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To the Scientific Committee of the Indian Ocean Tuna Commission for 2012

Patricia I. Hobsbawn, Heather M. Patterson and James Larcombe

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Department of Agriculture, Fisheries and Forestry
Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)
Postal address GPO Box 1563 Canberra ACT 2601
Switchboard +61 2 6272 2010|
Facsimile +61 2 6272 2001
Email info.abares@daff.gov.au
Web daff.gov.au/abares

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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 30/06/2012
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 30/06/2012

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 2011, two Australian longliners from the Western Tuna and Billfish Fishery operated in the IOTC Area of Competence. They caught 5.8 t of albacore tuna (*Thunnus alalunga*), 50.0 t of bigeye tuna (*Thunnus obesus*), 14.1 t of yellowfin tuna (*Thunnus albacares*), 189.9 t of swordfish (*Xiphius gladius*) and 0.7 t of striped marlin (*Tetrapturus audax*). These catches represent less than 10 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 4120 t in 2011. There was no purse seine fishing for skipjack tuna (*Katsuwonus pelamis*) in 2011. The peak skipjack catch taken by Australian vessels fishing in the IOTC Area of Competence was 1039 t in 2001. In 2011, approximately 1 t of shark was landed by the Australian longline fleet operating in the IOTC Area of Competence and approximately 13 000 sharks were discarded/released. In the Western Tuna and Billfish Fishery, 1.7 per cent of hooks set in longline operations were observed over two trips in 2011.

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 two vessels operating in 2011 (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 2011, two vessels from the WTBF and no vessels from the ETBF fished in the IOTC Area of Competence. In recent years, the Australian longline fleet has fished mainly within the Australia's Exclusive Economic Zone (EEZ) (87.9 per cent of total effort in 2011), between 20°S and 35°S.

Most Australian longline vessels range in length from 20 to 35 m and are less than 230 gross registered tonnes. The majority of the fishing trips undertaken by Australian longline operators are less than 15 days in length (44 trips undertaken in 2011). Vessels fishing in the high seas undertake longer voyages of up to 28 days. Ice, ice slurry or brine spray systems are used to chill the catch.

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 2011. 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 (longline and purse seine 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

n/a = data not available

Purse seine fleet

The purse seine fleet has fluctuated from 5–14 vessels since 1998 (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.

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. Since 2001, however, catches for all species have declined substantially (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 tuna (*Thunnus alalunga;* peak catch of 94 t in 1999), 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. The swordfish catch declined to a low of 142.2 t in 2008 but increased to 349.4 t in 2010 before declining to 189.9 in 2011 (Table 2a). Catches of yellowfin tuna and bigeye tuna have also declined dramatically since 2001 to 14.1 t and 50.0 t in 2011, respectively (Table 2a). Effort has also declined in recent years, with the number of hooks deployed falling from a high of 6.25 million in 2000 to 0.36 million in 2011 (Table 2a). 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 (Figure 2a, Figure 2b). Figures 3a and 3b indicate the distribution of the catch in the IOTC Area of Competence. However, for 2011 it was not possible to map the longline catch from the WTBF due to confidentiality.

Figure 1 Australian annual catch of primary species in the longline sector of the WTBF, 1986 to 2011

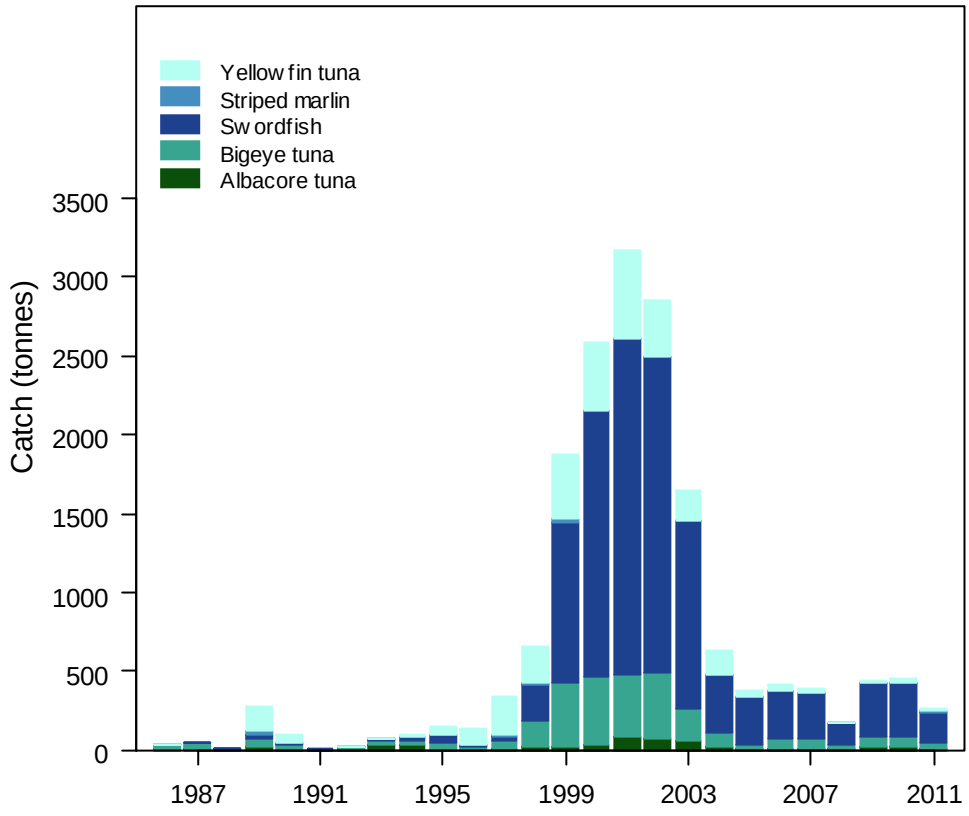


Figure 2a Fishing footprint in the Western Tuna and Billfish Fishery (longline) and in the Southern Bluefin Tuna Fishery (purse seine) for 2011. No skipjack tuna were taken in the IOTC Area of Competence in 2011.

