourable conservation status for albatrosses and petrels. ACAP has been developed under the auspices of another international agreement, the *Convention on the Conservation of Migratory Species of Wild Animals* (CMS). There is now increased confidence concerning the effectiveness of several mitigation measures, particularly line weighting strategies, use of bird-scaring lines, retention of offal during line setting, and night setting (in certain instances). These mitigation measures form the basis of the prescriptions set out in this threat abatement plan.

Threat abatement plans must specify actions needed to achieve their objective. Under the current plan:

- AFMA will require all pelagic longline tuna fishers operating within either the ETBF or WTBF, or both fisheries, southwards of the parallel of 25 degrees South to:

    a. employ a line-weighting strategy approved by AFMA that enables the bait to be rapidly taken below the reach of most seabirds;

    b. employ at least one bird-scaring line constructed to a specified standard approved by AFMA, or use another proven mitigation measure approved by AFMA for use without such a line;

    c. not discharge offal during line setting; and

    d. employ, as part of an adaptive management approach to seabird bycatch mitigation, such other mitigation measures as AFMA may stipulate following consultation with the Department of the Environment (including, but not limited to, use of bird exclusion devices and/or managing offal discharge during line hauling, night setting, and area closures).

- AFMA will continue to require domestic and foreign vessels in all longline fisheries operating within Australian jurisdiction to adopt proven mitigation measures that ensure the performance criteria for each fishery are achieved in all areas and seasons.

- AFMA will implement an appropriate management response if identified circumstances occur, or data analysis indicates that the performance criteria, defined in this threat abatement plan, have not been met in any fishing area, season or fishery, or that independent monitoring has dropped below acceptable levels. Consistent with an adaptive management approach, the management response will be implemented as soon as practical, but no later than within three months of identification of a problem.

- Require that seabird bycatch in all fishing areas and seasons in the ETBF and WTBF is less than 0.05 birds per 1000 hooks.

- Areas within the ETBF or WTBF south of the parallel of 25 degrees South are divided for the purposes of the above bycatch rate criteria into five degree latitudinal bands. Seasons are defined, for the purposes of the criteria, into two: summer 1 September – 30 April, and winter 1 May – 31 August.

NPOA-Seabirds

Australia is developing a National Plan of Action for Conservation and Management of Seabirds (NPOA) to address the potential risk posed to seabirds by other fishing methods, including longline fishing in state and territory waters, which are not covered by the current threat abatement plan. Currently, data about the risks to seabird populations from other fishing methods are limited. Inshore areas are however, proximate to a range of coastal and offshore island breeding sites and seabird foraging activity and intensity is high during the austral summer, particularly during daylight hours. The NPOA will complement the FAO's best practice technical guidelines for member countries to use when drafting NPOA, which recommends fishing methods apart from longline (particularly gillnet and trawl) be assessed for risk, and mitigation methods be developed and prescribed when drafting an NPOA. The Australian Government is investigating sources of seabird mortality from other fishing practices, including

trawl, gillnet and purse seine fishing, with a view to developing an appropriate response to mitigate the effects of these practices on seabird species.

Recovery Plan

A *National Recovery Plan for threatened albatrosses and giant petrels* in Australia has been in place since 2001, with the current recovery plan adopted in 2011. A copy of the current recovery plan may be obtained from the Department of the Environment: http://www.environment.gov.au/biodiversity/threatened/publications/recovery/albatrosses-and-giant-petrels.html. The recovery plan's objective is to ensure the long-term survival and recovery of albatross and giant petrel populations breeding and foraging in Australian jurisdiction. The recovery plan sets out a coordinated conservation strategy for albatrosses and giant petrels listed as threatened under the EPBC Act. It considers threats to albatrosses and giant petrels both at terrestrial breeding sites and at sea in their foraging habitat. The recovery plans also collects specific data on population trends of those threatened species found breeding in Australia.

Interactions

Western Tuna and Billfish Fishery

The abundance of seabirds on the west coast of Australia and the level of fishing effort for tuna-like species are considerably lower than on the east coast. In addition, the majority of the fleet in the WTBF targets swordfish and operates at night, which reduces interactions with many species of seabirds vulnerable to bycatch. While observer data are only available for recent years, when fishing activity has been very low, the data indicate that seabird interactions are near zero and well below the limit of 0.05 seabirds per 1000 hooks prescribed by the threat abatement plan. There was no observer coverage in the WTBF in 2013 (calendar year). Observers were deployed in late 2012 and early 2014.

