**National Tuna Fishery Report – Australia**

# AUSTRALIA'S TUNA AND BILLFISH FISHERIES: CATCH, EFFORT AND FLEET STATISTICS, 2003

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## ABSTRACT

Longline and purse seine are the main fishing methods used by Australian vessels to catch tuna and billfish in eastern areas of the IOTC area of competence. Longliners target broadbill swordfish, but also take significant catches of bigeye tuna and yellowfin tuna. There were 40 Australian longliners fishing in the area in 2002, but only 27 in 2003. Longline fishing effort also declined, from more than 6 million hooks in 2001 to 4 million hooks in 2003. There was a corresponding decline in catches of swordfish (1766 t in 2003 compared to 2000 t in 2002), bigeye (319 t cf. 418 t) and yellowfin tuna (232 t in 2003 cf. 354 t in 2002). The reduction in longline activity is attributed to reductions in market prices and increased operating costs. The purse seine fishery mainly targets southern bluefin tuna that are towed to near-shore cages for fattening (over 5000 t of southern bluefin are caught by those vessels each year). Late season catches of skipjack tuna are also taken by the purse seiners in some years. No skipjack tuna were reported in 2003. In 2002, 1144 t of skipjack tuna was caught by purse seine. Australia is engaged in a range of research activities that are of direct relevance to management of the domestic fishery and the broader region.

## 1 – INTRODUCTION

This paper summarises catch and effort by Australian domestic fisheries in the Eastern Indian Ocean in 2003, which is known as the Southern and Western Tuna and Billfish Fishery (SWTBF). Details of active fleet size are also provided where possible. The two predominant domestic gear types for catching tuna and billfish in the eastern Indian Ocean are longline and purse seine. There is also an active recreational fishery operating in this area targeting tuna and billfish species.

## 2 - LONGLINE FISHERY

Australia's longline fishery operating in the Eastern Indian Ocean is managed at a Commonwealth level (as opposed to being managed by individual states). A complete set of longline catch and effort data are now available to the end of 2003. All catch and effort statistics were compiled using logbook data. Historically, the main catch in Australia's western waters was taken by Japanese longliners operating in the AFZ

under bilateral agreements. They targeted high-value bigeye (*Thunnus obesus*) in the southwest, and yellowfin (*T. albacares*) and striped marlin (*Tetrapturus audax*) in the northwest. These longliners have been excluded from Australian waters since November 1997. A pelagic longline fishery has subsequently developed concentrating on broadbill swordfish (*Xiphius gladius*), in addition to bigeye and yellowfin (Caton 2002).

**2-1 Fishing vessels**

Most Australian longliners operating in the eastern Indian Ocean are 15–30 m long and work monofilament-longline gear. They store their catch on ice, in ice slurry or in brine spray systems. Trips are generally of 3–10 days' duration with a set of generally less than 1000 hooks before sunrise each day, although daytime setting south of 30°S is now banned to minimise interactions with seabirds. The longliners that target swordfish, the main catch of the fishery, use shallow (20–120 m) night-sets with squid baits and chemical light-sticks. Most longlining activity is within the AFZ, but some have fished beyond it. The range offshore is limited for most vessels by their small size and lack of freezer facilities. In the west, most of the catch is landed at Fremantle, Geraldton and Carnarvon. Most of the southern landings have been made at Albany and, more recently, Port Lincoln. Significant distances between some fishing grounds and ports have resulted in longer trips (of up to 14 days) (Caton 2002).

The Australian Fisheries Management Authority (AFMA) controls fishing in this region (which encompasses the domestic Southern and Western Tuna and Billfish Fishery) through limited entry. It issued a total of 90 domestic longline permits in 2003, the same number as in 2002. Only 27 longliners were active (fished more than one day) in this region in 2003 compared to 40 in 2002 and 50 in 2000 (See Table 1). This follows a rapid increase in number of active longliners since 1997 (only 9 active vessels) in line with the expansion of the fishery.

Recent years have been characterised by the replacement of small (15–20 m) longliners, with the larger replacement vessels able to operate under a wider range of weather conditions and further offshore. The lack of freezer capacity on domestic longline vessels limits the range of operations, but with potentially large catches of bigeye tuna and broadbill swordfish just beyond the AFZ, freezer vessels may be economically viable.