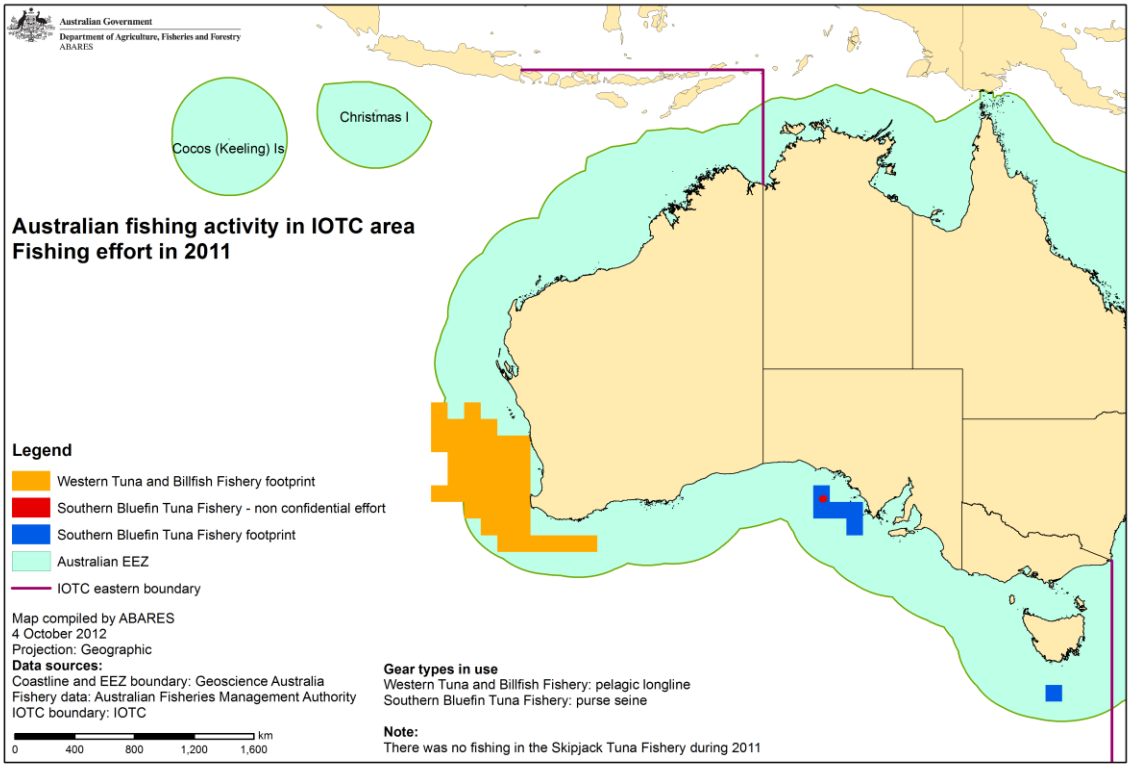


Figure 2b Aggregate fishing footprint in the Western Tuna and Billfish Fishery (longline), the Southern Bluefin Tuna Fishery (purse seine) and Western Skipjack Fishery (purse seine) for 2007–2011.

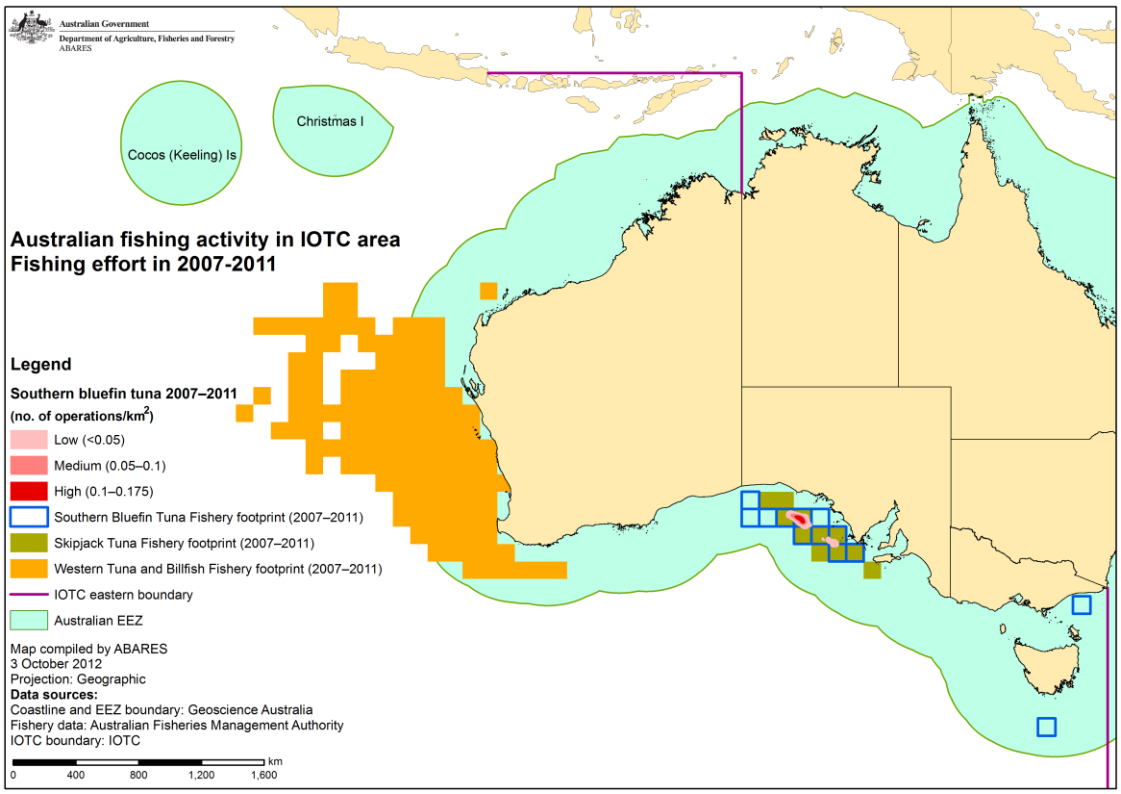


Figure 3a Distribution of catch in the Southern Bluefin Tuna Fishery (purse seine) for 2011. Note that due to the low effort in the WTBF in 2011, confidentiality rules prohibit the depiction of the 2011 WTBF data.