Eastern Tuna and Billfish Fishery

With the implementation of the original threat abatement plan in 1998, a large proportion of the ETBF longline fleet began to set their lines during the night to avoid interactions with albatross species. In doing so, they dramatically reduced the catch of albatross but increased the catch of shearwaters. Through a number of at-sea trials and the subsequent significant improvements to mitigation measures, the total catch of all seabirds in the fishery has been considerably reduced to a level below the 0.05 seabirds per 1000 hooks set, despite the widespread return to day setting. As very little effort from the ETBF has occurred in the IOTC Area of Competence in recent years, and there were no boats from the ETBF in 2013, a full description of seabird interactions is not provided here, but can be found in Australia's national report to the Western and Central Pacific Fisheries Commission (WCPFC; Hansen et al. 2014).

Southern Bluefin Tuna Fishery

There are very few recorded incidences of seabirds interacting with purse seine fishing vessels or gear in the SBTF, by observers. Observers did not report any seabird interactions in the purse seine sector in 2012–13 or 2013–14. All interactions with ecologically related species are reported to the CCSBT.

Marine turtles

Recovery plan

A Recovery Plan for Marine Turtles in Australia was developed, with an overall objective to reduce the detrimental impacts on Australian populations of marine turtles and hence promote

their recovery in the wild. A copy of the plan can be obtained from: http://www.environment.gov.au/coasts/publications/turtle-recovery/index.html.

Interactions

Western Tuna and Billfish Fishery

Catches of sea turtles are reported in logbooks and recorded by observers (Table 5). There was no observer coverage in the WTBF in 2013 (calendar year). Observers were deployed in late 2012 and early 2014.

Eastern Tuna and Billfish Fishery

A single vessel in the ETBF fished in the IOTC Area of Competence in 2012. A full description of sea turtle interactions in the ETBF can be found in Australia's national report to the WCPFC (Hansen et al. 2014).

Southern Bluefin Tuna Fishery

Observers did not report any turtle interactions in the purse seine sector in 2012–13 or 2013–14. All interactions with ecologically related species are reported to the CCSBT.

Table 5 Observed annual estimated captures of species of special interest (seabirds, turtles and marine mammals) for the Australian longline fleet, in the IOTC Area of Competence, for 2003 to 2013 (source: AFMA scientific observer data)

Group	Common name	Scientific name	2003–06	2007	2008	2009	2010	2011	2012	2013
Seabirds	Yellow nosed albatross	*Thalassarche chlororhynchos*	0	0	0	1	0	0	0	0
	Flesh footed shearwater	*Puffinus carneipes*	12	0	0	1	0	0	0	0
Turtles	Loggerhead turtle	*Caretta caretta*	4	1	2	1	0	0	0	0
	Hawksbill turtle	*Eretmochelys imbricata*	0	0	0	2	0	0	0	0
	Leatherback turtle	*Dermochelys coriacea*	4	0	2	4	1	0	1	0
	Green turtle	*Chelonia mydas*	2	0	0	0	0	0	0	0
	Olive Ridley turtle	*Lepidochelys olivacea*	1	0	0	0	0	0	0	0
Mammals	Australian fur seal	*Arctocephalus pusillus doriferus*	0	0	0	0	2	0	0	0

6 National data collection and processing systems

Logbooks

Catch and effort data continues to be collected in daily fishing logbooks for the Australian longline and purse seine vessels operating in the IOTC Area of Competence. AFMA distributes, collects and processes these logbooks. Logbooks have been in place for purse seines in the SBTF and SJK since the 1960s. Logbooks for Australian longline fisheries first began in 1986. The current Longline Daily Fishing Log, AL06 has existed in its current form since 2007. Electronic logbooks have been implemented for the ETBF and the WTBF.

Disposal of catch is monitored using catch disposal record forms for the WTBF and ETBF longline, and the SJF and SBT purse seine fisheries.

Vessel monitoring system

A Vessel Monitoring System (VMS) has been required in all Commonwealth managed-fisheries since 1 July 2007, including the WTBF, ETBF, SJF and SBTF. Compliance with VMS requirements has increased markedly since 2008, and from 1 November 2011, any vessel operator with a VMS that stops reporting could be ordered to return to port.