**2-2 Fishing Effort**

Despite the relatively wide geographic extent of Australia's waters (and coastline) in the eastern Indian Ocean, the commercially valuable tuna and billfish species are rare in the shallow northern region of the Australian Fishing Zone (AFZ), so fishing activities and effort are concentrated in oceanic waters along the western and southern coasts.

Fishing effort increased from 0.5 million hooks in 1997 to 6.21 million hooks in 2001. In 2003, a decrease in effort occurred (in line with fewer boats fishing) with 3.84 millions hooks set.

Longline fishing effort was concentrated off the western and southwestern coastline between 20ºS and 40ºS. Fishing did not extend beyond the AFZ prior to 1999, but there has been increasing activity recorded outside the AFZ in the period since.

### 2-3 Catch

The domestic longline fishery in the eastern Indian Ocean had been, up to 2001, one of the most rapidly growing fisheries in Australia: the total catch increased six-fold between 1997 (370 t) and 2000 (2500 t), reflecting a more than 10 fold increase in total effort (0.5 million to 6.2 million hooks). The longline fishery targets swordfish, but also bigeye tuna and yellowfin tuna, with most of the catch exported fresh-chilled to markets in Japan and the USA.

Catches of the principle target species, broadbill swordfish, in 2003 (1766 t) was down on the 2001 (2135 t), which represented the peak catch of swordfish for this fishery since its development. Swordfish annual catches had increased rapidly to this peak from around 235 t in 1998. Yellowfin and bigeye are caught in similar amounts in this fishery, although there is some variation between years in relative proportions. 232 t of yellowfin were caught in 2003, significantly less than in the four previous years, which had, catches over 400 t (peaking at 557 t in 2001). Catches of bigeye have varied between 385 – 433 t over the past 4 years, but only 319 t were caught in 2003. A number of byproduct species are taken in smaller but still economically significant amounts, e.g., albacore (23 t in 2003). Data from observers placed on longliners during 2003–04 provides details of the true catch composition (Figure 1).

***Japan's catches in the western Australian AFZ:*** In 1999 the domestic SWTBF catches first exceeded the historic Japanese average annual AFZ catches for the principal tuna and billfish species. The peak Japanese combined longline catch for albacore, bigeye, yellowfin, swordfish and striped marlin were 1643 t in 1987. The 1987 Japanese peak SWTBF-region catch was dominated by 892 t of bigeye tuna, far greater than their (next largest) 1993 bigeye catch of 384 t. In most years between 1983 and 1997 yellowfin tuna dominated the Japanese catch, but the catches were highly variable, ranging between 3 t and 866 t (Caton 2002).

## 3 - PURSE SEINE FISHERY

In the eastern Indian Ocean, the purse seine fishery predominantly acts as part of the domestic Southern Bluefin Tuna Fishery, with purse seiners employed to catch younger age class southern bluefin tuna and tow these to grow out farms in Port Lincoln (Great Australian Bight – Southern Australia). However, skipjack has occasionally been a late season (March–April) target of purse seiners in the southern bluefin tuna surface fishery, with over 1000 t taken in some years.

### 3-1 Fishing vessels

The farm operations use purse seine vessels to catch SBT, with assistance by former pole-and-line vessels as bait boats and the support of spotter planes (Findlay, 2003).

Seven purse seine vessels fished for southern bluefin tuna in the 2002-03 financial year, with the assistance of various live bait, pontoon-towing and feeding vessels. Purse seine fishers often use aircraft and satellite thermal imagery to locate schools. Most purse seine vessels are 20-25m long (two are 40-45m) (Caton, 2002).

### 3-2 Fishing Effort

In 2003 purse seiners spent 122 days fishing.

### 3-3 Catch

Since 1990, most of the domestic catch of skipjack in the eastern Indian Ocean has been taken by purse seine (lone or assisted by pole and line). Off the South Australian coast, where the southern bluefin tuna fishery operates, skipjack has been a late season (March-April) target of purse seiners and the total annual catch has varied between 300–1400 t in the mid-late 1990s. Most of the skipjack tuna is processed through the cannery at Port Lincoln. In recent years purse seine catch has increased from 486 t in 2000 to 1144 t in 2002, with none reported in 2003.

Since 1991, when purse seine towing of southern bluefin tuna to grow out farms first commenced in this region, the purse seine catch of SBT has rapidly increased from 138 t (1991) to over 5000 t annually from 1998 onwards (Findlay 2003).

