



Australian Government
Bureau of Rural Sciences

**Australia National Report to the
Scientific Committee of the Indian
Ocean Tuna Commission for 2008**

Patricia I. Hobsbawn and David T. Wilson

© Commonwealth of Australia 2009

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Commonwealth.

Requests and inquiries concerning reproduction and rights should be addressed to the Commonwealth Copyright Administration, Attorney General's Department, Robert Garran Offices, National Circuit, Barton ACT 2600 or posted at <http://www.ag.gov.au/cca>.



Australian Government
**Department of Agriculture,
Fisheries and Forestry**

The Commonwealth of Australia acting through the Bureau of Rural Sciences has exercised due care and skill in the preparation and compilation of the information and data set out in this publication. Notwithstanding, the Bureau of Rural Sciences, its employees and advisers disclaim all liability, including liability for negligence, for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon any of the information or data set out in this publication to the maximum extent permitted by law.

Postal address:
Bureau of Rural Sciences
GPO Box 858
Canberra, ACT 2601

Website: <http://www.brs.gov.au>

Preferred way to cite this publication:

Hobsbawn PI and Wilson DT (2009) Australia National Report to the Scientific Committee of the Indian Ocean Tuna Commission for 2008. Report to the Indian Ocean Tuna Commission. Bureau of Rural Sciences, Canberra.

Executive Summary

Abstract

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 2008, five Australian longliners (one from the Western Tuna and Billfish Fishery and four from the Eastern Tuna and Billfish Fishery) operated in the IOTC Convention Area. Together they caught 10.3 t of albacore tuna (*Thunnus alalunga*), 26.6 t of bigeye tuna (*Thunnus obesus*), 1.2 t of yellowfin tuna (*Thunnus albacares*), 142.2 t of broadbill swordfish (*Xiphius gladius*) and 0.5 t of striped marlin (*Tetrapturus audax*). These catches represent less than six percent of the peak catches taken 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 estimated catch of southern bluefin tuna (*Thunnus maccoyii*) in the purse seine fishery was 4531 t in 2008. The 2008 purse seine catch of skipjack tuna (*Katsuwonus pelamis*) was [REDACTED] t¹, a decrease of [REDACTED] percent from that caught in 2001 (1039 t).

¹ **Note:** The *Privacy Act 1998* prevents the disclosure of non-aggregated landing data to the public. The Australian Fisheries Management Authority currently has a policy that stipulates the minimum number of vessels required to publish aggregated landing data is five. The number of active vessels in the Western Tuna and Billfish Fishery (WTBF) and Skipjack Fishery (SJF) was less than five in the years 2006 and 2007. As such, total landing data for WTBF longliners and skipjack purse seiners for the years 2006 and 2007 cannot be provided in this report and have been blacked-out “[REDACTED]” accordingly. Where possible, reference has been made to 2005 catches, or combined with those from the Eastern Tuna and Billfish Fishery (ETBF), where four vessels operated in the IOTC convention area (bringing the total to five vessels).

Contents

Australia National Report to the Scientific Committee of the Indian Ocean Tuna Commission for 2008	i
Executive Summary	iii
Contents	iv
1. General fishery information	1
2. Catch by species and gear.....	1
<i>Longline fleet</i>	1
<i>Purse seine fleet</i>	2
<i>Multi-purpose fleets</i>	2
3. Fleet structure	4
4. National data collection and processing systems.....	6
<i>Logbooks</i>	6
<i>Vessel Monitoring System</i>	6
<i>Observer Program</i>	6
Western Tuna and Billfish Fishery.....	7
Eastern Tuna and Billfish Fishery.....	7
Southern Bluefin Tuna Fishery	7
5. Implementation of Scientific Committee recommendations	7
6. National research programs	8
7. Recreational fishery	8
8. Harvest Strategy.....	8
9. Environmental issues	8
<i>Bycatch and Discard Work Plan</i>	9
<i>Sea Turtles</i>	9
Recovery Plan.....	9
Circle Hook Research.....	10
Interactions.....	10
<i>Sharks</i>	10
NPOA-Sharks.....	10
Shark catch and finning regulation	11
Interactions.....	11
<i>Seabirds</i>	13
NPOA-Seabirds.....	14

Interactions	14
10. Literature cited	15

1. 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) (Fig. 1) and the purse seine fisheries – Southern Bluefin Tuna Fishery (SBTF) and the Skipjack Fishery (SJF). These four fisheries are managed by the Australian Government through the Australian Fisheries Management Authority (AFMA). Other methods such as handline, dropline, trolling and gillnetting capture tuna and related species in multi-purpose fisheries, which are managed by the Commonwealth and State Governments.

