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to the Scientific Committee of the Indian Ocean Tuna Commission for 2011

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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 30/06/2011
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 30/06/2011

Contents

Executive 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) Convention Area. In 2010, four Australian longliners (three from the Western Tuna and Billfish Fishery and one from the Eastern Tuna and Billfish Fishery) operated in the IOTC Convention Area. Together they caught 18.7 t of albacore tuna (*Thunnus alalunga*), 65.3 t of bigeye tuna (*Thunnus obesus*), 21.9 t of yellowfin tuna (*Thunnus albacares*), 349.4 t of swordfish (*Xiphius gladius*) and 0.5 t of striped marlin (*Tetrapturus audax*). These catches represent less than 15 per cent of the peak catches taken by Australian vessels fishing in the IOTC Convention Area in 2001, for these five species combined. 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 4039 t in 2010. There was no purse seine catch of skipjack tuna (*Katsuwonus pelamis*) in 2010. The peak skipjack catch taken by Australian vessels fishing in the IOTC Convention Area was 1039 t in 2001. In 2010, approximately 5 t of shark was landed by the Australian longline fleet operating in the IOTC Convention Area and approximately 14 000 sharks were discarded/released.

1 Background/General fishery information

Australian fisheries targeting tuna and billfish in the Indian Ocean Tuna Commission (IOTC) Convention Area are primarily 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.

2 Fleet structure

Longline fleet

The number of Australian longline vessels operating in the IOTC Convention Area has declined substantially since 2000 (61 vessels) with only four vessels operating in 2010 (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 west of 150°E. In 2010, three vessels from the WTBF and one vessel from the ETBF fished in the Convention Area. In recent years, the Australian longline fleet has fished mainly within the Australia's Exclusive Economic Zone (EEZ) (87.1 per cent of total effort in 2010), between 20°S and 35°S.

Most Australian longline vessels range in length from 20 to 35 m and are less than 200 gross tonnes. The majority of the fishing trips undertaken by Australian longline operators are less than 15 days in length (68 trips undertaken in 2010). 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 State longline and purse seine vessels reporting one or more fishing trips in the IOTC Convention Area from 1998 to 2010. 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. NA denotes that information is 'not available'.

Calendar Year	Longline	Purse seine	No. > 24 m
1998	37	5 (5)	NA
1999	49	7 (7)	NA
2000	61	8 (8)	NA
2001	45	13 (8)	NA
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

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 (Table 2a). Catches of yellowfin tuna and bigeye tuna have also declined dramatically since 2001 to 11.7 t and 61.7 t in 2009, respectively (Table 2a). However, catches increased in 2010 to 21.0 t and 65.3 t for bigeye tuna and yellowfin tuna, respectively. Effort has also declined in recent years, with the number of hooks deployed falling from a high of 6.25 million in 2000 to 0.62 million in 2010 (Table 2a). Owing 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 Convention Area. However, for 2010 it was not possible to depict 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 2010