## 4 - RECREATIONAL FISHERY

Western Australia has a keen recreational game fishery, targeting sailfish (*Istiophorus platypterus*), black marlin (*Makaira indica*), blue marlin (*M. mazara*), striped marlin (*Tetrapturus audax*) and yellowfin tuna. Consideration of recreational fishing interests in the late 1980s had resulted in the prohibition of Japanese longlining within 50 nm of the Western Australian coast. It also led to Japanese agreement that billfish other than swordfish would not be targeted, and that all black and blue marlin taken alive would be released. In 1994 Western Australia passed legislation preventing the landing of all billfish of the family Istiophoridae. However, this legislation was not enforced until December 1999. Meanwhile, in 1998 the Commonwealth banned the retention of blue and black marlin, whether alive or dead, taken anywhere in the AFZ by commercial fishing.

## 5 - RESEARCH

Following is a list of Commonwealth funded research and monitoring projects underway that are relevant to Australia's domestic fisheries operating in the eastern Indian Ocean. Principal investigators and the year of commencement are shown in parentheses.

- SWTBF size monitoring program (Williams 1999)
- Pilot scientific monitoring program for the SWTBF (BRS 2003)
- A review of byproduct interactions and economics in Australia's tuna and billfish fisheries (BRS 2003)
- Development of a robust set of stock status indicators for the Southern and Western, and the Eastern Tuna and Billfish Fisheries (CSIRO 2002)
- Review and analysis of information required for the determination of TACs and decision rules relevant to the SWTBF (CSIRO 2001)
- A scientific appraisal of the suitability of underwater setting chute technology as a seabird mitigation measure for Australian tuna longline fisheries (Brothers 2001)
- SWTBF ecological risk assessment (CSIRO 2003)

- On-board chilled storage of broadbill swordfish: assessing and improving post harvest quality (Slattery 2002)

## 6 - ENVIRONMENTAL ISSUES

Over 60 marine species have been recorded from AFZ longline catches, including tuna and tuna-like fish, billfish, sharks, rays, various other fish, seabirds, and (rarely) sea turtles and marine mammals. When Japanese longliners were operating in the fishery, they retained about 30 species (mainly the tunas, billfishes and sharks) for commercial sale. The bycatch species (most commonly blue shark, *Prionace glauca*) were released or discarded at sea. The 2003–04 pilot scientific monitoring program found that domestic longliners frequently catch blue shark and crocodile shark (*Pseudocarcharius kamoharai*). The latter are quite rare in other longline fisheries. Commercial markets have developed in Australia and overseas for several bycatch species, including escolar or black oilfish (*Lepidocybium flavobrunneum*), oilfish (*Ruvettus pretiosus*) and dolphinfish or mahi mahi (*Coryphaena hippurus*). Several other species, such as wahoo (*Acanthocybium solandri*), have commercial potential. In response to bycatch issues, AFMA formulated a Bycatch Action Plan for the three Australian tuna fisheries (SWTBF, Eastern Tuna and Billfish and Southern Bluefin Tuna Fishery).

A 2001 BRS report highlighted high levels of shark bycatch and the widespread practice of 'shark finning' in Australia's tuna fisheries. Fishery-specific arrangements are required to increase knowledge about shark catches and their sustainability. In the interim, AFMA has banned the practice of finning sharks at sea, prohibiting the possession or landing of fins separate from carcasses. AFMA has enforced the landing limit of 20 sharks per vessel per fishing trip, and also banned wire traces (which increase the likelihood of retaining shark).

Catches of sea turtles have been reported in SWTBF logbooks and during interviews with operators. Observers placed on longliners during 2003–04 reported low catch rates of sea turtles.

In August 1998 the Minister for the Environment approved a Threat Abatement Plan to reduce the incidental catch of seabirds by longliners. The chapter on the Eastern Tuna and Billfish Fishery details progress in identifying longline fishing practices intended to reduce the mortality of seabirds. All SWTBF operators are currently required to carry an approved bird-scaring 'tori' line, to use it and set it only at night when operating south of 30ºS, and to not discharge offal during line setting and hauling.

## 7 - FURTHER READING

Campbell, R.A., Tuck, G.N., Pepperell, J.G. and Larcombe J.W.P. (1998) *Synopsis on the Billfish Stocks and Fisheries Within the Western AFZ and the Indian Ocean*. Australian Fisheries Management Authority, Canberra, 122 pp.