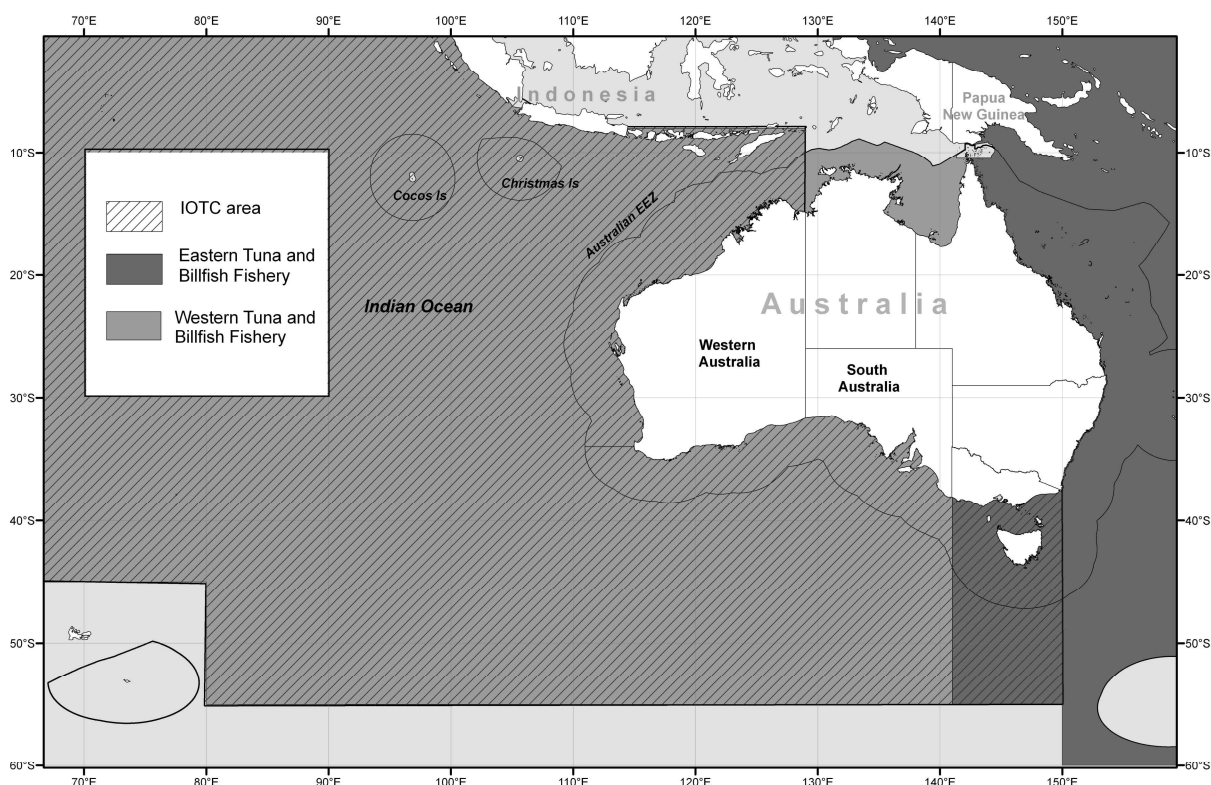


Figure 1: Locations of the Eastern Tuna and Billfish Fishery (ETBF) and the Western Tuna and Billfish Fishery (WTBF) in relation to the Indian Ocean Tuna Commission (IOTC) Convention Area.

2. Catch by species and gear

Longline fleet

Australian longline fishing activity and associated catches for 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 (Table 1). Broadbill 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*), bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*) and striped marlin (*Tetrapturus audax*) landed each year (Table 1). The broadbill swordfish catch declined to 301.4 t in 2005 and has remained at or below these low levels since (142.2 t in 2008). Catches of yellowfin and bigeye tuna

have also declined dramatically since 2001 to less than 100 t combined (1.2 t and 26.6 t, respectively in 2008) (Table 1).

Table 1: Total numbers of Australian longline vessels, hooks set and total catches (tonnes live weight) of tuna and billfish taken by those vessels operating in the IOTC Convention Area from 1998 to 2008.

Calendar Year	No. of Longline vessels	Hooks set (thousands)	Albacore tuna	Bigeye tuna	Yellowfin tuna	Swordfish	Striped marlin
1998	37	1807	25.1	161.1	231.3	238.3	8.8
1999	49	4031	29.2	411.6	406.2	1013.7	22.6
2000	61	6246	30.9	436.2	429.1	1690.5	1.7
2001	45	6175	93.9	386.0	557.5	2135.7	0.0
2002	44	5956	72.1	419.5	355.2	2004.8	0.7
2003	36	4000	65.7	205.5	191.3	1184.0	0.2
2004	22	1593	26.6	90.9	152.3	370.0	0.4
2005	6	773	7.3	31.3	35.9	301.4	4.1
2006	4	■	■	■	■	■	■
2007	3	■	■	■	■	■	■
2008	5	237	10.3	26.6	1.2	142.2	0.5

Purse seine fleet

Purse seine fishing operations by Australian vessels in the IOTC Convention Area are dominated by targeting of southern bluefin tuna (SBT) in the Great Australian Bight for grow-out in farm cages at Port Lincoln, South Australia. The estimated catch of southern bluefin tuna in the purse seine fishery was 4531 t in 2008. However, in the 2007–08 fishing season (1 Dec 2007 to 30 Nov 2008) the actual catch taken was 5015 t (Table 2). The quota allocated to Australia since 1989 by the Commission for Conservation of Southern Bluefin Tuna (CCSBT) is 5265 t per quota year and applies to all methods, including purse seine. In some fishing seasons, purse seine vessels also target skipjack tuna late in the SBT season. Catches of skipjack in 2008 (■ t) has decreased by ■ percent from that caught in 2001 (■ t).