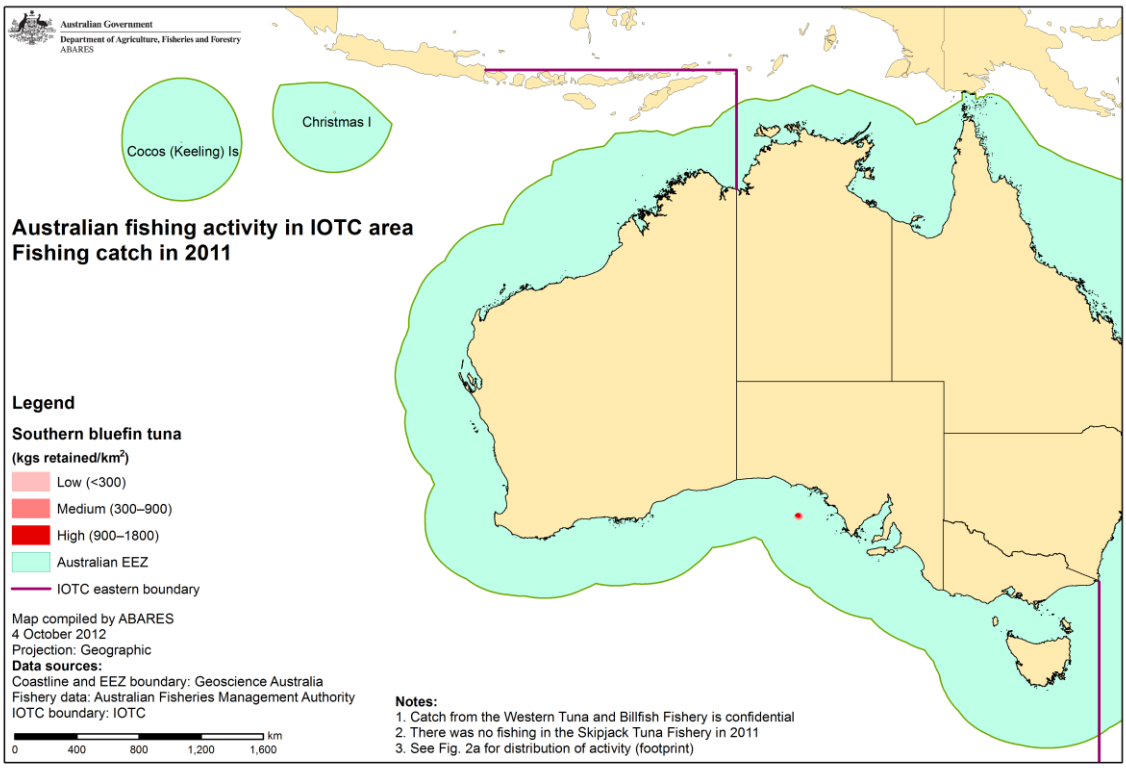
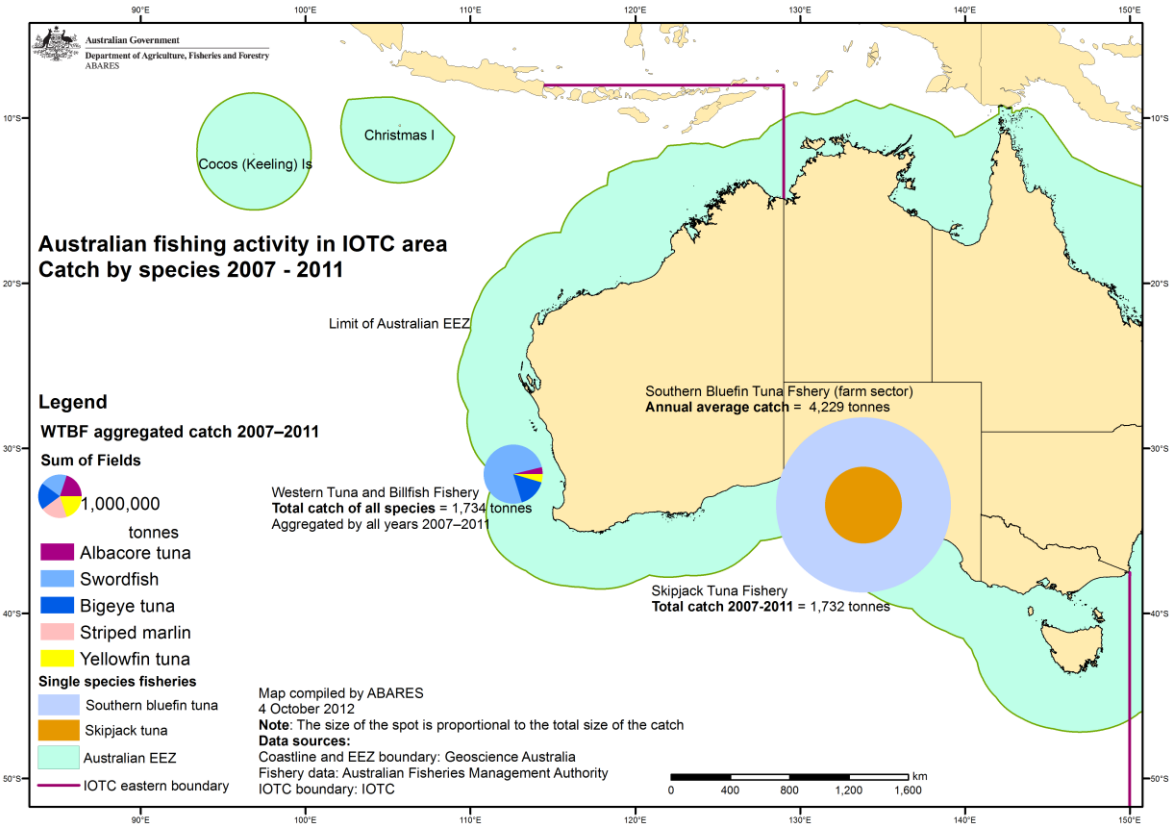