Caton, A (2002) Fishery Status Report 2001. Bureau of Rural Sciences, Canberra, ACT.

Findlay, J. (2003) Australia's 2001-02 southern bluefin tuna fishing season. Working Paper CCSBT-SC/ presented at the Seventh Meeting of the Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna September 2003,Christchurch New Zealand.

Larcombe, J.W.P., Caton, A., Williams, D.McB. and Speare, P.J. (1997) *Western Tuna and Billfish Fisheries Research*. Bureau of Resource Sciences, Canberra, 205 pp.

Williams, K. (1984) Australian skipjack surveys inconclusive. *Australian Fisheries* 43(20):34–38.

**Table 1.** The number of Australian longline vessels actively fishing each year in the Eastern Indian Ocean, 1986–2003. Active vessels are defined as vessels that reported fishing on one or more days.

| Year | Active vessels |
|---|---|
| 1986 | 1 |
| 1987 | 3 |
| 1988 | 3 |
| 1989 | 6 |
| 1990 | 7 |
| 1991 | 4 |
| 1992 | 7 |
| 1993 | 9 |
| 1994 | 16 |
| 1995 | 15 |
| 1996 | 11 |
| 1997 | 9 |
| 1998 | 19 |
| 1999 | 37 |
| 2000 | 50 |
| 2001 | 43 |
| 2002 | 40 |
| 2003 | 27 |

**Table 2** – Total annual catch (whole estimated weight, scaled up from landed processed weight) for three target species (yellowfin tuna, bigeye tuna and swordfish), three major byproduct species (albacore tuna, dolphinfish and rudderfish) and three marlin species caught by Australian fisheries operating in the eastern Indian Ocean, 1986–2003. All catches are for the longline fishery, with the exception of skipjack, which is caught by the purse seine fishery. Note that according to a report by Campbell (2001), data recorded by fishermen in the early years is likely to be a mix of whole and processed weights, therefore the data presented here for years prior to 2000 are likely to underestimate whole weight.

| Year | Effort (million hooks) | Yellowfin tuna | Bigeye tuna | Swordfish | Skipjack tuna* | Albacore tuna | Blue shark | Rudder -fish | Blue marlin | Black marlin | Striped marlin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1986** | 0.05 | 0.00 | 16.76 | 0.49 | 635.10 | 14.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 |
| **1987** | 0.29 | 2.55 | 44.28 | 0.11 | 1208.80 | 9.56 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 |
| **1988** | 0.14 | 0.23 | 6.69 | 0.11 | 81.90 | 7.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **1989** | 0.68 | 157.63 | 53.79 | 19.07 | 2.20 | 24.89 | 0.00 | 0.00 | 9.37 | 17.82 | 27.89 |
| **1990** | 0.35 | 54.53 | 32.86 | 12.44 | 635.70 | 4.32 | 0.00 | 0.00 | 4.55 | 3.90 | 1.40 |
| **1991** | 0.00 | 0.72 | 1.06 | 0.21 | 0.00 | 3.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **1992** | 0.07 | 7.46 | 8.51 | 1.12 | 334.00 | 12.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| **1993** | 0.36 | 1.98 | 26.72 | 9.64 | 29.00 | 33.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| **1994** | 0.39 | 14.06 | 22.66 | 26.38 | 1201.00 | 40.20 | 0.00 | 0.00 | 0.08 | 0.42 | 0.45 |
| **1995** | 0.53 | 53.16 | 47.00 | 46.07 | 465.00 | 3.55 | 0.00 | 0.00 | 0.05 | 0.05 | 1.86 |
| **1996** | 0.28 | 89.07 | 21.68 | 15.68 | 335.27 | 2.55 | 0.00 | 6.28 | 0.00 | 0.01 | 2.36 |
| **1997** | 0.52 | 246.45 | 42.99 | 25.35 | 27.00 | 16.64 | 0.03 | 9.82 | 1.55 | 2.59 | 11.68 |
| **1998** | 1.04 | 232.06 | 160.45 | 235.74 | 1400.20 | 23.48 | 0.44 | 34.64 | 0.00 | 0.00 | 8.82 |
| **1999** | 3.53 | 405.06 | 411.48 | 1009.55 | 826.00 | 20.05 | 0.41 | 54.50 | 0.00 | 0.00 | 22.59 |
| **2000** | 6.20 | 427.40 | 433.40 | 1684.90 | 486.00 | 30.59 | 24.15 | 82.48 | 0.00 | 0.00 | 1.69 |
| **2001** | 6.21 | 557.46 | 385.99 | 2135.62 | 897.80 | 93.85 | 26.11 | 46.13 | 0.00 | 0.00 | 0.00 |
| **2002** | 5.98 | 354.64 | 418.51 | 1999.76 | 1144.01 | 71.97 | 52.49 | 31.40 | 0.00 | 0.00 | 0.73 |
| **2003** | 3.84 | 232.07 | 318.77 | 1766.08 | 0.00 | 108.54 | – | – | 0.00 | 0.00 | 0.17 |