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 2008, very small quantities of fish were caught using minor line methods (e.g. handline), with the majority of the catch taken by trolling (Tables 3 and 4).

Table 2: Purse seine catches (tonnes live weight) of southern bluefin tuna by Australian vessels fishing in the IOTC Convention Area by fishing season and calendar year.

Fishing Season	Estimated Catch (t)	Actual Catch (t)	Calendar Year	Estimated Catch (t)
1994–95	2179	2009	-	-
1995–96	2859	3442	-	-
1996–97	3134	2505	-	-
1997–98	3916	3629	1998	3290
1998–99	4418	4991	1999	5120
1999–00	4746	5131	2000	4616
2000–01	5100	5162	2001	5319
2001–02	5400	5234	2002	4920
2002–03	5188	5375	2003	5587
2003–04	5299	4874	2004	5178
2004–05	5225	5215	2005	5330
2005–06	5463	5302	2006	5852
2006–07	5091	5230	2007	4822
2007–08	4530	5211	2008	4531
2008–09	4348*	5015*	2009	-

*the 2008–09 figures are preliminary as the season does not finish until end November 2009.

Table 3: Numbers of boats fishing and catch (kg live weight) in Western Australian state fisheries by method.

Year	Dropline		Gillnet		Line (mainly handline)		Trawl		Troll	
	Catch (kg)	Vessels	Catch (kg)	Vessels	Catch (kg)	Vessels	Catch (kg)	Vessels	Catch (kg)	Vessels
2004	581	7	2706	9	36787	46	3413	14	435062	34
2005	42	6	2617	8	46348	30	4989	4	310445	22
2006	-	-	903	6	*10600	30	23357	10	283641	18
2007	101	5	1189	8	23559	24	-	-	317830	18
2008	-	-	5007	9	12414	22	-	-	333646	25

* total includes dropline catches for this year as individual method data could not be presented for confidentiality reasons (i.e. < 5 active vessels using each method).

Table 4: Catch of tuna and tuna-like species in Western Australian state fisheries, by method. DL = Dropline; GN = Gillnet; LI = Line (mainly handline); TL = Troll.

Year	Species		Live weight (kg)				
	Common name	Scientific name	DL	GN	LI	TL	TOTAL
2007	Bonito	<i>Sarda australis</i>	101	174	578	999	1 852
	Mackerel, grey (broad-barred)	<i>Scomberomorus semifasciatus</i>	-	-	3717	7631	11 348
	Mackerel, other	<i>Scombridae</i>	-	2	-	18	20
	Mackerel, shark (salmon)	<i>Grammatorcynus bicarinatus</i>	-	-	250	40	290
	Mackerel, Spanish	<i>Scomberomorus commerson</i>	-	-	17571	308217	325 788
	Mackerel, spotted	<i>Scomberomorus munroi</i>	-	-	23	57	80
	Tuna, bigeye	<i>Thunnus obesus</i>	-	-	163	-	163
	Tuna, mackerel	<i>Euthynnus affinis</i>	-	-	-	261	261
	Tuna, northern bluefin	<i>Thunnus tonggol</i>	-	24	215	124	363
	Tuna, other	<i>Scombridae</i>	-	778	488	-	1 266
	Tuna, skipjack or striped	<i>Katsuwonus pelamis</i>	-	-	-	30	30
	Tuna, yellowfin	<i>Thunnus albacares</i>	-	211	381	273	865
	Wahoo	<i>Acanthocybium solandri</i>	-	-	173	180	353
	Total			101	1189	23559	317830
2008	Bonito	<i>Sarda australis</i>		20	1 757	573	2 350
	Mackerel, grey (broad-barred)	<i>Scomberomorus semifasciatus</i>	-	4 247	3 933	13 794	21 974
	Mackerel, other	<i>Scombridae</i>	-	5		7	12
	Mackerel, shark (salmon)	<i>Grammatorcynus bicarinatus</i>	-	-		516	516
	Mackerel, Spanish	<i>Scomberomorus commerson</i>	-	110	5 889	317 417	323 417
	Mackerel, spotted	<i>Scomberomorus munroi</i>	-	-		466	466
	Tuna, bigeye	<i>Thunnus obesus</i>			2		2
	Tuna, mackerel	<i>Euthynnus affinis</i>	-	-	26	344	370
	Tuna, northern bluefin	<i>Thunnus tonggol</i>	-	73	31	62	166
	Tuna, other	<i>Scombridae</i>	-	157	692	46	895
	Tuna, skipjack or striped	<i>Katsuwonus pelamis</i>	-	-	4	33	37
	Tuna, yellowfin	<i>Thunnus albacares</i>	-	396	60	33	489
	Wahoo	<i>Acanthocybium solandri</i>	-	-	19	354	372
	Total			0	5 007	12 414	333 646

3. 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 five vessels operating in 2008 (Table 5). Historically, most of these vessels have operated in the WTBF (Fig. 2) with very little longline effort taking place in the area of the ETBF west of 150°E. However, in 2008 four vessels from the ETBF fished in the convention area compared to a single vessel from the WTBF. In recent years, the longline fleet has fished mainly within the Australian Exclusive Economic Zone (EEZ) (95.9 percent of total effort in 2008), between 20°S and 35°S. Longline fishing effort by Australian

vessels has declined substantially from a peak of 6.25 million hooks in 2000 to 0.24 million hooks in 2008 (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.