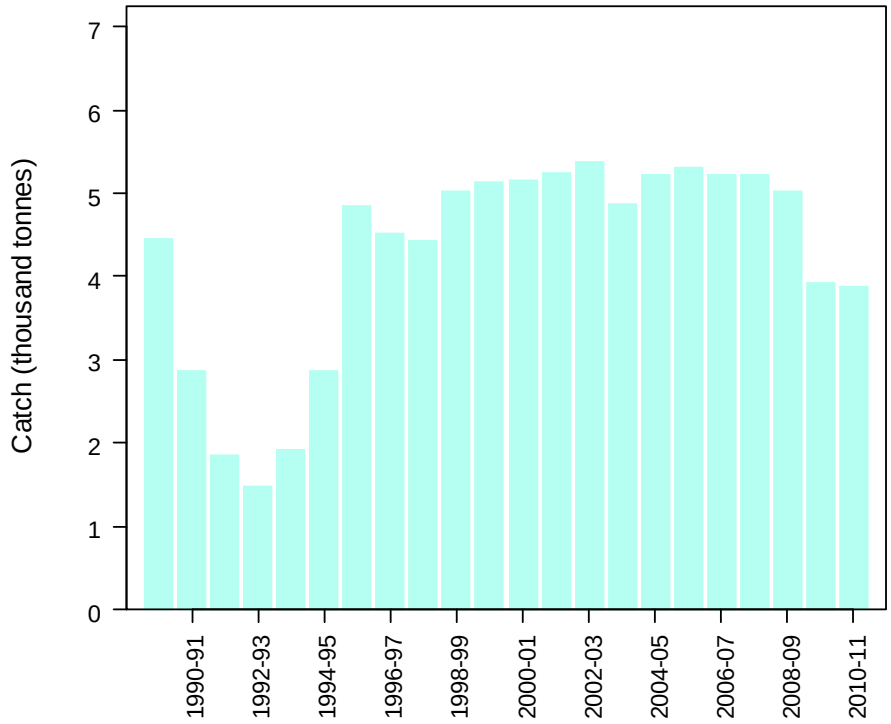
Figure 3b Distribution of catch in the Western Tuna and Billfish Fishery (WTBF; longline) and in the Southern Bluefin Tuna Fishery (purse seine) for 2007–2011.



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 (based on landings) catch of SBT taken in the purse seine fishery in 2011 was 4120 t, while the actual catch for the 2010–11 season was 3872 t (Table 2b; Figure 4). In the 2011–12 fishing season (1 December 2010 to 30 November 2012) the actual catch taken was 4463 t (pending any further catch in November 2012; Table 2b). Distribution of the catch in the SBTF is shown for 2011 in Figure 3a and for 2007–11 in Figure 3b. In some fishing seasons, purse seine vessels also target skipjack tuna (*Katsuwonus pelamis*) late in the SBT season as part of the SJF. Purse seine catches of skipjack in 2009 (855 t) represent 82 per cent of the peak catches taken by Australian vessels fishing in the IOTC Area of Competence in 2001 (1038.8 t) (Table 2b). There was no fishing for skipjack in 2011. Effort in the purse seine sector declined from a high of 160 sets in 2006–07 to 78 sets in 2009–10 but increased to 153 in 2011–12 (Table 2b). Effort in 2011 was restricted to a very small area around Port Lincoln, South Australia (Figure 2a). 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 2010–11



Multi-purpose fleets

The multi-purpose fisheries (dropline, gillnet, minor line, trawl and troll) typically target different species (e.g. Spanish mackerel) to the longline fishery. In 2011, total tuna catch and effort for gillnet and troll from Western Australian fisheries increased from 2010 (Tables 2c, 2d), while line (mainly handline) catches decreased from about 27.1 t to 14.7 t (Tables 2c, 2d).

In 2011, four Commonwealth vessels, three trolling vessels and one vessel using handline, operated in the IOTC Area of Competence. They caught 13 t of longtail tuna, 1.7 t of albacore, 1.0 t of SBT and less than 1.0 t of 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 2011.

Calendar year	Vessel number	Hooks set (thousands)	Albacore tuna	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

[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[b]	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	5017	2009	4316	4882	855
2009–10	417	78	3323	3998	2010	3660	4039	0
2010–11	835	106	3840	3872	2011	3909	4120	0[c]
2011–12[d]	1150	153	4328	4463	2012	n/a	n/a	n/a

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

[b] n/a = data not available

[c] Note that there was no effort in the Skipjack Tuna Fishery in 2009–10 or 2010–11

[d] Note that the catch data provided for 2011–12 is preliminary as the season does not conclude until 30 November 2012

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[b]	n/a	0.9	6	10.6[c]	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	15	n/a	n/a	285.5	17

[a] Line consists mainly of handline

[b] n/a = data not available

[c] 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)

Table 2d Catch of tuna and tuna-like species in Western Australian state fisheries, by method, for 2010 and 2011

