

LONGTAIL TUNA

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Longtail tuna (*Thunnus tonggol*) in the Indian Ocean is currently subject to a number of Conservation and Management Measures adopted by the Commission:

- Resolution 15/01 on the recording of catch and effort by fishing vessels in the IOTC area of competence
- Resolution 15/02 mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating non-Contracting Parties (CPCs)
- Resolution 14/05 concerning a record of licensed foreign vessels fishing for IOTC species in the IOTC area of competence and access agreement information
- Resolution 12/11 on the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating Non-Contracting Parties
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area

FISHERIES INDICATORS

Longtail tuna: General

Longtail tuna (*Thunnus tonggol*) is an oceanic species that forms schools of varying sizes. It is most abundant over areas of broad continental shelf. **Table 1** outlines some key life history parameters relevant for management.

TABLE 1. Longtail tuna: Biology of Indian Ocean longtail tuna (*Thunnus tonggol*).

Parameter	Description
Range and stock structure	An oceanic species that forms schools of varying sizes. It is most abundant over areas of broad continental shelf. Feeds on a variety of fish, cephalopods, and crustaceans, particularly stomatopod larvae and prawns. No information is available on the stock structure of longtail tuna in the Indian Ocean.
Longevity	~20 years
Maturity (50%)	Age: n.a.; females n.a. males n.a. Size: females and males ~40 cm FL (Pacific Ocean).
Spawning season	The spawning season varies according to location. Off the west coast of Thailand there are two distinct spawning seasons: January-April and August-September.
Size (length and weight)	Maximum: Females and males 145 cm FL; weight 35.9 kgs. Most common size in Indian Ocean ranges 40–70 cm. Grows rapidly to reach 40–46 cm in FL by age 1.

n.a. = not available. Sources: Chang et al. 2001, Froese & Pauly 2009, Griffiths et al. 2010a, b, Kaymaran et al. 2011

Longtail tuna – Fisheries and catch trends

- Main fisheries: longtail tuna are caught mainly using gillnets and, to a lesser extent, coastal purse seine nets and trolling (**Table 2; Fig. 1**).
- Main fleets (i.e., highest catches in recent years):
Nearly half of catches of longtail in the Indian Ocean are accounted for by I.R. Iran (gillnet), followed by Indonesia (gillnet, trolling), Pakistan (gillnet) and India (Gillnet) (**Fig. 2**).
- Retained catch trends:
Estimates catches of longtail tuna have increased steadily from the mid-1950s, reaching around 15,000t in the mid-1970's, over 35,000t by the mid-1980's, and more than 96,000 t in 2000. Between 2000 and 2005, catches declined, but have since recovered and reached the highest levels recorded – over 170,000 t in 2011.

From around 2009 I.R. Iran has reported large increases catches of longtail tuna in coastal waters in the Arabian Sea, as a result of the threat of piracy and displacement of fishing effort (and change of targeting) by gillnet vessels

formerly operating in the North-West Indian Ocean. Since 2013 lower catches have been reported, most likely in response to the reduced threat of piracy, and resumption of fishing activity on the high seas.

- Discard levels: are thought to be very low, although estimates of discards are unknown for most fisheries.

Changes to the catch series: no major changes to the catch series of longtail tuna since WPNT in 2015.

TABLE 2. Longtail tuna: Best scientific estimates of the catches of longtail tuna by type of fishery for the period 1950–2015 (in metric tonnes) (data as of October 2016).

Fishery	By decade (average)						By year (last ten years)									
	1950s	1960s	1970s	1980s	1990s	2000s	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Purse seine	61	204	1,012	4,863	10,933	17,719	16,128	23,838	18,885	20,649	16,531	26,062	25,218	17,227	12,770	11,110
Gillnet	2,960	6,224	10,026	25,838	41,648	63,485	59,802	68,398	69,708	87,159	105,094	121,672	115,278	113,370	107,059	98,817
Line	551	810	1,564	4,349	5,016	9,502	9,514	11,929	11,206	12,494	12,977	15,295	25,891	20,707	22,128	20,450
Other	0	0	125	1,090	1,992	3,731	3,638	5,686	5,460	5,300	6,513	8,467	9,073	5,789	4,642	5,542
Total	3,573	7,239	12,727	36,141	59,590	94,437	78,498	89,081	109,851	105,260	125,601	141,115	171,495	174,480	157,291	147,587