Most longline vessels range in length from 20 to 35 m and are less than 200 gross tonnage (GRT). Ice, ice slurry or brine spray systems are used to chill the catch. The majority of the fishing trips undertaken by Australian longline operators are less than 14 days in length (29 trips undertaken in 2008). Vessels fishing in the high seas undertake longer voyages, up to 28 days in recent years.

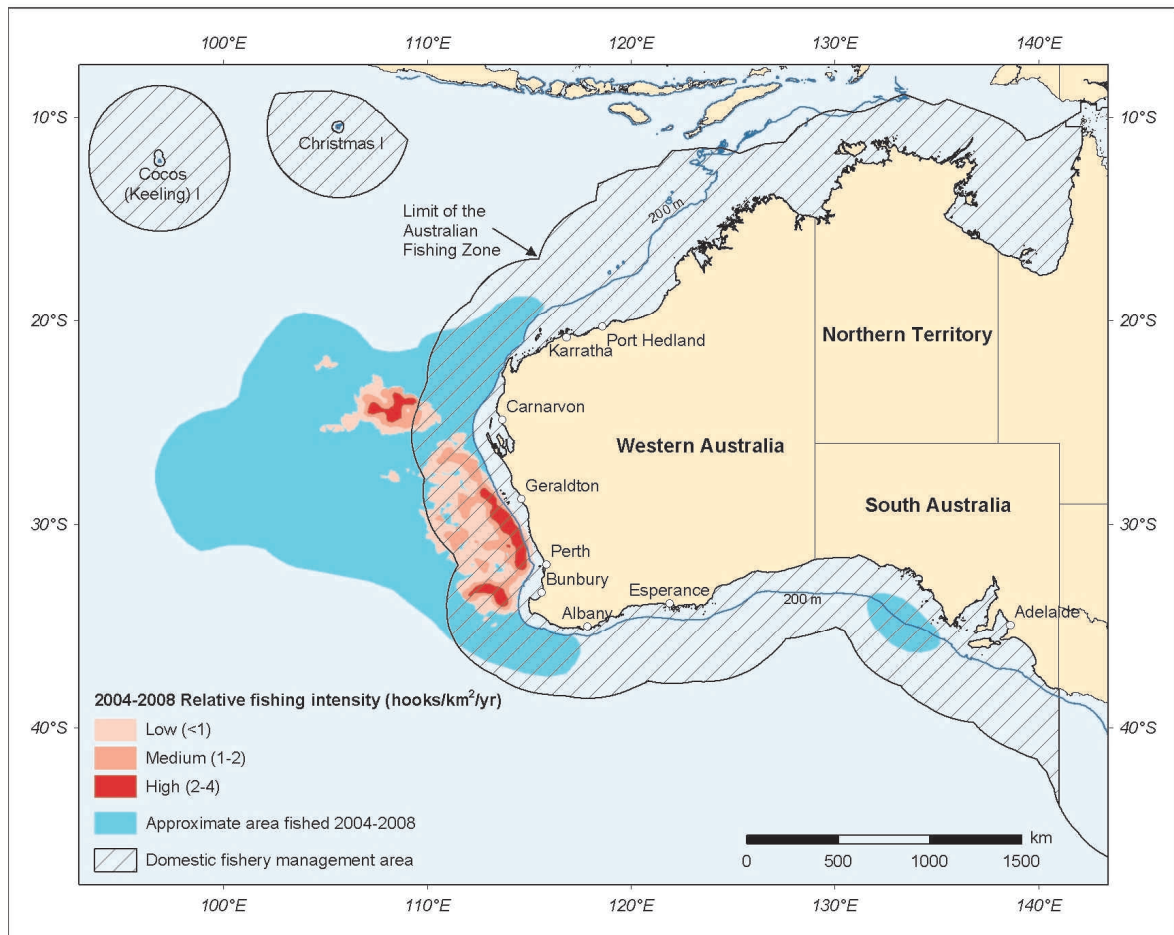


Figure 2: Relative fishing intensity in the Western Tuna and Billfish Fishery (WTBF), 2004–2008 (source: Wilson et al. 2009).

Purse seine fleet

The purse seine fleet has fluctuated from 5-14 vessels since 1998 (Table 5). The purse seine fleets' vessels vary in length from 20 to 45 m. The focus has been on the capture of SBT for farm cage grow-out.

Table 5: Number of Commonwealth and State longline and purse seine vessels reporting one or more fishing trips in the IOTC Convention Area from 1998 to 2008. 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.

Calendar Year	Longline	Purse seine
1998	37	5 (5)
1999	49	7 (7)
2000	61	8 (8)
2001	45	13 (8)
2002	44	9 (7)
2003	36	7 (7)
2004	22	7 (6)
2005	6	8 (8)
2006	4	14 (7)
2007	3	11 (6)
2008	5	10 (7)

4. National data collection and processing systems

Logbooks

Catch and effort data continues to be collected by daily fishing logbooks for the Australian longline and purse seine vessels operating in the IOTC Convention Area. AFMA distributes, collects and processes these logbooks.