Observer program

Western Tuna and Billfish Fishery

In 2007, an ongoing observer program was implemented in the WTBF with a target level of observer coverage set at 5 per cent. In 2013, no observers were deployed so zero per cent of hooks set in WTBF longline operations were observed compared to 17.8 per cent in 2012. This is a timing issue as observers were deployed late in 2012 and early in 2014 so that observer coverage requirements were fulfilled for the 2012–13 and 2013–14 financial years.

Eastern Tuna and Billfish Fishery

No vessels in the ETBF fished in the IOTC Area of Competence in 2013. Observer coverage in the ETBF, which occurs in the WCPFC Convention Area, was 6.2 per cent of hooks set in 2013, compared to 5.9 per cent in 2012.

Southern Bluefin Tuna Fishery

The ongoing target observer coverage for the SBT purse seine fleet operating out of Port Lincoln is 10 per cent of the total catch and effort for the fishery. During the 2012–13 quota year, one Australian observer spent 56 days at sea. They observed purse seine activities for 8 days and tow activities for 26 days, with the remainder of the days spent in transit or lost due to rough weather. The observers monitored 14 purse seine sets where fish were retained and one set that was aborted, representing 12.7 per cent coverage for sets where fish were retained. This equates to approximately 13.9 per cent of the total catch.

Regional observer scheme

In March 2010, the IOTC passed Resolution 10/04 on a regional observer scheme, which was superseded by Resolution 11/04, which specifies:

1. *In order to improve the collection of scientific data, at least 5% of the number of operations/sets for each gear type by the fleet of each CPC while fishing in the IOTC Area of 24 meters overall length and over, and under 24 meters if they fish outside their EEZs shall be covered by this observer scheme. For vessels under 24 meters if they fish outside their EEZ, the above mentioned coverage should be achieved progressively by January 2013; and*
2. *When purse seiners are carrying an observer as stated in paragraph 1, this observer shall also monitor the catches at unloading to identify the composition of bigeye catches. The requirement for the observer to monitor catches at unloading is not applicable to CPCs already having a sampling scheme, with at least the coverage set out in paragraph 2.*

These specifications are re-iterated in Resolution 11/04, along with the following tasks for observers:

a) *Record and report fishing activities, verify positions of the vessel; b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency; c) Record the gear type, mesh size and attachments employed by the master; d) Collect information to enable the cross-checking of entries made to the logbooks (species composition and quantities, live and processed weight and location, where available); and e) Carry out such scientific work (for example, collecting samples), as requested by the IOTC Scientific Committee.*

AFMA has recruited and trained observers since its establishment in 1992. Approximately 22 observers are currently employed in the AFMA observer program. They are sourced from universities and maritime industries from around Australia and must be able to live and work at sea, have demonstrated experience in collecting biological data at sea, and experience in fisheries research methodologies and collection of associated scientific data. Observers must also hold marine radio operators certificate of proficiency (or similar qualifications and/or experience), a sea safety certificate and medical certificate, and have completed an AFMA observer training course.

In 2013, a total of 609 995 longline hooks were deployed in the IOTC Area of Competence by Australian vessels.

No observers were deployed in the WTBF in the 2013 calendar year; observers were deployed late in 2012 and early in 2014 (Table 6). Given the observer coverage in 2013, we have not provided a map depicting the spatial distribution of longline coverage in the IOTC Area of Competence. Observer coverage of the SBTF has also not been depicted as the operations are generally confined to a small spatial area in the Great Australian Bight and this information is reported to the CCSBT.

Table 6 Observer coverage, by hooks in the WTBF longline sector and by sets in the purse seine sector, in the IOTC Area of Competence for 2006 to 2013 (calendar year). The purse seine coverage noted here refers only to fishing for southern bluefin tuna (SBT).

Year	Longline Hooks Observed	Percentage Coverage (Hooks)	SBT Season	Purse Seine Sets Observed	Percentage Coverage (Sets)
2006	n/a	n/a	2006–07	9	5.6
2007	n/a	1.42	2007–08	16	11.8
2008	n/a	n/a	2008–09	11	7.9
2009	44 790	8.46	2009–10	7	9.0
2010	15 330	2.45	2010–11	21	19.8
2011	6 232	1.7	2011–12	17	11.1
2012	119 757	17.8	2012–13	14	12.7
2013	0	0.0	2013–14	16	17.0

n/a = data not available

Port sampling program

A fish size monitoring program for the WTBF has been conducted since 1999. When possible, a contractor collects weights and lengths for yellowfin tuna, bigeye tuna and swordfish from processors in Western Australia. However, given the generally low effort in the WTBF, this program is integrated with Australia's observer program and measurements reported were primarily done by observers on board fishing vessels or in port.