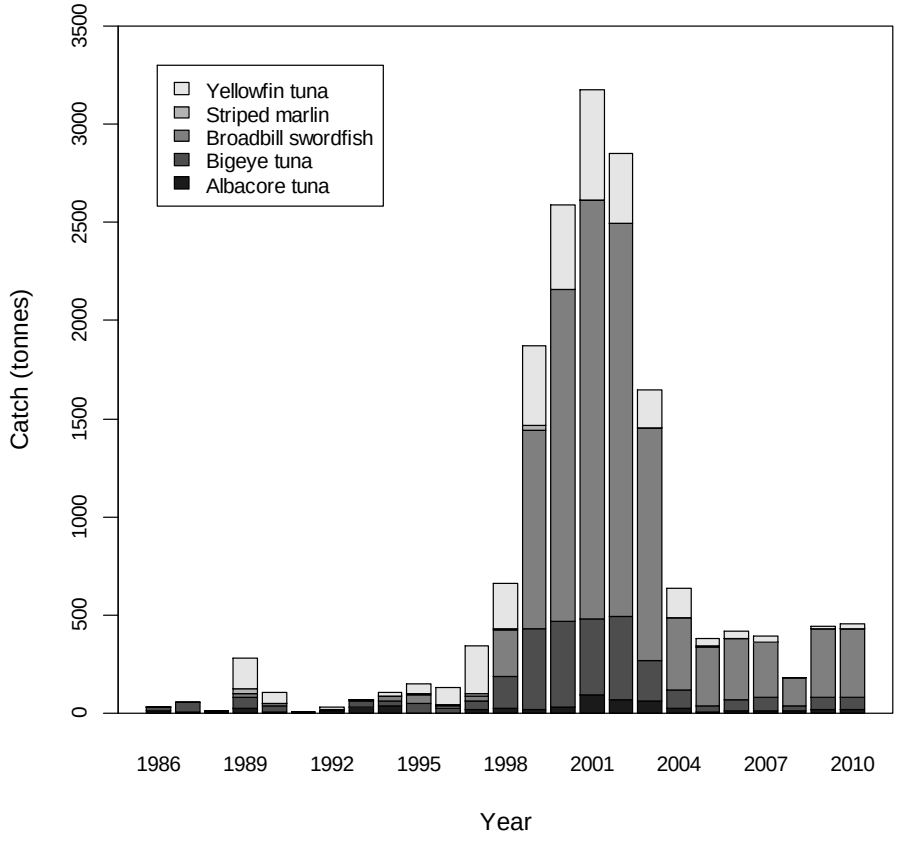


Figure 2a Fishing footprint in the Western Tuna and Billfish Fishery (WTBF; longline) and in the Southern Bluefin Tuna Fishery (SBT; purse seine) for 2010. No skipjack tuna were taken in the IOTC convention area in 2010.

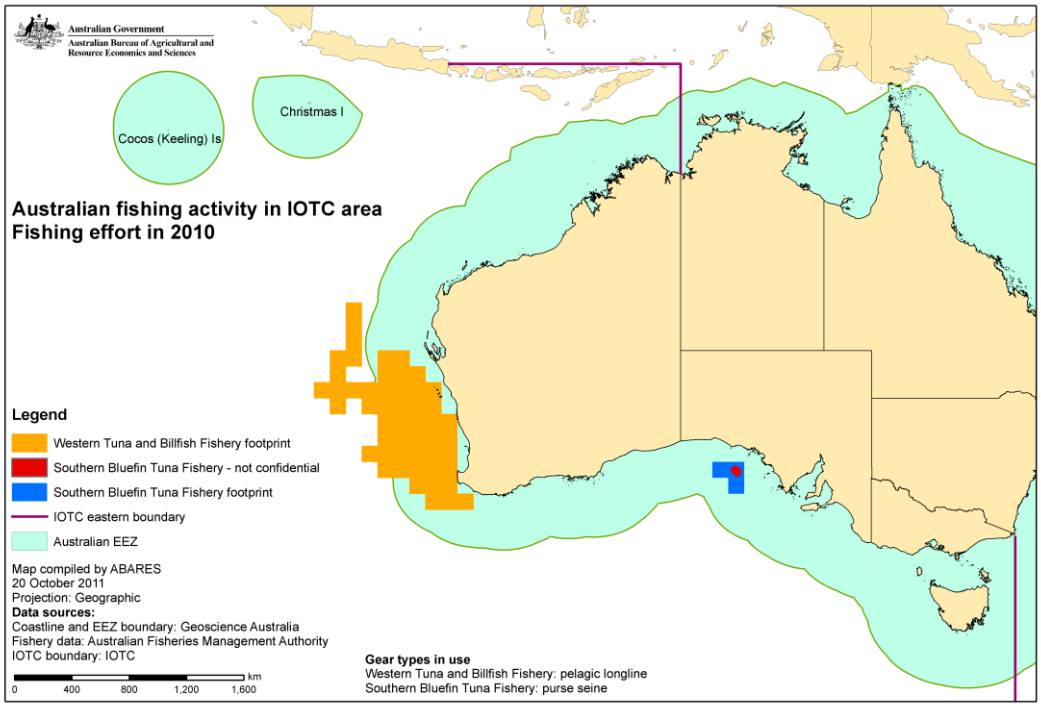


Figure 2b Aggregate fishing footprint in the Western Tuna and Billfish Fishery (longline), the Southern Bluefin Tuna Fishery (purse seine) and Western Skipjack Fishery (purse seine) for 2006–2010.