Year	Species		Live weight (kg)			
	Common name	**Scientific name**	**Gillnet**	**Line**[a]	**Trolling**	**Total**
2010	Australia bonito	*Sarda australis*	65	30	124	219
	mackerel, grey	*Scomberomorus semifasciatus*	n/a[b]	1795	7766	9560
	mackerel, shark	*Grammatorcynus bicarinatus*	n/a	12	442	454
	mackerel, Spanish	*Scomberomorus commerson*	n/a	23946	259741	283687
	mackerel, spotted	*Scomberomorus munroi*	n/a	n/a	26	26
	tuna, longtail	*Thunnus tonggol*	n/a	15	65	80
	tuna, mackerel	*Euthynnus affinis*	n/a	86	309	395
	tuna, other	*Scombridae*	543	875	467	1885
	tuna, yellowfin	*Thunnus albacares*	202	254	112	567
	wahoo	*Acanthocybium solandri*	n/a	48	322	370
	TOTAL		**809**	**27 060**	**269 374**	**297 244**
2011	Australia bonito	*Sarda australis*	12	175	109	296
	mackerel, grey	*Scomberomorus semifasciatus*	n/a	2356	11072	13428
	mackerel, shark	*Grammatorcynus bicarinatus*	n/a	n/a	205	205
	mackerel, Spanish	*Scomberomorus commerson*	12	11241	273103	284355
	mackerel, spotted	*Scomberomorus munroi*	n/a	115	6	121
	tuna, bigeye	*Thunnus obesus*	2	40	n/a	42
	tuna, longtail	*Thunnus tonggol*	n/a	27	n/a	27
	tuna, northern bluefin	*Thunnus orientalis*	n/a	99	491	590
	tuna, other	*Scombridae*	411	214	50	675
	tuna, skipjack	*Katsuwonus pelamis*	n/a	13	n/a	13
	tuna, yellowfin	*Thunnus albacares*	647	459	88	1195
	wahoo	*Acanthocybium solandri*	n/a	n/a	410	410
	TOTAL		**1084**	**14 740**	**285 534**	**301 357**

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

4 Recreational fishery

Recreational fishing is popular in Australian states and the Northern Territory. Western Australia in particular has an active recreational gamefish fishery, targeting 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 most sailfish and marlins are tagged and released. There is also a combined daily bag limit of two fish for yellowfin tuna and southern bluefin tuna. In South Australia, Victoria and Tasmania, gamefishers mainly target albacore, skipjack tuna and southern bluefin tuna. Daily bag limits or possession limits also apply in those states. Recent estimates of total recreational catch for tuna and tuna-like species in Australia are currently not available due to incomplete coverage of the fisher population in recreational fishing surveys.

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 environmental performance of Commonwealth, State and the Northern Territory-managed wild-harvest fisheries is assessed under the EPBC Act. The EPBC Act requires that:

- all Commonwealth-managed 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-managed 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-managed fisheries and any State-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 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 with the aim of quantifying impacts on ecologically related species and the broader marine environment. The purpose of AFMA's Ecological Risk Management (ERM) is to respond to the ERAs for major fisheries managed by the Australian Government and to develop a framework for future risk

assessments as additional information becomes available. The ERA/ERM framework will help 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 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 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 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 AFZ, 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, two species of sunfish and 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. The ERM 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

AFMA, in conjunction with the CSIRO, has undertaken three levels of ecological risk assessment (ERA) for the SBTF (Hobday et al. 2007, AFMA 2009d, Zhou et al. 2009). 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 the sustainability of these species (AFMA 2009d). It was determined that the risk to the sustainability of 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 is described in AFMA (2009b), and available at: http://afma.gov.au/environment/eco_based/eras/docs/sbt/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 2011–2013 commenced in December 2011.

Sharks

NPOA-Sharks

Australia's National Plan of Action for Conservation and Management of Sharks (NPOA-Sharks) was first released in 2004 according to the guidelines set out by the United Nations' Food and Agriculture Organisation and its International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). The NPOA-Sharks provides advice and guidance to fisheries managers, conservation managers and the general public on action needed to ensure that Australia's shark populations are managed sustainably into the future.

Australia's NPOA-Sharks was recently reviewed and a revised NPOA-Sharks (Shark-plan 2) was released in July 2012 (DAFF 2012). The revised plan 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/sharkplan2.

Shark catch and finning regulation

Australia 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 dehookers 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 Australian longline fleet with shark species in the IOTC Area of Competence are provided in Tables 3a, 3b and 4. In 2011, 69 individual sharks were landed (Table 3a) weighing approximately 1 t (Table 3b), while 12 902 individuals were discarded/released (Table 4). No information is currently available from logbooks on the life status of discarded/released sharks, and there are few observer data because of limited effort in the WTBF.

Southern Bluefin Tuna Fishery

No interactions with sharks were reported by observers in the IOTC Area of Competence relevant to the SBTF in 2011. However, in 2011 two white sharks (*Carcharodon carcharias*) were caught in a purse seine. The net was dropped and both sharks were released alive.

Table 3a Total number of sharks, by species, retained by Australian longline vessels in the IOTC Area of Competence from 2004 to 2011 (source: AFMA logbook data)

Common name	Scientific name	2004	2005	2006	2007	2008	2009	2010	2011
Blacktip shark	*Carcharhinus* spp.	2	1	5	2	0	0	0	0
Blue shark	*Prionace glauca*	649	309	406	612	309	366	148	2
Bronze whaler	*Carcharhinus brachyurus*	8	1	0	0	0	0	0	0
Cookie-cutter shark	*Isistius brasiliensis*	0	0	0	0	0	0	0	0
Crocodile shark	*Pseudocarcharias kamoharai*	0	0	0	6	0	51	105	0
Dusky shark	*Carcharhinus obscurus*	27	0	0	0	0	0	0	0
Hammerhead	*Sphyrna* spp.	0	0	8	0	0	0	0	13
Oceanic whitetip	*Carcharhinus longimanus*	14	10	19	14	24	11	7	11
Porbeagle	*Lamna nasus*	0	0	1	2	9	0	3	0
Roughskin shark	*Centroscymnus* spp.; *Deania* spp.	0	0	0	0	0	0	0	0
Sandbar shark	*Carcharhinus plumbeus*	2	0	0	0	0	0	0	0
Scalloped hammerhead	*Sphyrna lewini*	10	1	0	0	0	0	0	0
Shortfin mako	*Isurus oxyrinchus*	53	19	56	21	8	16	20	43
Silky shark	*Carcharhinus falciformis*	0	2	0	0	0	1	0	0
Smooth hammerhead	*Sphyrna zygaena*	0	0	0	0	0	0	0	0
Thresher shark	*Alopias vulpinus*	0	0	0	1	0	1	1	0
Tiger shark	*Galeocerdo cuvier*	2	2	0	0	2	0	0	0
Shark - other	-	0	0	0	0	0	0	0	0
TOTAL		**769**	**345**	**495**	**658**	**352**	**446**	**284**	**69**