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 in the WTBF. 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).

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 the SBTf.

Observer Program

In April 2009, the IOTC passed Resolution 09/04 on a regional observer scheme that specified:

- 1) *In order to improve the collection of scientific data, at least 5% of the number of operations/sets for each gear type by the fleet of each CPC while fishing in the IOTC Area of 24 meters overall length and over, and under 24 meters if they fish outside their EEZs shall be covered by this observer scheme. For vessels under 24 meters if they fish outside their EEZ, the above mentioned coverage should be achieved progressively by January 2013; and*

- 2) *When purse seiners are carrying an observer as stated in paragraph 1, this observer shall also monitor the landing at port to identify the composition of bigeye catches. The requirement for the observer to monitor landings at port is not applicable to CPCs already having a port sampling, with at least the above mentioned coverage.*

The AFMA has recruited and trained observers since its establishment in 1992. Approximately 30 observers are currently employed in the AFMA observer program. They are sourced from universities and maritime industries from around Australia and require the ability to live and work at sea, have demonstrated experience in collecting biological data at sea, and have experience in fisheries research methodologies and collection of associated scientific data. Observers 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.

Western Tuna and Billfish Fishery

In 2007 and 2008, an ongoing observer program was implemented in the WTBF with a target level of observer coverage set at five percent. In 2008, 12.72 percent of hooks set in WTBF longline operations were observed (1.63 percent in 2007).

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 broadbill swordfish from processors in Western Australia. In most years, the majority of landings for these three species are monitored by this project due to the low level of fishing effort and catches. 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.

Eastern Tuna and Billfish Fishery

There was a small amount of effort in the ETBF as part of the IOTC Convention Area in 2008, ■■■ hooks were set in that area, although none of these sets were observed. It should be noted that for the remainder of the ETBF effort, that occurs in the WCPFC Convention Area, 10.38 percent observer coverage occurred (5.26 percent in 2007).

Southern Bluefin Tuna Fishery

The ongoing target coverage for the SBT purse seine fleet operating out of Port Lincoln is 10 percent of the total catch and effort for the fishery. During the 2008–09 quota year, observers spent 48 days at sea and observed purse seiner activities for 27 days and tow activities for 15 days, with the remainder of the days spent in transit. Observers monitored 11 purse seine sets where fish were retained and eight sets that were aborted, representing 7.9 percent coverage for sets where fish were retained.

5. Implementation of Scientific Committee recommendations

Australia participates actively in the IOTC Scientific Committee and the associated working parties. Complete data were provided to the IOTC for statistical reporting in June 2009 including bycatch and size-frequency data for target tuna and billfish species. Observers continue to be placed on Australian longline vessels fishing in the eastern Indian Ocean to monitor catch and effort reporting, bycatch and wildlife interactions. Bycatch reduction measures are described below.

6. National research programs

The current research priorities for Australia's WTBF against which research proposals will be considered include:

- investigate the stock structure of bigeye tuna and swordfish in the eastern Indian Ocean, with particular emphasis on determining the relationship between fish caught within the WTBF and those caught in nearby waters and the broader Indian Ocean;
- monitor catch and effort by the recreational and charter fishing sectors targeting highly migratory fishes;
- determine key biological parameters (age, growth, reproduction) required for assessment of Indian Ocean populations of bigeye tuna, yellowfin tuna and swordfish stocks;
- develop a harvest strategy including appropriate target and limit reference points;
- assess the impact and reliance of the WTBF on the pelagic ecosystem, including trophic linkages and the impact of fishing on ecologically related species;
- develop strategies to reduce the damage and loss of catch through predation.

7. Recreational fishery

Western Australia has an active recreational game 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 AFZ by commercial fishing. In 2005, legislation was introduced by the Australian Government to allow the landing of striped marlin in Western Australia. Impacts from these legislative changes have greatly benefited the recreational fishery.

8. Harvest Strategy

In 2007, the Australian Government introduced a harvest strategy policy to guide sustainability of its fisheries. A copy of the Commonwealth Harvest Strategy Policy can be obtained from www.daff.gov.au. Harvest strategies that incorporate appropriate target and limit reference points are being developed for the WTBF (Davies et al. 2008) and ETBF (AFMA 2007).

9. Environmental issues

In Australia, the Environmental Protection and Biodiversity Conservation Act (EPBC Act 1999) covers environmental issues including the ecologically sustainable use of marine resources. It is a requirement under the EPBC Act to prepare strategic assessment reports for all Commonwealth fisheries and those State fisheries with an export component to ensure that they are managed in an ecologically sustainable manner. The reports consider the impacts of the fishery on target and non-target species caught and the impacts of fishing on the broader marine environment. Strategic assessments have been completed for the WTBF, ETBF and SBTF (see <http://environment.gov.au/coasts/fisheries/commonwealth/index.html>), and continue to guide the development of improved management arrangements to reduce the ecological impacts of Australian tuna and billfish fisheries.

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 (ERS) 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 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 ERS, 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 ERS (see below).

AFMA has commenced an ecological risk assessment for each of its fisheries (www.afma.gov.au/environment/eco_based/eras/reports.htm) with an aim of quantifying impacts on ERS and the marine environment. The purpose of AFMA's ecological risk management is to undertake ecological risk assessments for major fisheries managed by the Australian Government and to develop a framework for future risk assessments as additional information becomes available. The results of the framework will help inform fisheries management agencies of priorities for research, data collection, monitoring and management, and ensure there is a high level of confidence in verifiable results.