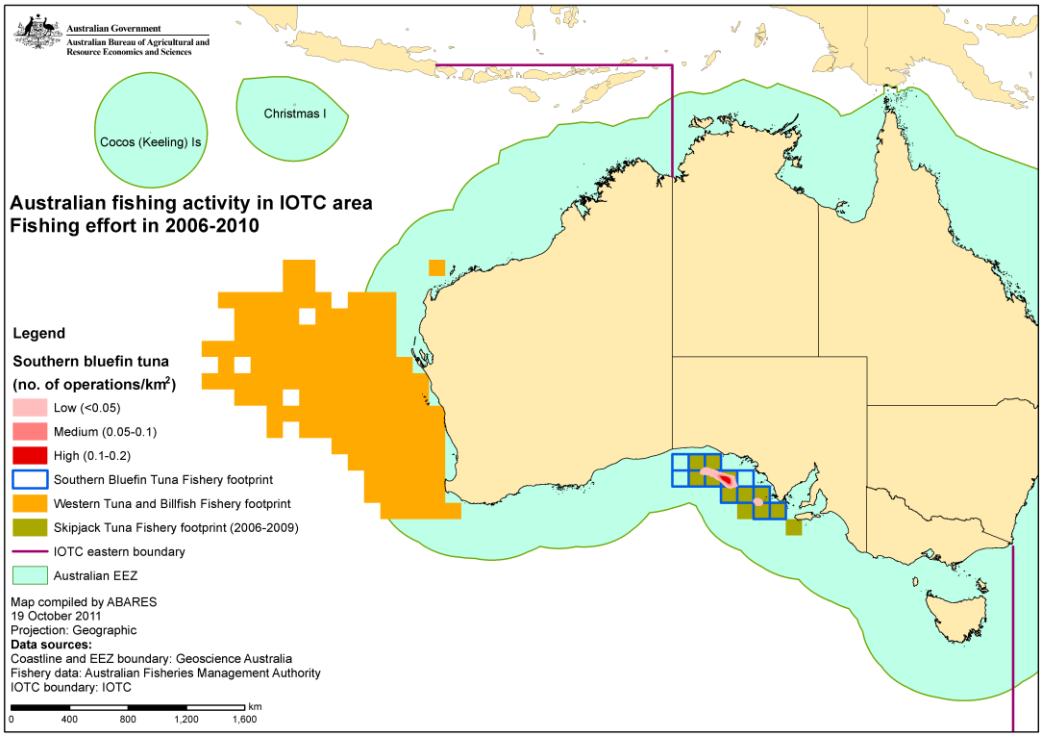


Figure 3a Distribution of catch in the Southern Bluefin Tuna Fishery (SBT; purse seine) for 2010. Note that due to the low effort in the WTBF in 2010, confidentiality rules prohibit the depiction of the 2010 WTBF data.

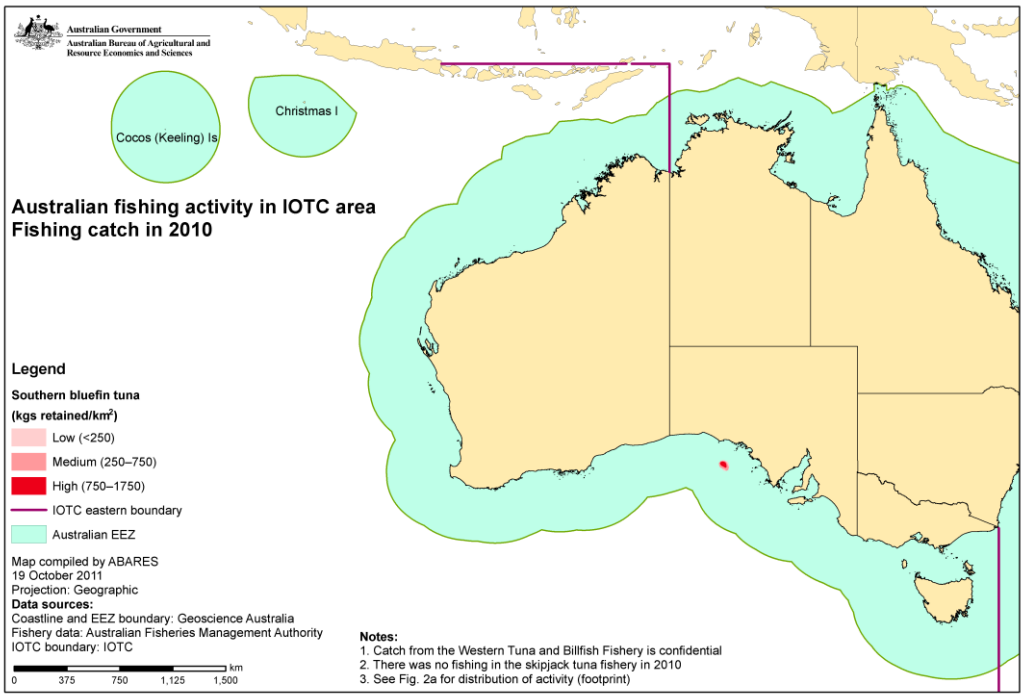
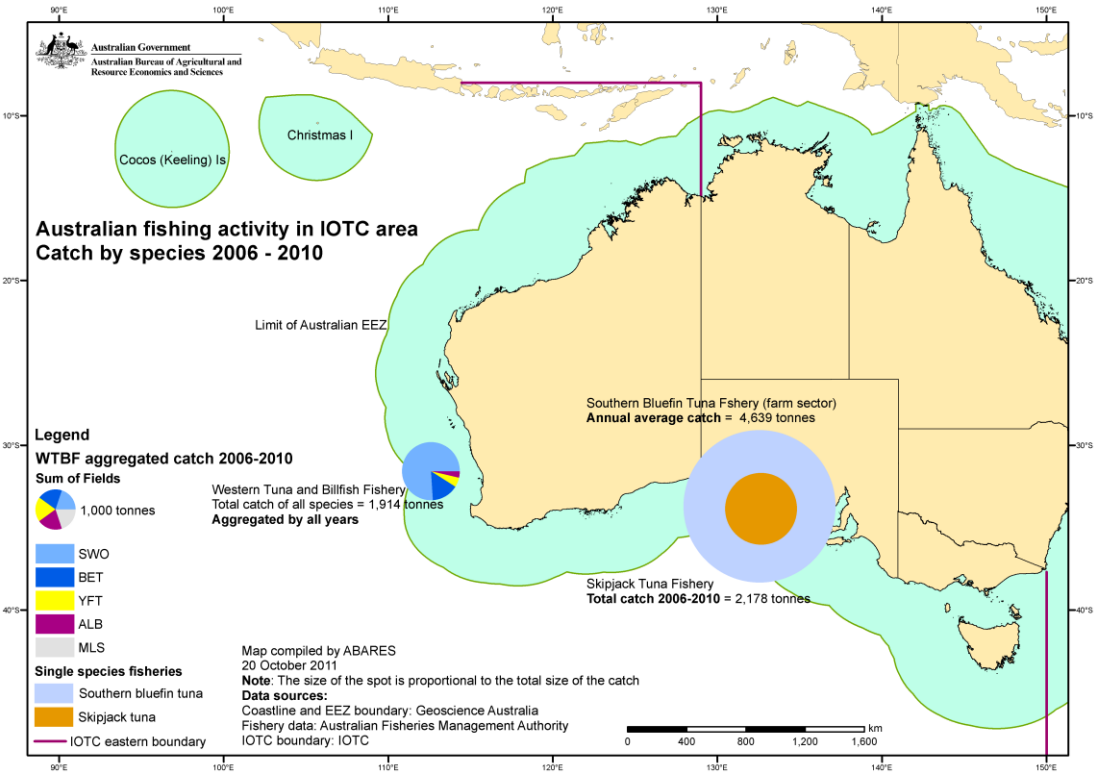