Table 3b Total weight (tonnes trunked weight) of shark species retained by Australian longline vessels in the IOTC Area of Competence from 2004 to 2011 (source: AFMA logbook data)

Common name	Scientific name	2004	2005	2006	2007	2008	2009	2010	2011
Blacktip shark	*Carcharhinus* spp.	0.06	0.04	0.2	0.05	0	0	0	0
Blue shark	*Prionace glauca*	19.3	9.9	10.8	15.1	9.2	10.2	3.9	0.04
Bronze whaler	*Carcharhinus brachyurus*	0.3	0.04	0	0	0	0	0	0
Cookie-cutter shark	*Isistius brasiliensis*	0	0	0	0	0	0	0	0
Crocodile shark	*Pseudocarcharias kamoharai*	0	0	0	0.03	0	0.1	0.3	0
Dusky shark	*Carcharhinus obscurus*	0.3	0	0	0	0	0	0	0
Hammerhead	*Sphyrna* spp.	0	0	0.1	0	0	0	0	0.2
Oceanic whitetip	*Carcharhinus longimanus*	0.4	0.4	0.6	0.3	0.7	0.3	0.1	0.2
Porbeagle	*Lamna nasus*	0	0	0.05	0.06	0.2	0	0.05	0
Roughskin shark	*Centroscymnus* spp.; *Deania* spp.	0	0	0	0	0	0	0	0
Sandbar shark	*Carcharhinus plumbeus*	0.05	0	0	0	0	0	0	0
Scalloped hammerhead	*Sphyrna lewini*	0.3	0.07	0	0	0	0	0	0
Shortfin mako	*Isurus oxyrinchus*	2.4	0.9	1.9	0.6	0.2	0.2	0.4	0.6
Silky shark	*Carcharhinus falciformis*	0	0.06	0	0	0	0.04	0	0
Smooth hammerhead	*Sphyrna zygaena*	0	0	0	0	0	0	0	0
Thresher shark	*Alopias vulpinus*	0	0	0	0.03	0	0.04	0.03	0
Tiger shark	*Galeocerdo cuvier*	0.06	0.1	0	0	0	0	0	0
Shark - other	-	0	0	0	0	0	0	0	0
TOTAL		**23.2**	**11.5**	**13.7**	**16.2**	**10.3**	**10.9**	**4.8**	**1.1**

Table 4 Total number of sharks, by species, released/discarded by Australian longline vessels in the IOTC Area of Competence from 2004 to 2011 (source: AFMA logbook data)

Common name	Scientific name	2004	2005	2006	2007	2008	2009	2010	2011
Blacktip shark	*Carcharhinus* spp.	5	1	6	0	0	0	0	0
Blue shark	*Prionace glauca*	7 582	3 329	3 717	7 213	4 044	8 596	7 073	5 148
Bronze whaler	*Carcharhinus brachyurus*	81	7	2	14	3	2	0	1
Cookie-cutter shark	*Isistius brasiliensis*	0	1	0	0	0	0	0	0
Crocodile shark	*Pseudocarcharias kamoharai*	2 540	4 197	4 079	3 650	900	4 651	5 861	7 167
Dusky shark	*Carcharhinus obscurus*	186	3	3	0	0	0	0	0
Hammerhead	*Sphyrna* spp.	4	0	55	79	32	3	2	6
Oceanic whitetip	*Carcharhinus longimanus*	293	55	117	85	19	66	171	51
Porbeagle	*Lamna nasus*	1	6	7	2	0	0	0	0
Roughskin shark	*Centroscymnus* spp.; *Deania* spp.	199	0	0	0	0	0	0	0
Sandbar shark	*Carcharhinus plumbeus*	0	0	0	0	0	0	0	0
Scalloped hammerhead	*Sphyrna lewini*	181	30	0	0	0	0	0	0
Shortfin mako	*Isurus oxyrinchus*	236	74	158	356	50	575	756	525
Silky shark	*Carcharhinus falciformis*	7	19	2	0	0	0	0	0
Smooth hammerhead	*Sphyrna zygaena*	5	2	0	0	0	0	0	0
Thresher shark	*Alopias vulpinus*	23	9	2	0	4	1	1	4
Tiger shark	*Galeocerdo cuvier*	19	10	8	131	0	0	0	0
Shark - other	-	0	0	2	0	0	0	0	0
TOTAL		**11 362**	**7 743**	**8 158**	**11 530**	**5 052**	**13 894**	**13 864**	**12 902**

Seabirds

Seabirds may be attracted to longline vessels by discarded offal and baits, and may attack and ingest baited hooks during the setting or, less commonly, hauling of longlines. Because of the design of purse seine nets and the way the gear is deployed, the risk of seabird bycatch in this sector is very low.

Longline

Australia has demonstrated its commitment to reduce the incidental catch of seabirds through the development of the Threat Abatement Plan (TAP) for the Incidental Catch (or bycatch) of Seabirds during oceanic longline fishing operations. The TAP is Australia's key national measure for mitigating the impact of longline fisheries on seabird populations and demonstrates Australia's commitment to the International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds). The 2006 TAP can be obtained from: http://www.aad.gov.au/default.asp?casid=35316.

The TAP was adopted in 1998 and subsequently updated in 2006 (Anon 2006). It meets the requirements of the EPBC Act to implement actions to reduce the impact of longline fishing practices on seabirds in Commonwealth waters. The TAP has been successful in reducing seabird bycatch in the most at-risk longline fishing areas since the first national assessment of incidental catch of seabirds in longline fisheries was conducted in 2003. This has been achieved through development of a suite of mitigation approaches prescribed by the TAP in 1998, which have been implemented and strengthened following the review and subsequent updating of the TAP in 2006.

The overall long-term objective of the 2006 TAP is to achieve zero bycatch, with an interim five year objective of significantly reducing the bycatch of seabirds in Commonwealth waters as a result of longline fishing operations. The interim objective has been achieved through:

1. Mitigation –fishing practices and legislative directives to ensure reducing levels of seabird bycatch.
2. Education – disseminating information to longline fishers.
3. International initiatives – global adoption of best practice mitigation measures pursued at international level.
4. Research and Development – new mitigation measures developed, trialled, assessed and supported.
5. Innovation – the potential accreditation of longline fishers who are able to demonstrate 'bird friendly' fishing practices.