The ecological risk assessments rely on existing biological and catch information and consider five ecosystem components: target species, by-product 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. AFMA has completed ERAs for the WTBF and SBTF, although these aren't yet in the public domain. ERAs of the ETBF (Webb et al. 2007, AFMA 2009) are available at the web address shown above.

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 ecological risk assessment process as being at high risk from fishing operations. The Bycatch and Discard Work Plan commenced on 1 November, 2008.

Sea Turtles

Recovery Plan

A Recovery Plan for Marine Turtles in Australia has been developed by the Department of the Environment, Water, Heritage and the Arts (DEWHA). 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>.

Circle Hook Research

The Australian Government conducted experiments to test the effects of circle hooks on target and non-target longline catches in the ETBF (Ward et al. 2008). The commercial longliners fished for yellowfin tuna, bigeye tuna and swordfish in a broad area off south-eastern Queensland. Crew members alternated equal numbers of similar-sized circle hooks and Japanese tuna hooks along each longline. The experimental design, combined with the large sample size (14 trips and more than 95 000 hooks), allowed measurement of the performance of circle hooks.

Key findings included:

- Circle hooks produced higher catch rates of most commercial species such as albacore, yellowfin tuna and striped marlin.
- Circle hooks produced higher catch rates of some shark species.
- For most target species, there was no difference in the size of fish caught on circle hooks and tuna hooks.
- Increased financial returns from higher catch rates of target species outweighed the costs of gearing-up with circle hooks.

Due to the small number of observed interactions with sea turtles in the fishery, the potential effectiveness of using circle hooks as a mitigation measure has not been determined. While circle hooks are not mandatory in Australia's pelagic longline fisheries, AFMA will be considering the potential benefits of such a mitigation measure to sea turtles in light of potential implications that introducing such an action may have upon other bycatch species, primarily sharks, in 2009.

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 turtle, four loggerhead turtle, two green turtle and an Olive Ridley turtle) during monitoring that accounted for four percent of the total effort in the fishery. All were released alive by crew members.

Observers placed on WTBF longliners during 2008 (12.72 percent of effort) reported two loggerhead turtles and two leatherback turtles hooked. One of the leatherback turtles was found dead, while the other three sea turtles were released alive. No information is available on the survivorship of these released sea turtles.

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 (Sands and Wilson 2009).

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 now due for review and the Australian Government is currently updating the Shark Assessment Report (SAR) which is the scientific basis for the adoption of the Shark Plan. The 2008 SAR builds upon the information provided in the 2001 SAR and aims to identify 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 finalised by the end of 2010.

Shark catch and finning regulation

AFMA prohibits the possession or landing of fins separate from shark carcasses. This policy was implemented in 2000. AFMA has enforced the landing limit of 20 sharks per longline vessel per fishing trip, and 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.

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 6-8. In 2008, 10.41 tonnes of shark were landed (Table 6), totalling 352 individual sharks (Table 7), while 5052 individuals were discarded/released (Table 8). No information is currently available from logbooks on the life status of discarded/released sharks, and limited data from observer records due to limited effort in the WTBF and ETBF.

Table 6: Total weight (kg whole weight) of shark species retained by Australian longline vessels in the IOTC Convention Area from 2004 to 2008 (source: AFMA logbook data).

Common name	Scientific name	2004	2005	2006	2007	2008
Blacktip sharks	<i>Carcharhinus</i> spp.	60	40	180	50	0
Blue Shark	<i>Prionace glauca</i>	18915	9585	10828	15120	9193
Bronze Whaler	<i>Carcharhinus brachyurus</i>	260	40	0	0	0
Cookie-cutter Shark	<i>Isistius brasiliensis</i>	0	0	0	0	0
Crocodile Shark	<i>Pseudocarcharias kamoharai</i>	0	0	0	30	0
Dusky Shark	<i>Carcharhinus obscurus</i>	220	0	0	0	0
Hammerhead Shark	<i>Sphyrna</i> spp.	0	0	134	0	0
Oceanic Whitetip Shark	<i>Carcharhinus longimanus</i>	435	425	565	283	740
Porbeagle	<i>Lamna nasus</i>	0	0	50	55	205
Roughskin Shark	<i>Centroscymnus</i> spp. <i>Deania</i> spp.	0	0	0	0	0
Sandbar Shark	<i>Carcharhinus plumbeus</i>	50	0	0	0	0
Scalloped Hammerhead	<i>Sphyrna lewini</i>	340	70	0	0	0
Shortfin Mako	<i>Isurus oxyrinchus</i>	1035	678	1958	590	210
Silky Shark	<i>Carcharhinus falciformis</i>	0	60	0	0	0
Smooth Hammerhead	<i>Sphyrna zygaena</i>	0	0	0	0	0
Thresher Shark	<i>Alopias vulpinus</i>	0	0	0	30	0
Tiger Shark	<i>Galeocerdo cuvier</i>	55	110	0	0	60
TOTAL		21370	11008	13715	16158	10408

Table 7: Total number of sharks, by species, retained by Australian longline vessels in the IOTC convention area from 2004 to 2008 (source: AFMA logbook data).