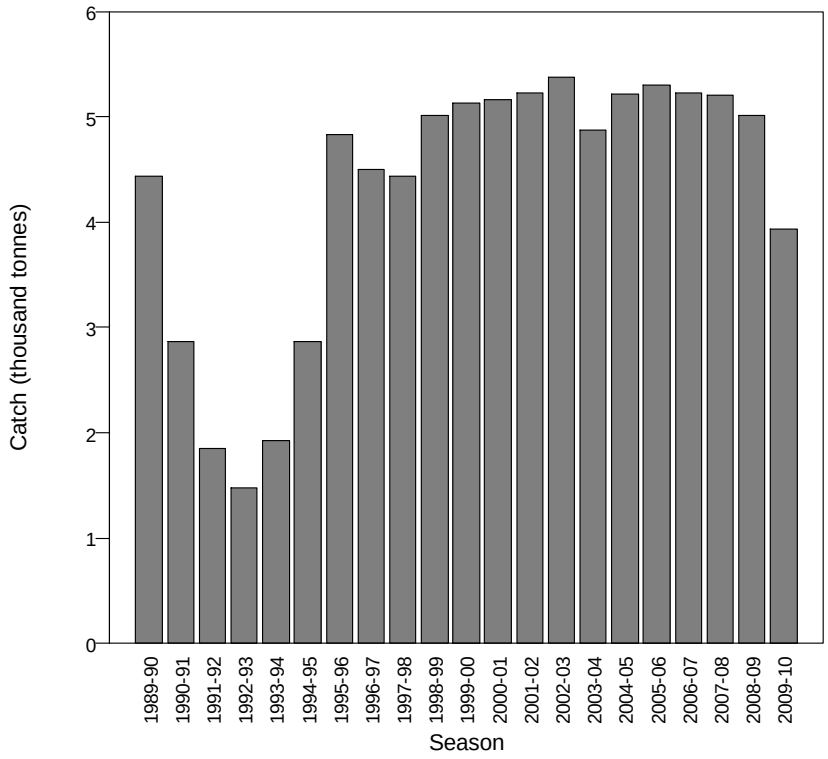
Figure 3b Distribution of catch in the Western Tuna and Billfish Fishery (WTBF; longline) and in the Southern Bluefin Tuna Fishery (SBT; purse seine) for 2006–2010. SWO = swordfish; BET = bigeye tuna; YFT = yellowfin tuna; ALB = albacore tuna; MLS = striped marlin.



Purse seine fleet

Purse seine fishing operations by Australian vessels in the IOTC Convention Area 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 in 2010 was 4039 t. However, in the 2010–11 fishing season (1 December 2010 to 30 November 2011) the actual catch taken was 3802 t (pending any further catch in November 2011; Table 2b, Figure 4). Distribution of the catch in the Southern Bluefin Tuna Fishery is shown for 2010 in Figure 3a and for 2006–10 in Figure 3b. In some fishing seasons, purse seine vessels also target skipjack tuna (*Katsuwonus pelamis*) late in the SBT season. 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 Convention Area in 2001 (1038.8 t) (Table 2b). No skipjack were taken in 2010. Effort in the purse seine sector has declined from a high of 160 sets in 2006–07 to 104 sets in 2010–11 (Table 2b). Effort in 2010 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, 1986 to 2010



Multi-purpose fleets

The multi-purpose fisheries (dropline, gillnet, minor line, trawl and troll) target different species to the longline and purse seine fisheries. In 2010, total catch and effort for gillnet and troll decreased from 2009 (Tables 2c, 2d). However, line (mainly handline) catches increased from about 12.1 t to 27.1 t (Tables 2c, 2d).