The size of longtail tunas taken by the Indian Ocean fisheries typically ranges between 20 and 100 cm depending on the type of gear used, season and location. The fisheries operating in the Andaman Sea (coastal purse seines and trolling) tend to catch longtail tuna of small size (20–45cm) while the gillnet fisheries of Iran and Pakistan (Arabian Sea) catch larger specimens (50–100cm).

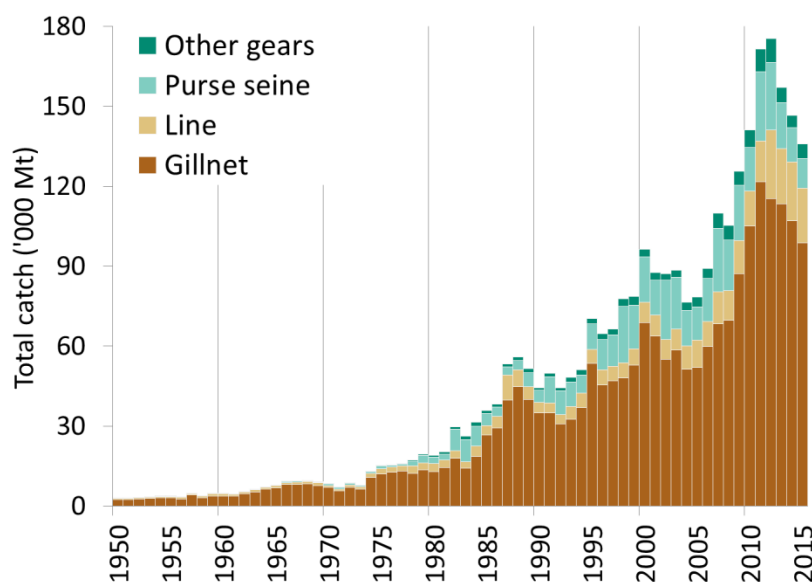


Fig. 1. Longtail tuna: Annual catches by gear recorded in the IOTC Database (1950–2015) (data as of October 2016).

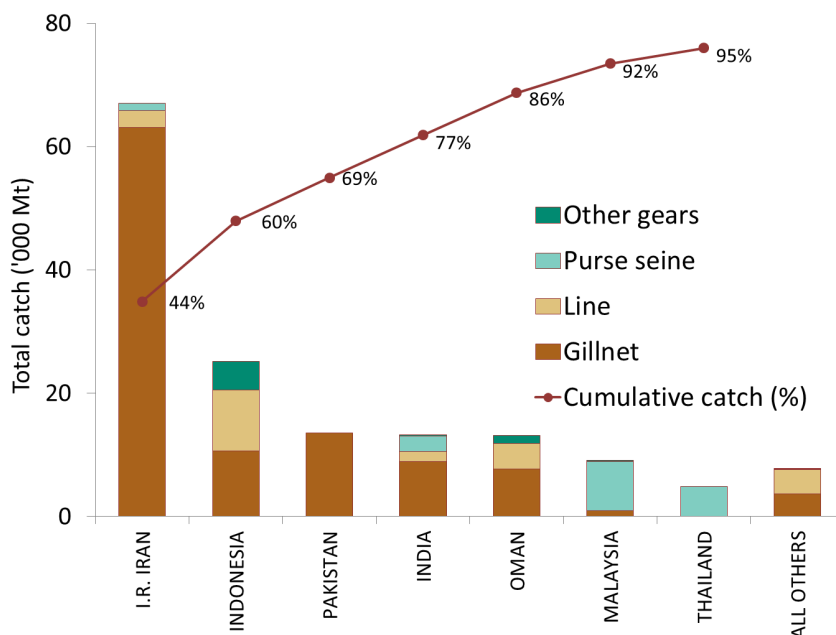


Fig. 2. Longtail tuna: Average catches in the Indian Ocean over the period 2012–15, by country. Countries are ordered from left to right, according to the importance of catches of longtail reported. The red line indicates the (cumulative) proportion of catches of longtail tuna for the countries concerned, over the total combined catches of this species reported from all countries and fisheries (data as of October 2016).