No fish were measured in 2013 as part of the port sampling program in the IOTC Area of Competence as no observers were deployed in the WTBF and there was no fishing in the Western Skipjack Fishery.

Unloading/transhipment

This section is not applicable to Australia as Australian-flagged vessels do not tranship at sea in the IOTC Area of Competence.

7 National research programs

Australia undertakes research projects and programs that are applicable to IOTC fisheries. Details of current and upcoming projects are provided below in Table 7.

Table 7 Summary table of current and future national research programs

Project title	Period / Status	Countries involved	Budget (AUD)	Funding source; (Implementing agency)	Objectives	Short description
Line weighting regime for tuna longline fishing using live-baiting to improve crew safety and seabird bycatch mitigation	2012–13 Report in prep	Australia	Approx. $105,000	FRDC[a], AFMA, DE[b]; (AFMA, DE)	Evaluate the effects of 60g sliding weights placed within 1 m of the hook on the life status of live baits	This project extends the previous line weighting research and seeks to improve line weighting measure, reduce seabird bycatch in longline fisheries from increased sink rates and improve crew safety of longline tuna fisheries. The impacts of moving the weights to within 1 m of the hook on the life status of live bait will also be tested. The live bait trial has been completed and a draft final report has been submitted to FRDC.
Data management, provision of fishery indicators and implementation of the harvest strategies for Australia's tropical tuna fisheries	2011–14 Ongoing	Australia	$428,634	AFMA; (CSIRO)	Manage tuna fisheries data and develop and evaluate harvest strategies	This large-scale tuna-related project seeks to manage all the data for the tropical tuna and billfish fisheries, as well as to implement, evaluate and further develop tuna harvest strategies, particularly in terms of reference points for byproduct and bycatch species. Fishery and market drivers will also be investigated and the response to the introduction of quota management assessed. Fishery indicators will be investigated and environmental and oceanographic influences on the availability of tuna species, both seasonal and inter-annual availability, will be evaluated.

Development of an underwater bait setter for pelagic longline fisheries	2008–14 Ongoing	Australia	Approx. $150,000	DE, Amerro Engineering, Packard Foundation, Peregrine Tours, and WWF[c]; (DE, Amerro)	To develop a method of setting baited hooks underwater, out of reach of seabirds	This research continues work described in IOTC-2010-WPEB-08. Trials of a prototype underwater setting machine occurred in Australia and Uruguay in 2010. The prototype achieved improved bait retention and similar setting speeds compared to hand setting. Following field testing some design refinements are being made and a second-generation prototype will need to be tested. This will occur in Uruguay in mid-2014.

[a] FRDC = Fisheries Research & Development Corporation
[b] DE= Department of the Environment
[c] WWF = World Wide Fund for Nature

8 Implementation of Scientific Committee recommendations and resolutions of the IOTC relevant to the SC

Australia is compliant with IOTC resolutions relevant to the Scientific Committee. Table 8 details the resolutions and how they have been implemented.

Table 8 Scientific requirements contained in the Resolutions of the Commission

No.	Resolution	Scientific requirement	CPC progress
13/03	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–11	- Catch and effort data prescribed in the Resolution collected in daily fishing logbooks for the Australian longline and purse seine vessels operating in the IOTC area of competence. -Catch and effort data are also recorded in fisheries managed by Western Australia that operate in the IOTC area of competence. - Disposal of catch is monitored using catch disposal record forms for the WTBF and ETBF longline, and the SJF and SBT purse seine fisheries. -Australia submitted a template of its official logbooks to record data in accordance with Annex I, II and III to the IOTC Executive Secretary for publishing on the IOTC website to facilitate MCS activities before 15 February 2014.
13/04	On the conservation of cetaceans	Paragraphs 7–9	-Resolution 13/04 has been implemented through conditions on boat SFRs in the WTBF and permit conditions in the SJF. -The setting of purse seines around cetaceans is prohibited and concession holders are required to report all interactions with cetaceans through their daily catch and effort logbooks. This information is also collected by observers if on board. -All cetacean species are protected by Australian law (EPBC Act).
13/05	On the conservation of whale sharks (*Rhincodon typus*)	7–9	-On the conservation of whale sharks Resolution 13/05 has been implemented through conditions on boat SFRs in the WTBF and permit conditions in the SJF. -The setting of purse seines around whale sharks is prohibited and concession holders are required to report all interactions with cetaceans through their daily catch and effort