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 Convention Area from 1998 to 2010. 'NEI' denotes species that are 'not elsewhere indicated'.

Calendar year	No. of longline vessels	Hooks set (thousands)	Albacore tuna	Bigeye tuna	Yellowfin tuna	Swordfish	Striped marlin	NEI	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

Table 2b Purse seine effort and catch (tonnes live weight) of southern bluefin tuna and skipjack tuna by Australian vessels fishing in the IOTC Convention Area by fishing season and calendar year. n/a = not available.

Southern bluefin tuna								Skipjack tuna (Calendar year)
Fishing season	Search hours	No. of sets	Estimated catch (t)	Actual catch (t)	Calendar year	Estimated catch (t)	Actual catch (t)	Estimated catch (t)
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	1038.5
2001–02	1309	159	5400	5234	2002	4920	4683	1144.2
2002–03	1276	150	5188	5375	2003	5587	5792	0.5
2003–04	1202	160	5299	4874	2004	5178	4834	30.1
2004–05	1168	139	5225	5215	2005	5330	5210	<0.1
2005–06	1304	156	5463	5302	2006	5852	5629	446.2
2006–07	1459	160	5091	5230	2007	4822	4809	4.2
2007–08	1217	134	4530	5211	2008	4531	5010	877.4
2008–09	1156	139	4348	5017	2009	4332	4882	855.0
2009–10	417	78	3323	3998	2010	3660	4039	0
2010–11	816	104	3786	3802	2011	n/a	n/a	n/a

Table 2c Numbers of vessels fishing and catch (kg live weight) in Western Australian state fisheries by method

Year	Dropline		Gillnet		Line (mainly handline)		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	-	-	0.9	6	*10.6	30	23.4	10	283.6	18
2007	0.1	5	1.2	8	23.6	24	-	-	317.8	18
2008	-	-	5.0	9	12.6	22	-	-	333.6	26
2009	-	-	1.3	7	12.0	18	-	-	285.6	16
2010	-	-	0.8	6	27.1	14	-	-	269.4	15

* 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. GN = Gillnet; LI = Line (mainly handline); TL = Troll for 2009 and 2010.

Year	Species		Live weight (t)			
	Common name	**Scientific name**	**GN**	**LI**	**TL**	**Total**
2009	Australia Bonito	*Sarda australis*	-	0.5	0.3	0.8
	Mackerel, Australian Spotted	*Scomberomorus munroi*	-	0.003	0.005	0.008
	Mackerel, Broad-Barred Spanish	*Scomberomorus semifasciatus*	-	1.8	9.3	11.1
	Mackerel, Narrow-Barred Spanish	*Scomberomorus commerson*	0.03	9.2	275.1	284.2
	Mackerel, Shark	*Grammatorcynus bicarinatus*	-	-	0.09	0.09
	Mackerels, General	*Scombridae*	0.07	-	-	0.07
	Tuna, Bigeye	*Thunnus obesus*	0.03	-	-	0.03
	Tuna, Mackerel	*Euthynnus affinis*	-	0.006	0.2	0.2
	Tuna, Northern Bluefin	*Thunnus orientalis*	-	0.2	0.02	0.2
	Tuna, Northern Bluefin (Long-Tailed)	*Thunnus tonggol*	0.09	0.01	0.4	0.5
	Tuna, Other	*Scombridae*	0.4	0.4	0.02	0.8
	Tuna, Yellowfin	*Thunnus albacares*	0.6	0.05	0.08	0.8
	Wahoo	*Acanthocybium solandri*	-	0.004	0.3	0.3
	TOTAL		**1.22**	**12.2**	**285.8**	**299.1**
2010	Australia Bonito	*Sarda australis*	0.07	0.03	0.1	0.2
	Mackerel, Australian Spotted	*Scomberomorus munroi*	-	-	0.03	0.03
	Mackerel, Broad-Barred Spanish	*Scomberomorus semifasciatus*	-	1.8	7.8	9.6
	Mackerel, Narrow-Barred Spanish	*Scomberomorus commerson*	-	23 .9	259.7	283.7
	Mackerel, Shark	*Grammatorcynus bicarinatus*	-	0.01	0.4	0.5
	Tuna, Mackerel	*Euthynnus affinis*	-	0.02	0.07	0.08
	Tuna, Northern Bluefin (Long-Tailed)	*Thunnus tonggol*	-	0.09	0.3	0.4
	Tuna, Other	*Scombridae*	0.5	0.9	0.5	1 .9
	Tuna, Yellowfin	*Thunnus albacares*	0.2	0.3	0.1	0.6
	Wahoo	*Acanthocybium solandri*	-	0.05	0.3	0.4
	TOTAL		**0.8**	**27.1**	**269.3**	**297.4**