Longtail tuna: estimation of catches – data related issues

Retained catches for longtail tuna were derived from incomplete information, and are therefore uncertain¹ (Fig.3), notably for the following fisheries:

- **Artisanal fisheries of Indonesia:** Indonesia did not report catches of longtail tuna by species or by gear for 1950–2004; instead catches of longtail tuna, kawakawa and other species were reported as aggregated for this period. In the past, the IOTC Secretariat used the catches reported since 2005 to break the aggregates for 1950–2004, by gear and species. However, a recent review by the IOTC Secretariat conducted by an independent consultant in 2012 indicated that catches of longtail tuna had been severely overestimated by Indonesia. While the new catches estimated for the longtail tuna in Indonesia remain uncertain, the new figures are considered more reliable than those existing in the past.

In addition, the IOTC Secretariat has been conducting a pilot sampling project of artisanal fisheries in North and West Sumatra since 2014 to improve estimates of catch by species for coastal fisheries. One of the key issues is the misclassification of juvenile tunas (*tongkol*) as longtail tuna (*Thunnus tonggol*) by District authorities in Indonesia, which is believed to have led to over-estimates of catches of longtail for a number of years. Based on the results of the pilot sampling, the IOTC Secretariat is working with Indonesia to further improve the estimates of longtail tuna.

- **Artisanal fisheries of India and Oman:** Although these countries report catches of longtail tuna, until recently the catches have not been reported by gear. The IOTC Secretariat used alternative information to assign the catches reported by Oman by gear. The catches of India were also reviewed by the independent consultant in 2012 and assigned by gear on the basis of official reports and information from various alternative sources.
- **Artisanal fisheries of Myanmar and Somalia:** None of these countries have ever reported catches of longtail tuna to the IOTC Secretariat. While catch levels are unknown they are unlikely to be substantial. In the case of Myanmar, catches are taken from FAO and SEAFDEC (various years).
- **Other artisanal fisheries:** The IOTC Secretariat had to estimate catches of longtail tuna for the artisanal fisheries of Yemen (no data reported to the IOTC Secretariat) and until recently Malaysia (with catches of the main neritic tunas aggregated and reported as longtail).

¹ The uncertainty in the catch estimates has been assessed by the Secretariat and is based on the amount of processing required to account for the presence of conflicting catch reports, the level of aggregation of the catches by species and or gear, and the occurrence of non-reporting fisheries for which catches had to be estimated.

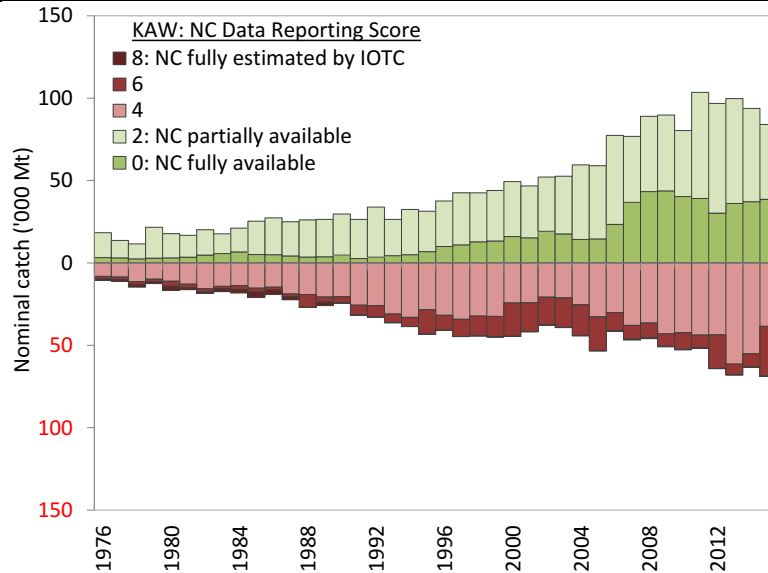


Fig. 3. Longtail tuna: Nominal catch; uncertainty of annual catch estimates (1950–2015). Catches are assessed against IOTC reporting standards, where a score of 0 indicates catches that are fully reported according to IOTC standards; catches assigned a score of between 2 – 6 do not report catch data fully by gear and/or species (i.e. partially adjusted by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document; catches with a score of 8 refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat) (data as of October 2016).