Common name	Scientific name	2004	2005	2006	2007	2008
Blacktip sharks	<i>Carcharhinus</i> spp.	2	1	5	2	0
Blue Shark	<i>Prionace glauca</i>	639	299	406	612	309
Bronze Whaler	<i>Carcharhinus brachyurus</i>	8	1	0	0	0
Cookie-cutter Shark	<i>Isistius brasiliensis</i>	0	0	0	0	0
	<i>Pseudocarcharias</i>					
Crocodile Shark	<i>kamoharai</i>	0	0	0	6	0
Dusky Shark	<i>Carcharhinus obscurus</i>	27	0	0	0	0
Hammerhead Shark	<i>Sphyrna</i> spp.	0	0	8	0	0
Oceanic Whitetip Shark	<i>Carcharhinus longimanus</i>	14	10	19	14	24
Porbeagle	<i>Lamna nasus</i>	0	0	1	2	9
	<i>Centroscymnus</i> spp.					
Roughskin Shark	<i>Deania</i> spp.	0	0	0	0	0
Sandbar Shark	<i>Carcharhinus plumbeus</i>	2	0	0	0	0
Scalloped Hammerhead	<i>Sphyrna lewini</i>	10	1	0	0	0
Shortfin Mako	<i>Isurus oxyrinchus</i>	26	18	56	21	8
Silky Shark	<i>Carcharhinus falciformis</i>	0	2	0	0	0
Smooth Hammerhead	<i>Sphyrna zygaena</i>	0	0	0	0	0
Thresher Shark	<i>Alopias vulpinus</i>	0	0	0	1	0
Tiger Shark	<i>Galeocerdo cuvier</i>	2	2	0	0	2
Shark other	-	0	0	0	0	0
TOTAL		730	334	495	658	352

Table 8: Total number of sharks, by species, released/discarded by Australian longline vessels in the IOTC Convention Area from 2004 to 2008 (source: AFMA logbook data).

Common name	Scientific name	2004	2005	2006	2007	2008
Blacktip sharks	<i>Carcharhinus</i> spp.	5	1	6	0	0
Blue Shark	<i>Prionace glauca</i>	7604	3327	3717	7213	4044
Bronze Whaler	<i>Carcharhinus brachyurus</i>	81	7	2	14	3
Cookie-cutter Shark	<i>Isistius brasiliensis</i>	0	1	0	0	0
	<i>Pseudocarcharias</i>					
Crocodile Shark	<i>kamoharai</i>	2540	4197	4079	3650	900
Dusky Shark	<i>Carcharhinus obscurus</i>	186	3	3	0	0
Hammerhead Shark	<i>Sphyrna</i> spp.	6	0	55	79	32
Oceanic Whitetip Shark	<i>Carcharhinus longimanus</i>	293	55	117	85	19
Porbeagle	<i>Lamna nasus</i>	1	6	7	2	0
	<i>Centroscymnus</i> spp.					
Roughskin Shark	<i>Deania</i> spp.	199	0	0	0	0
Sandbar Shark	<i>Carcharhinus plumbeus</i>	0	0	0	0	0
Scalloped Hammerhead	<i>Sphyrna lewini</i>	181	30	0	0	0
Shortfin Mako	<i>Isurus oxyrinchus</i>	237	74	158	356	50
Silky Shark	<i>Carcharhinus falciformis</i>	7	19	2	0	0
Smooth Hammerhead	<i>Sphyrna zygaena</i>	5	2	0	0	0
Thresher Shark	<i>Alopias vulpinus</i>	23	9	2	0	4
Tiger Shark	<i>Galeocerdo cuvier</i>	19	10	8	131	0
Shark other	-	0	0	2	0	0
TOTAL		11387	7741	8158	11530	5052

Southern Bluefin Tuna Fishery

No interactions with sharks were observed in the IOTC Convention Area relevant to the SBTF in 2008. A detailed description of the observer program in the SBTF can be found in Australia's national reports to the CCSBT (www.ccsbt.org).

Seabirds

Seabirds are attracted to longline vessels by discarded offal and baits, and on occasion 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 for the incidental catch (or by-catch) of seabirds during oceanic longline fishing operations* (TAP). 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 TAP was adopted in 1998 and subsequently updated in 2006 (Anon 2006). It meets the requirements of the Environment Protection and Biodiversity Conservation (EPBC) Act (1999) to implement actions to reduce the impact of longline fishing practices on seabirds in Commonwealth waters.

A copy of the 2006 TAP can be obtained from: <http://www.aad.gov.au/default.asp?casid=35316>.

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 in 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 by mitigation measures pursued at international level.
4. Research and Development – new mitigation measures developed, trialled and assessed 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:

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

2. 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
3. AFMA will require domestic and foreign longline vessels in all demersal fisheries operating within Australian jurisdiction to adopt proven mitigation measures that ensure the performance criteria for each fishery are achieved in all areas and seasons

4. 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 seasons (1 September–30 April; 1 May–31 August).

AFMA has implemented fishing permit conditions that are designed to avoid the capture of seabirds. Conditions to fish south of 25°S include the mandatory use of seabird streamers or ‘tori’ lines to prevent seabirds from diving on line, and weighted swivels to sink the line out of reach of seabirds.