4 Recreational fishery

Western Australia has an active recreational gamefish fishery, targeting blue marlin (*Makaira mazara*), sailfish (*Istiophorus platypterus*), black marlin (*M. indica*), striped marlin (*Tetrapturus audax*) and yellowfin tuna (*Thunnus albacares*). In 1994, Western Australia passed legislation preventing the landing of all billfish of the family *Istiophoridae*. This legislation came into force in December 1999. Meanwhile, in 1998 the Australian Government banned the retention of blue and black marlin, whether alive or dead, taken anywhere in the Australian Fishing Zone (AFZ) by commercial fishing. In 2005, legislation was introduced by the Australian Government to allow the landing of striped marlin in Western Australia.

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. by 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.

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 species 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 to the ERA process: 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 SJTF (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 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 will commence in December 2011.

Sharks

NPOA-Sharks

Australia's National Plan of Action for Conservation and Management of Sharks (NPOA-Sharks) was released in 2004 according to guidelines as set out in the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). The NPOA-Sharks was designed to provide 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. A copy of the NPOA-Sharks can be obtained from www.daff.gov.au.

Australia's NPOA-Sharks is currently under review and the Australian Government has finalised the 2009 Shark Assessment Report (SAR) which is the scientific basis for the adoption of the NPOA. The 2009 SAR (Bensley et al. 2010) builds upon the information provided in the 2001 SAR and identifies any significant changes that have occurred in fisheries since the release of the 2001 SAR. The assessment includes the presentation and where possible, analyses of:

- resource information (e.g. harvest methods, catch and effort data, and stock assessments);

- management information (e.g. management frameworks, fishery statistics and markets);
- law and enforcement information.

The second Australian NPOA-Sharks is expected to be released in early 2012. It will be provided to the IOTC Working Party on Ecosystems and Bycatch and Scientific Committee in 2012.

Shark catch and finning regulation

Australia prohibits the possession or landing of fins separate from shark carcasses. AFMA has enforced the landing limit of 20 sharks per longline vessel per fishing trip, and has also banned wire traces, which increase 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 makos, longfin makos and porbeagles were listed under the Convention of 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 was 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 Convention Area are provided in Tables 3a, 3b and 4. In 2010, 284 individual sharks were landed (Table 3a) weighing approximately 5 t (Table 3b), while 13 864 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 and ETBF.

Southern Bluefin Tuna Fishery

No interactions with sharks were reported by observers in the IOTC Convention Area relevant to the SBTF in 2010.

Table 3a Total number of sharks, by species, retained by Australian longline vessels in the IOTC convention area from 2004 to 2010 (source: AFMA logbook data).

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

Table 3b Total weight (t trunked weight) of shark species retained by Australian longline vessels in the IOTC Convention Area from 2004 to 2010 (source: AFMA logbook data).

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

Table 4 Total number of sharks, by species, released/discarded by Australian longline vessels in the IOTC Convention Area from 2004 to 2010 (source: AFMA logbook data).

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

Seabirds

Seabirds are 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 baited hooks are not used when purse seining, the rate of seabird interactions in this sector is 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: 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 highly 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 objective of the 2006 TAP is to significantly reduce the bycatch of seabirds in Commonwealth waters as a result of longline fishing operations. This is being achieved through:

1. Mitigation – effective 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 proven the current TAP is capable of minimising interactions and dealing with the occurrence of any unusual issues.

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

NPOA-Seabirds

Australia is developing an NPOA-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 at risk are low, suggest that seabird bycatch in these fisheries is unlikely to be a problem.

The FAO released a set of 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.

Trawl fishing has yet to be assessed in Australia in terms of its impact on vulnerable seabird species. The Australian Government is currently investigating other sources of mortality to seabirds through other fishing practices, such as 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.

Recovery Plan

A Recovery Plan for Albatrosses and Giant Petrels in Australia has been in place since 2001 and is currently under review. The overall objective of the plan is to reduce the detrimental impacts on Australian populations of albatrosses and petrels and hence promote their recovery in the wild. A copy of the 2001 plan can be obtained from:
http://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 is considerably lower than that on the east coast. In addition, the majority of the fleet in the WTBF targets swordfish and operates at night, which reduces interactions with seabirds. While observer data are only available for recent years, when fishing activity has been very low, the data indicate that seabird interactions are below the limit of 0.05 seabirds per 1000 hooks prescribed by the TAP. Observers placed on WTBF longliners during 2010 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 improvement to a variety of mitigation measures, the catch of all seabirds in the fishery as a whole has been reduced to a level below the 0.05 seabirds per 1000 hooks set as required under the TAP. As very little effort from the ETBF has occurred in the IOTC Convention Area in recent years and none of that effort was observed in 2010, 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 and Sahlqvist 2011).