*Purse seine catches.

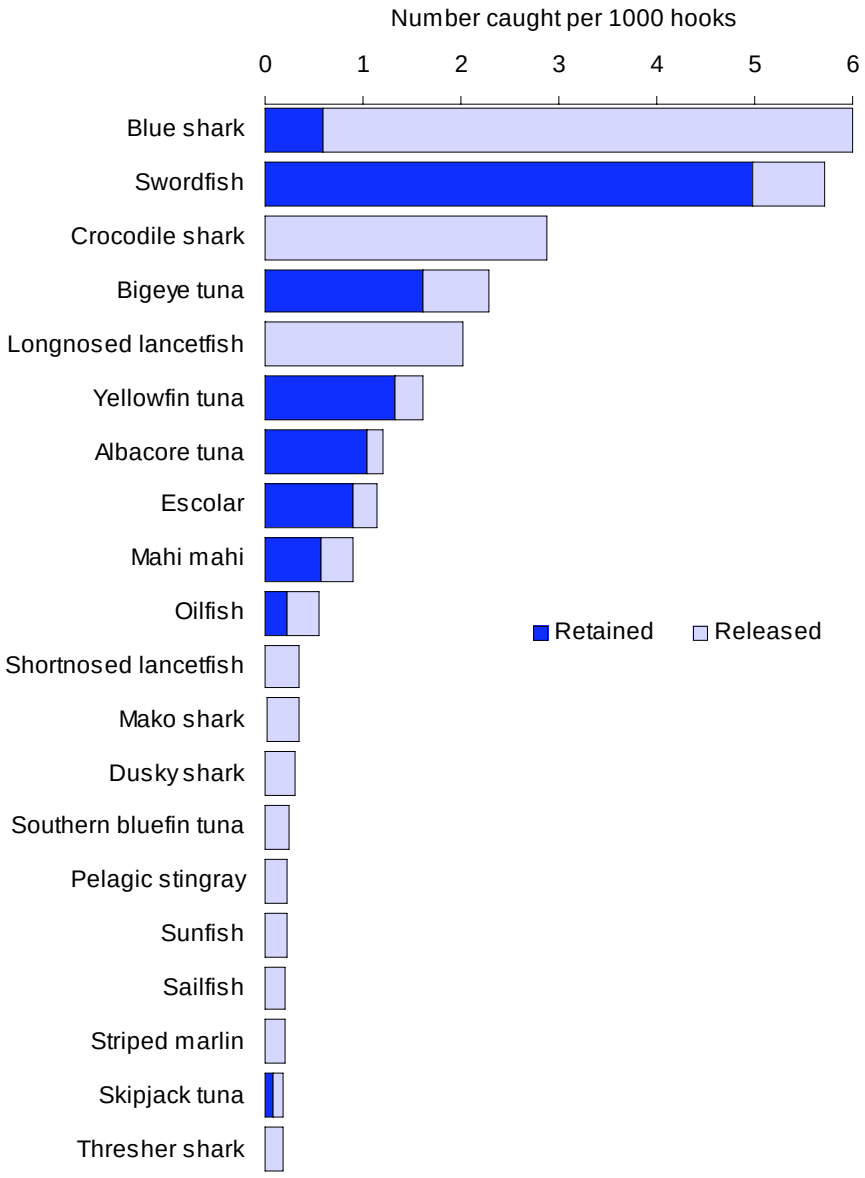


**Figure 1.** Longline catch rates of the 20 most abundant species reported by observers during 2003–04. Observers reported a further 26 species, which are not shown in this graph. Observers monitored 13 longliner trips, amounting to 104 longline operations and 134 755 hooks. All operations were night sets. Note that the proportion of each species retained and released is shown and that many of the bycatch species were released, in good condition.