Longtail tuna – Effort trends

- Availability: Effort trends are unknown for longtail tuna in the Indian Ocean due to the lack of catch-and-effort data.

Longtail tuna – Catch-per-unit-effort (CPUE) trends

- Availability: highly incomplete, with data available for only short periods of time and selected fisheries (**Table.3**).
- Main CPUE series available: Thailand coastal purse seine and gillnet vessels (i.e., available over 10 years) (**Fig.4**).

TABLE 3. Longtail tuna: Availability of catch-and-effort series, by fishery and year (1970–2015)². Note that no catch-and-effort are available between 1950–1971.

Gear-Fleet	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	00	02	04	06	08	10	12	14	
PSS-Malaysia																								
PSS-Thailand																								
PS-EU-Spain																								
PS-Iran, IR																								
PS-Seychelles																								
PS-NEI																								
GILL-India																								
GILL-Indonesia																								
GILL-Iran, IR																								
GILL-Malaysia																								
GILL-Oman																								
GILL-Pakistan																								
GILL-Thailand																								
LINE-Australia																								
LINE-Indonesia																								
LINE-Malaysia																								
LINE-Oman																								
LINE-Yemen																								
OTHR-Australia																								
OTHR-Indonesia																								
OTHR-Malaysia																								
OTHR-Oman																								

² Note that the above list is not exhaustive, showing only the fisheries for which catch-and-effort are available in the IOTC database. In addition, catch-and-effort may not be available for all months for years shown in the table for each fishery.

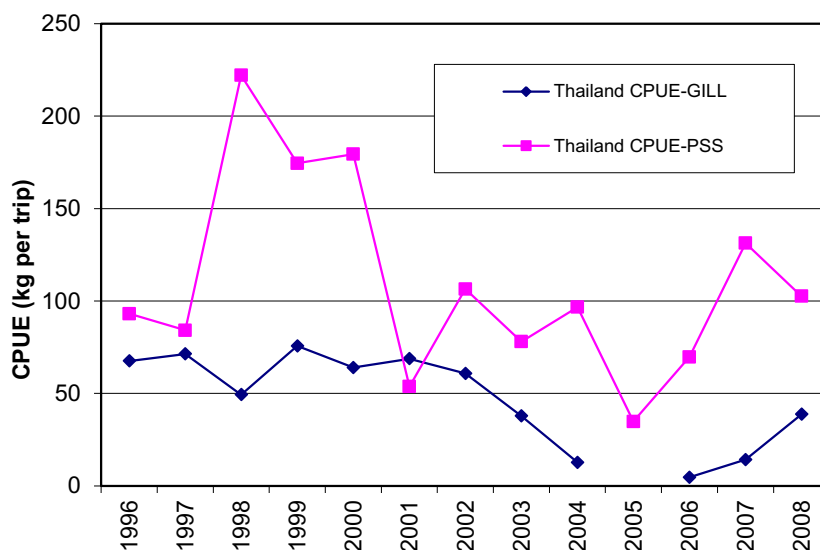


Fig. 4. Longtail tuna: Nominal CPUE series for gillnet (GILL) and coastal purse seine (PSS) fisheries of Thailand derived from the available catches and effort data (1996–2008).

Longtail tuna – Fish size or age trends (e.g., by length, weight, sex and/or maturity)

- **Sizes:** longtail tunas taken by Indian Ocean fisheries typically range between 20 – 100 cm depending on the type of gear used, season and location (**Table 4**). Fisheries operating in the Andaman Sea (coastal purse seines and trolling) tend to catch smaller sized longtail tuna (e.g., 20–45cm), while gillnet fisheries of I.R. Iran and Pakistan (Arabian Sea) catch larger specimens (e.g., 50–100cm).
- **Size frequency data:** highly incomplete, with data available only for selected fisheries.