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 2009–10 or 2010–11.

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 2010 reported one interaction with a leatherback turtle (Table 5), which was released alive.

Eastern Tuna and Billfish Fishery

No interactions with sea turtles were observed in the IOTC Convention Area relevant to the ETBF. 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 and Sahlqvist 2011).

Table 5 Observed annual estimated captures of species of special interest (seabird, turtle and marine mammals) for the Australian longline fleet, in the IOTC Convention Area, for 2003 to 2010 (source: AFMA scientific observer data).

Group	Common name	Scientific name	2003-2006	2007	2008	2009	2010
Seabirds	Yellow nosed albatross	*Thalassarche chlororhynchos*	0	0	0	1	0
	Flesh footed shearwater	*Puffinus carneipes*	12	0	0	1	0
Marine turtles	Loggerhead turtle	*Caretta caretta*	4	1	2	1	0
	Hawksbill turtle	*Eretmochelys imbricata*	0	0	0	2	0
	Leatherback turtle	*Dermochelys coriacea*	4	0	2	4	1
	Green turtle	*Chelonia mydas*	2	0	0	0	0
	Olive Ridley turtle	*Lepidochelys olivacea*	1	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 Convention Area. 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.

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

Approximately 60 species of fish are recorded in longline logbooks as being captured by Australian flagged vessels in the IOTC Convention Area. The majority of non-target species are caught and retained or discarded in low numbers, with the notable exceptions of blue shark (*Prionace glauca*) and crocodile shark (*Pseudocarcharias kamoharai*) (Tables 6–8). Electronic logbooks were recently implemented for these 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

In March 2010, the IOTC passed Resolution 10/04 on a regional observer scheme (since revoked and superceded by Resolution 11/04) that specified:

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 2010, a total of 622 461 longline hooks were deployed in the IOTC Convention Area by Australian vessels (619 220 hooks and 3241 hooks by vessels operating in the WTBF and ETBF, respectively). Of these, 15 330 hooks were observed as part of AFMA's scientific observer program, representing a total of 2.5 per cent coverage. Note that due to the low level of observer coverage in the IOTC Convention Area in 2010, mainly due to the very low effort in the WTBF in 2010 and zero effort in the SJF in 2010, it is not possible to depict the spatial distribution of the observer coverage.

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 2010, 2.5 per cent of hooks set in WTBF longline operations were observed over two trips (8.48 per cent in 2009 and 12.72 per cent in 2008).

A 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. In most years, the majority of landings for these three species are monitored due to the low level of fishing effort and catches.

Eastern Tuna and Billfish Fishery

There was a small amount of effort (3241 hooks set) in the ETBF part of the IOTC Convention Area in 2010, although none was observed. For the remainder of the ETBF effort, which occurs in the WCPFC Convention Area, observer coverage was 3.6 per cent of hooks set, compared to 10.4 per cent in 2008 and 6.4 per cent in 2009.

Southern Bluefin Tuna Fishery

The ongoing target 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 2010–11 quota year, two Australian observers spent 71 days at sea. They observed purse seine activities for 19 days and tow activities for 22 days, with the remainder of the days spent in transit or lost due to rough weather. The observers monitored 21 purse seine sets where fish were retained and 11 sets that were aborted, representing 20.2 per cent coverage for sets where fish were retained. This equates to approximately 12.4 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. In the 2012–13 fishing season, a stereo-video system will be implemented in order to measure the fish and convert the length to fish weight.

Table 6 Observer coverage in the longline and purse seine sectors, in the IOTC Convention Area for 2006 to 2010.

Year	Longline Hooks Observed	Percentage Coverage of Longline Hooks	SBT Season	Purse Seine Sets Observed (SBT)	Percentage Coverage of Purse Seine Sets (SBT)
2006	NA	NA	2006–07	9	5.6
2007	NA	1.42	2007–08	16	11.8
2008	NA	NA	2008–09	11	7.9
2009	44 790	8.46	2009–10	7	9.0
2010	15 330	2.45	2010–11	21	20.2

NA = 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. Fish from two out of a total of 18 trips (11%) in the WTBF were measured through the observer program in 2010.

There were four observed SBT purse seine trips in the IOTC convention area in 2010. In three of these trips, the observers did not take measurements. On one of the trips, there were three SBT measured. There was no fishing in the Western Skipjack Fishery in 2010. Details on the fish measured in 2010 as part of the port sampling program in the IOTC Convention Area are given in Table 7.

Table 7. Number of individuals measured, by species, in the WTBF and SBTF in 2010. All species were caught with pelagic longline, with the exception of southern bluefin tuna, which were taken with purse seine.