In the 2006 TAP the following mitigation actions are prescribed:

- AFMA will require all pelagic longline tuna fishers operating within the ETBF south of latitude 25°S to adopt one of two options:
    - a line-weighting strategy that enables the bait to be rapidly taken below the reach of most seabirds; or
    - set all hooks during the night;

  In both options, vessels will also employ at least one seabird scaring ('tori') line constructed to a specified standard, not use bait that is still frozen and retain all offal during line setting.

- AFMA will require all pelagic longline tuna fishers operating within the WTBF south of latitude 30°S to set all hooks during the night. In addition, vessels will also employ at least one seabird scaring line constructed to a specified standard, not use bait that is still frozen and retain all offal during line setting.
- AFMA will require domestic and foreign longline vessels in all demersal fisheries operating within the 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 data analysis indicates that the criteria defined in the 2006 TAP have not been met in any area, season and fishery, or that observer coverage has dropped below acceptable levels (performance criteria) for each fishery (Anon 2006).

The current TAP (2006) requires the ETBF to reduce the bycatch of seabirds in oceanic longline operations and maintain a bycatch rate of less than 0.05 seabirds per 1000 hooks in all fishing areas (by 5° latitudinal bands) and fishing seasons (1 September–30 April; 1 May–31 August).

Vessel/crew responses to interactions with seabirds are mandated in the TAP, and AFMA and the fishing industry have shown the current TAP is capable of minimising interactions and dealing with the occurrence of any unusual issues. Since the introduction of the 2006 TAP provisions outlined above, AFMA has made the use of line weighting mandatory for all fishers in the ETBF and WTBF.

The TAP is currently under review and is expected to incorporate revised elements in any conservation and management measure for seabirds.

NPOA-Seabirds

Australia is developing a National Plan of Action for Conservation and Management of Seabirds to address the potential risk posed to seabirds by longline fishing in State and Territory waters, which are not covered by the 2006 TAP. Low levels of longline fishing in these waters and a reliance on inshore fishing areas where seabird species known to be vulnerable to bycatch are less abundant, suggest that seabird bycatch in these fisheries is unlikely to be a significant problem.

In 2009, the FAO adopted best practice technical guidelines for member countries to use when drafting NPOAs, 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. In response, the Australian Government is currently 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 endangered seabird species as required.

Recovery Plan

A Recovery Plan for Albatrosses and Giant Petrels in Australia was first adopted in 2001. A new Recovery Plan for these species was adopted in 2011, with the overall objective of ensuring the long term survival and recovery of albatross and giant petrel populations breeding and foraging in Australian jurisdiction by reducing or eliminating human-related threats. A copy of the 2011 plan can be obtained from http://www.environment.gov.au/biodiversity/threatened/publications/recovery/albatrosses-and-giant-petrels.html

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 TAP. Observers placed on WTBF longliners during 2011 reported no interactions with seabirds.

Eastern Tuna and Billfish Fishery

With the implementation of the original TAP 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 was no effort in 2011, 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; Patterson et al. 2012).

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 2010–11 or 2011–12.

Marine Turtles

Recovery Plan

A Recovery Plan for Marine Turtles in Australia was developed by the former Department of the Environment, Water, Heritage and the Arts. The overall objective of the plan is 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. During the 2003–2006 pilot scientific monitoring program in the WTBF, observers reported 11 sea turtles (four leatherback turtles, four loggerhead turtles, two green turtles and an Olive Ridley turtle) during monitoring that accounted for four per cent of the total effort in the fishery. All were released alive. Observers placed on WTBF longliners during 2011 reported no interactions with marine turtles (Table 5).

Eastern Tuna and Billfish Fishery

No effort in the ETBF relevant to the IOTC Area of Competence occurred in 2011. A full description of sea turtle interactions throughout the remainder of the ETBF can be found in Australia's national report to the WCPFC (Patterson et al. 2012).

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 2011 (source: AFMA scientific observer data)

Group	Common name	Scientific name	2003–06	2007	2008	2009	2010	2011
Seabirds	Yellow nosed albatross	*Thalassarche chlororhynchos*	0	0	0	1	0	0
	Flesh footed shearwater	*Puffinus carneipes*	12	0	0	1	0	0
Turtles	Loggerhead turtle	*Caretta caretta*	4	1	2	1	0	0
	Hawksbill turtle	*Eretmochelys imbricata*	0	0	0	2	0	0
	Leatherback turtle	*Dermochelys coriacea*	4	0	2	4	1	0
	Green turtle	*Chelonia mydas*	2	0	0	0	0	0
	Olive Ridley turtle	*Lepidochelys olivacea*	1	0	0	0	0	0
Mammals	Nil	-	0	0	0	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 five per cent. In 2011, 1.7 per cent of hooks set in WTBF longline operations were observed over two trips (2.5 per cent in 2010 and 8.5 per cent in 2009).

A fish size monitoring program for the WTBF has been conducted since 1999. A contractor collects weights and lengths (where possible) for yellowfin tuna, bigeye tuna and swordfish from processors in Western Australia.

Eastern Tuna and Billfish Fishery

There was no effort in the ETBF part of the IOTC Area of Competence in 2011. For the ETBF effort, which occurs in the WCPFC Convention Area, observer coverage was in 2011 was 6.3 per cent of hooks set, compared 3.6 per cent in 2010 and 6.4 per cent in 2009.

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 2011–12 quota year, one Australian observer spent 30 days at sea. They observed purse seine activities for 9 days and tow activities for 13 days, with the remainder of the days spent in transit or lost due to rough weather. The observers monitored 17 purse seine sets where fish were retained and two sets that were aborted, representing 11.1 per cent coverage for sets where fish were retained. This equates to approximately 13.8 per cent of the total catch.