No.	Resolution	Scientific requirement	CPC progress
			logbooks. This information is also collected by observers if on board. -Whale sharks are protected by Australian law (EPBC Act).
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	5–6	-The retention, transhipment, landing or storage of oceanic whitetip sharks, whole or parts of, is prohibited in the WTBF and ETBF. -Australia continues to collect data, including on ocean whitetip sharks, through Australia's scientific observer program.
12/09	On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	-Australia provides data on interactions with thresher sharks to the IOTC . - In 2011, Australia implemented new permit conditions to prohibit licence holders from retaining, transhipping, landing, storing or selling thresher sharks in the IOTC Area of Competence. -Commercial interactions with thresher sharks in 2012 have been reported to the IOTC as required. Captured thresher sharks were released as required. - The results from recreational tuna catch surveys indicated that interactions with thresher sharks by recreational fishers are also extremely rare.
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraph 3–7	-Australia has conducted research on methods to reduce seabird bycatch and reported the results to the IOTC (e.g. Robertson & Ashworth 2010; Robertson et al. 2010a, b; Robertson & Candy 2013; Robertson et al. 2013) -In 2014, Australia implemented a revised Threat Abatement Plan for seabirds to minimise seabird interactions in pelagic longline operations. Under the 2014 plan, longline vessels are required to maintain the bycatch rate of 0.05 seabirds per 1000 hooks set in all fishing areas. -Consistent with the objectives of the plan and with Resolution 12/06, Australia requires that all longline vessels fishing south of 25°S employ an approved line-weighting strategy and a bird-scaring line or another approved method; longline vessels in all other areas must use at least one mitigation method. -Australia reports on seabird interactions and mitigation measures in its national report.
12/04	On the conservation of marine turtles	Paragraphs, 3, 4, 6–10	-Australian vessels required to record and report interactions with marine turtles; this information is reported to the IOTC .

No.	Resolution	Scientific requirement	CPC progress
			-Research using circle hooks has been undertaken and reported to IOTC (Ward & Hall 2009) -Australia is a signatory member of Indian Ocean South-East Asia Marine Turtle Memorandum of Understanding and has committed to implement conservation and management measures to protect sea turtle habitat and nesting sights -Australia require the operators of all longline vessels to carry line cutters and de-hookers to facilitate the appropriate handling and prompt release of marine turtles that are caught or entangled
11/04	On a regional observer scheme	Paragraph 9	-Australia provides information on observer coverage including the number of vessels monitored and the coverage rates by gear type achieved. Australia has had observers for a number of years and aims to achieve 5 per cent observer coverage each year.
10/02	Mandatory statistical requirements for IOTC members and cooperating non contracting parties	Paragraphs 1–7	-All data submitted by 30 June each year.
05/05	Concerning the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 1–12	-Data reported as per the data reporting requirements outlined in the resolution. -Landing requirements in place: sharks must be landed with fins attached naturally or by other means; landing of shark livers only (i.e. without the carcass) not permitted. -Wire leaders not permitted. -In the Australian EEZ, a longline shark trip limit of 20 sharks per vessels per trip applies; 15 kg trip limit for gulper sharks. -Good handling practices encouraged to return sharks to the sea alive and vigorous. -Research pertaining to the conservation of sharks has been conducted by Australia and reported to the IOTC (e.g. Hindmarsh 2007; Ward et al. 2007; Ward & Hall 2009; Patterson et al. 2014). -Shark bycatch mitigation guide produced and distributed to encourage practical solutions that can be used by fishers (Patterson & Tudman 2009). - Under Australia's *Environment Protection and Biodiversity Conservation Act* 1999, licence holders must take measures to avoid the catch of porbeagle shark (*Lamna nasus*), shortfin (*Isurus oxyrinchus*) and longfin (*Isurus paucus*) makos and any live animals must be returned to the water alive.

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Appendix 1 Fishery boundaries

Locations of the ETBF and the WTBF in relation to the IOTC Area of Competence. The Western Skipjack Fishery and the Eastern Skipjack Fishery use the same boundary line as the WTBF and ETBF.