Common name	Scientific name	Number measured
Bigeye tuna	*Thunnus obesus*	89
Yellowfin tuna	*Thunnus albacares*	24
Albacore	*Thunnus alalunga*	75
Swordfish	*Xiphius gladius*	119
Escolar	*Lepidocybium flavobrunneum*	16
Ray's bream	*Brama brama*	26
Mahi mahi	*Coryphaena hippurus*	6
Southern bluefin tuna	*Thunnus maccoyii*	3
Total		358

Unloading/Transhipment

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

7 National research programs

Australia undertakes numerous research projects and programs that are applicable to IOTC fisheries. Details of recent and upcoming projects are provided below in Table 8.

Table 8. Summary table of national research programs, including dates.

Project title	Period / Status	Countries involved	Budget total (AUD)	Funding source, and/or (Implementing agency)	Objectives	Short description
Data management, provision of fishery indicators and implementation of the harvest strategies for Australia's tropical tuna fisheries	2011–14 Contract in prep	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.

Experimental determinations of optimum line weighting regimes and their effect on target catch rates	2010–12 Ongoing	Australia	Approx. $55,000	Dept. of Sustainability, Environment, Water, Populations & Communities (DSEWPaC), AFMA; (DSEWPaC)	To determine optimum line weighting regimes for avoiding seabird bycatch	This research continues work described in IOTC-2010-WPEB-06 and seeks to determine optimum line weighting regimes which are also safe, practical and have no significant adverse effects on target catch rates. The focus is on evaluating weights of around 40–60 grams placed at or close to (<1 m from) the hook.
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 the World Wide Fund for Nature ; (DSEWPaC, Amerro Engineering)	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. Development and testing is continuing in Australia prior to what is hoped to be final trials in 2012, including in Uruguay. The current prototype has achieved improved bait retention and similar setting speeds compared to hand setting. Current development is focussed on achieving greater setting depth while maintaining or increasing setting speeds, and refining and commercially proving the machine.
Testing seabird and turtle mitigation efficacy of the smart hook system in tuna longline fisheries	2008–09 Completed	Australia	$69,625	AFMA, FRDC; (AHI Enterprises)	To determine the operational performance of the Smart Hook System	This project evaluated the performance of the smart hook system in commercial tuna fisheries by observing the behavioural response of seabirds and marine turtles to the smart hook and the efficacy of the smart hook system in mitigating interactions with seabirds and turtles.

Development of harvest strategies for target species of the Eastern and Western Tuna and Billfish Fisheries	2006–08 Completed	Australia	$195,282	AFMA; (CSIRO)	To develop harvest strategies for target tuna and billfish species	This project aimed to develop single species harvest strategies for swordfish, bigeye tuna, yellowfin tuna, albacore tuna and striped marlin and to identify strategic research issues for future evaluation and implementation of harvest strategies in ETBF and WTBF.
Western Tuna and Billfish Fishery size monitoring program 2006/2007	2006–07 Completed	Australia	$16,000	AFMA, WA Fisheries; (WW Fisheries Limited)	To provide length and weight information in the WTBF	This project aimed to continue the length and/or weight data collection system established in WA. Specifically the project aimed to: -explore and develop the possibilities of establishing a routine length/weight data gathering system. -gather the individual weight records identified at Albany (if any fishing takes place) as an indicator of size structure in the southern areas of the fishery. -continue to develop and maintain a data base of size & length/weight data -opportunistically collect size data on byproduct and bycatch species.

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, adopted from 2005 to 2011.

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 -Longline shark trip limit of 20 sharks per vessels per trip; 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)
08/04	Concerning the recording of catch by longline fishing vessels in the IOTC area	Paragraph 1–3	-All Australian-flagged fishing vessels required to use and submit logbooks -Data are submitted to the IOTC by 30 June of the following year
09/06	On marine turtles	Paragraphs 2, 8, 11, 12,	-Australian vessels required to record and report interactions with marine turtles; this

No.	Resolution	Scientific requirement	CPC progress
		13 and 14	information is reported to the IOTC - In 2009, Australia implemented a Marine Turtle Mitigation Strategy to help minimise the bycatch of turtles in Australian longline fisheries. The strategy specifies management measures to be implemented if the level of observed turtle interactions reaches certain trigger limits. -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 caught or entangled, consistent with Resolution 09/06.
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

No.	Resolution	Scientific requirement	CPC progress
			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
10/12	On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of agreement	Paragraphs 6 and 7	-Australia provides data on interactions with thresher sharks to the IOTC -Australia has amended the Western Skipjack Fishery permit conditions and the Western Tuna and Billfish Fishery Statutory Fishing Right conditions to prohibit concession holders from retaining, transhipping, landing, storing or selling thresher sharks
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.

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Appendix 1 Fishery Boundaries

Locations of the Eastern Tuna and Billfish Fishery (ETBF) and the Western Tuna and Billfish Fishery (WTBF) in relation to the Indian Ocean Tuna Commission (IOTC) Convention Area. The Western Skipjack Fishery and the Eastern Skipjack Fishery use the same boundary line as the WTBF and ETBF.