Size monitoring of the SBT purse seine catch is carried out when fish are transferred from tow cages to farm cages. When calculating the average weight per tow cage a sample of at least 40 fish (excluding those under 10 kg) from each tow cage are weighed and measured.

Regional observer scheme

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

6. *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*
7. *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 2011, a total of 359 832 longline hooks were deployed in the IOTC Area of Competence by Australian vessels (all by vessels operating in the WTBF). Of these, 6232 hooks were observed as part of AFMA's scientific observer program, representing a total of 1.7 per cent coverage. Note that due to the low level of observer coverage in the IOTC Area of Competence in 2011, mainly due to the very low effort in the WTBF in 2011 and zero effort in the SJF in 2011, it is not possible to depict the spatial distribution of the observer coverage.

Table 6 Observer coverage, by hooks in the longline sector and by sets in the purse seine sector, in the IOTC Area of Competence for 2006 to 2011. 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[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

[a] n/a = data not available

Port sampling program

Australia's port sampling has been operating in the WTBF since 2000. This is integrated with Australia's observer program. There was one observed trip in the WTBF and three observed SBT purse seine trips in the IOTC Area of Competence in 2011. There was no fishing in the Western Skipjack Fishery in 2011. Details on the fish measured in 2011 as part of the port sampling program in the IOTC Area of Competence are given in Table 7.

Table 7 Number of individuals measured, by species, in the WTBF and SBTF in 2011. All species were caught with pelagic longline in the WTBF, with the exception of southern bluefin tuna, which were taken with purse seine in the SBTF

Common name	Scientific name	Number measured
Albacore tuna	*Thunnus alalunga*	6
Bigeye tuna	*Thunnus obesus*	42
Blue shark	*Prionace glauca*	4
Blue-eye trevalla	*Hyperoglyphe antarctica*	1
Crocodile shark	*Pseudocarcharias kamoharai*	74
Escolar	*Lepidocybium flavobrunnum*	22
Long snouted lancetfish	*Alepisaurus ferox*	1
Mahi mahi	*Coryphaena hippurus*	29
Manta ray	*Manta birostris*	1
Oceanic whitetip	*Carcharhinus longimanus*	1
Pelagic stingray	*Pteroplatytrygon violacea*	7
Scalloped hammerhead	*Sphyrna lewini*	3
Shortfin mako	*Isurus oxyrinchus*	1
Snake mackerel	*Gemphylus serpens*	3
Swordfish	*Xiphias gladius*	27
Tiger shark	*Galeocerdo cuvier*	1
Yellowfin tuna	*Thunnus albacares*	4
Southern bluefin tuna	*Thunnus maccoyii*	4
Total		**231**

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 8.

Table 8 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 Ongoing	Australia	Approx. $105,000	FRDC[a], AFMA, DSEWPaC; (AFMA, DSEWPaC)	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 be at or near the hook on the life status of live bait will also be tested.
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.

Analysis of tuna tagging data from the Indian Ocean Tuna Tagging Programme	2012 Complete (1/12/12)	Australia	Approx. $69,000	IOTC, CSIRO; (CSIRO/IOTC)	To develop growth models and estimate mortality rates for target species	A large-scale Indian Ocean Tuna Tagging Programme (IOTTP) was conducted by the IOTC in 2002-2009. The main goal was to improve management of tuna fisheries through better knowledge of the status and population dynamics of the main stocks. A Tagging Symposium to be held on 30 October – 2 November 2012 in order to present and review results from analyses of the IOTTP dataset. The Symposium Steering Committee selected some key analyses to be done and presented at the symposium, which include the growth modelling and mortality rate estimation to be conducted as part of this project (Eveson et al. 2012a, 2012b)
Experimental determinations of optimum line weighting regimes and their effect on target catch rates	2010–12 Complete	Australia	Approx. $55,000	DSEWPaC[b], AFMA; (DSEWPaC)	To determine optimum line weighting regimes for avoiding seabird bycatch	This research continued work described in IOTC-2010-WPEB-06 and aimed to determine optimum line weighting regimes which are also safe, practical and have no significant adverse effects on target catch rates. The focus was on evaluating weights of around 40–60 grams placed at or close to (<1 m from) the hook. The findings provide the fishing industry with new line weighting options (Robertson et al. 2012a, b)
Development of an underwater bait setter for pelagic longline fisheries	2008–12 Ongoing	Australia	Approx. $150,000	DSEWPaC, Amerro Engineering, Packard Foundation, Peregrine Tours, and WWF[c]; (DSEWPaC, 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. Further trials of a prototype underwater setting machine occurred in Australia and Uruguay in 2010. The current prototype has achieved improved bait retention and similar setting speeds compared to hand setting. Following field testing in Uruguay in 2012, some refinements to the design are being made and will need to be tested. This will occur in Australia and probably also in Uruguay in 2013, subject to progress in 2012.

[a] FRDC = Fisheries Research & Development Corporation
[b] DSEWPaC = Department of Sustainability, Environment, Water, Population & Communities
[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 9 details the resolutions and how they have been implemented.

Table 9 Scientific requirements contained in the Resolutions of the Commission

No.	Resolution	Scientific requirement	CPC progress
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) -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

No.	Resolution	Scientific requirement	CPC progress
			to the water alive.
10/02	Mandatory statistical requirements for IOTC members and cooperating non contracting parties	Paragraphs 1–7	-All data submitted by 30 June each year
10/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraph 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) -In 2006, Australia implemented a Threat Abatement Plan (TAP) for seabirds to minimise seabird interactions in pelagic longline operations. Under the TAP, 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 TAP and with Resolution 10/06, Australia requires that all longline vessels fishing south of 25°S use at least two appropriate mitigation methods; 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
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.
12/03	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–9	- 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

No.	Resolution	Scientific requirement	CPC progress
			-Australia provides all the required data to the IOTC Secretariat by June 30th
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 -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
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. -No interactions with thresher sharks were observed from commercial fishers in the IOTC area of competence in 2010 or 2011 - The results from recreational tuna catch surveys indicated that interactions with thresher sharks are also extremely rare in the recreational tuna fishing sector

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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.