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.

Consistent with the objectives and prescriptions of the TAP, Australia has implemented conditions aimed at reducing seabird mortality through requirements on fishing permits. These are detailed in Section 7 of this report.

NPOA-Seabirds

Australia has drafted an NPOA-Seabirds to address the potential risk posed to seabirds by longline fishing in State and Territory waters, not covered by the 2006 TAP. Low levels of longline fishing in State and Territory managed fisheries, 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.

At its last meeting on seabird issues, 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.

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 (where appropriate) following the review and subsequent updating of the Plan in 2006.

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 broadbill swordfish and operates at night. 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.

During a pilot scientific monitoring program in the WTBF from 2003 to 2006 (four percent coverage), observers reported mortalities of five flesh-footed shearwaters occurred after the birds were hooked during setting. An additional seven flesh-footed shearwaters were entangled in

branchlines during longline retrieval but managed to free themselves or were released alive. Other species such as petrels and albatrosses, were often associated with longline retrieval but none were caught.

Observers placed on WTBF longliners during 2008 did not report any seabird interactions.

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 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, a full description of seabird interactions is not provided here, but can be found in Australia's national report to the WCPFC (Sands and Wilson 2009).

Southern Bluefin Tuna Fishery

There are very few recorded incidences of seabirds interacting with purse seine fishing vessels or gear in the SBTF. There were no observed seabird interactions in the purse-seine sector in 2007–08 or 2008–09. In 2006–07, one white-faced storm petrel was discovered on the aft deck of a tow vessel. It was captured and later released.

10. Literature cited

- AFMA (Australian Fisheries Management Authority) 2007, *Eastern Tuna and Billfish Fishery harvest strategy framework 2007*, AFMA, Canberra, p.6.
- AFMA (Australian Fisheries Management Authority) 2008, *Australia's Tuna and Billfish Longline Fisheries, Bycatch and Discarding Workplan, November 1, 2008 to October 31, 2010*, AFMA, Canberra.
- AFMA (Australian Fisheries Management Authority) 2009, *Ecological risk management: report for the Eastern Tuna and Billfish Fishery*, AFMA, Canberra.
- Davies, C, Campbell, R, Prince, J, Dowling, N, Kolody, D, Basson, M, McLoughlin, K, Ward, P, Freeman, I & Bodsworth, A 2008, *Development and preliminary testing of the harvest strategy framework for the Western Tuna and Billfish Fishery*, CSIRO, Hobart.
- Sands AH & Wilson DT 2009, *Annual report to the Western and Central Pacific Fisheries Commission. Part 1: Information on fisheries, research and statistics. National Tuna and Billfish Fisheries Report 2008*. Bureau of Rural Sciences, Canberra.
- Ward P, Epe S, Kreutz D, Lawrence E, Robins C & Sands A 2008. *Implementation of bycatch mitigation measures in Australia's pelagic longline fisheries: the effects of circle hooks on target and non-target catches*. Final Report to the Natural Heritage Trust. Bureau of Rural Sciences, Canberra.
- Webb, H, Hobday, A, Dowdney, J, Bulman, C, Sporcic, M, Smith, T, Stobustzki, I, Fuller, M & Furlani D 2007, *Ecological risk assessment for the effects of fishing: Eastern Tuna & Billfish Fishery: longline sub-fishery*, report for the Australian Fisheries Management Authority, Canberra.
- Wilson D, Curtotti R, Begg G & Phillips K (eds) 2009, *Fishery status reports 2008: status of fish stocks and fisheries managed by the Australian Government*, Bureau of Rural Sciences & Australian Bureau of Agricultural and Resource Economics, Canberra.

Attachment 1: Fish species or species groups identified by observers in the WTBF retained or released in 2008, excluding tuna and swordfish.

COMMON NAME	SCIENTIFIC NAME
Short Snouted Lancetfish	<i>Alepisaurus brevirostris</i>
Long Nosed Lancetfish	<i>Alepisaurus ferox</i>
Pelagic Thresher Shark	<i>Alopias pelagicus</i>
Bronze Whaler Shark	<i>Carcharhinus brachyurus</i>
Oceanic Whitetip Shark	<i>Carcharhinus longimanus</i>
Rudderfishes	<i>Centrolophus niger</i>
Dolphinfish	<i>Coryphaena hippurus</i>
Pelagic Ray	<i>Dasyatis</i> spp.
Lantern Shark	<i>Etmopterus</i> spp.
Tiger Shark	<i>Galeocerdo cuvier</i>
Snake Mackerel	<i>Gempylus serpens</i>
Mako Shark	<i>Isurus oxyrinchus</i>
Striped Tuna	<i>Katsuwonus pelamis</i>
Escolar	<i>Lepidocybium flavobrunneum</i>
Giant Manta	<i>Manta birostris</i>
Sunfish	<i>Mola</i> spp.
Blue Whaler Shark	<i>Prionace glauca</i>
Crocodile Shark	<i>Pseudocarcharias kamoharai</i>
Oilfish	<i>Ruvettus pretiosus</i>
Hammerhead Sharks (not elsewhere indicated)	<i>Sphyrna</i> spp.