Main sources for size samples: I.R. Iran (gillnet) and Oman (gillnet).

Length distributions derived from data available for gillnet fisheries are shown in **Fig.5**. Total numbers of samples, across all years, are also well below the minimum sampling standard of 1 fish per tonne of catch recommended by the IOTC Secretariat to reliably assess changes in average weight.

- **Catch-at-Size (Age) table:** Not available, due to lack of size samples and uncertainty over the reliability of retained catch estimates.
- **Sex ratio data:** have not been provided to the Secretariat by CPCs.

TABLE 4. Longtail tuna: Availability of length frequency data, by fishery and year (1980–2015)³. Note that no length frequency data are available at all for 1950–1982.

³ Note that the above list is not exhaustive, showing only the fisheries for which size data are available in the IOTC database. In addition, size data may not be available for all months for years shown in the table for each fishery.

Gear-Fleet	80	82	84	86	88	90	92	94	96	98	00	02	04	06	08	10	12	14
PSS-Malaysia					■									■	■			
PSS-Thailand													■	■	■			
PS-Iran															■	■	■	■
GILL-Indonesia			■															
GILL-Iran							■	■	■	■	■	■	■	■	■	■	■	■
GILL-Malaysia					■									■				
GILL-Oman					■	■	■	■	■	■					■			
GILL-Pakistan																	■	
GILL-Sri Lanka					■	■	■	■	■	■								
LINE-Indonesia				■														
LINE-Iran																	■	■
LINE-Malaysia				■	■	■	■											
LINE-Oman															■			
OTHR-Indonesia				■	■													

Key

- More than 2,400 specimens measured
- Between 1,200 and 2,399 specimens measured
- Less than 1,200 specimens measured



Fig. 5. Longtail tuna: Left - longtail tuna (gillnet fisheries): Length frequency distributions (total amount of fish measured by 1cm length class) derived from data available at the IOTC Secretariat. Right - number of longtail tuna specimens (gillnet fisheries) sampled for lengths, by fleet and year.

STOCK ASSESSMENT

Two assessment approaches were applied to Longtail tuna in 2016, a traditional Catch-MSY model and an Optimised Catch Only Method (OCOM). The approaches provided similar estimates of MSY and the same stock status advice. For final reporting and stock status advice the OCOM model was used (**Table 5**).

TABLE 5. Longtail tuna (*Thunnus tonggol*): Key management quantities from the OCOM used in 2016.

Management Quantity	Indian Ocean
Most recent catch estimate (2014)	146 751 t
Mean catch over last 5 years ⁴ (2010-2014)	158 495 t
MSY (plausible range)	143 153 t ⁵ (105 604-193 762)
Data period used in assessment	1950 – 2014
F _{MSY} (plausible range)	0.39 (0.29 – 0.54)
B _{MSY} (plausible range)	297 689 (196 714 -545 071)
F _{current} /F _{MSY} (plausible range)	1.03 (0.88-1.26)
B _{current} /B _{MSY} (plausible range)	0.99 (0.78-1.19)
SB _{current} /SB _{MSY} (80% CI)	n.a.
B _{current} /B ₀ (plausible range)	0.50 (0.39-0.60)
SB _{current} /SB ₀ (80% CI)	n.a.
B _{current} /B _{0, F=0} (80% CI)	n.a.
SB _{current} /SB _{0, F=0} (80% CI)	n.a.

n.a. not available; Geometric means and plausible ranges

LITERATURE CITED

- Chiang W-C, Hsu H-H, Fu S-C, Chen S-C, Sun C-L, Chen W-Y, Liu D, Su W-C (2001) Reproductive biology of longtail tuna (*Thunnus tonggol*) from coastal waters off Taiwan. IOTC–2011–WPNT01–30
- Froese R, Pauly DE (2009) FishBase, version 02/2009, FishBase Consortium, <www.fishbase.org>
- Griffiths SP, Fry GC, Manson FJ, Lou DC (2010a) Age and growth of longtail tuna (*Thunnus tonggol*) in tropical and temperate waters of the central Indo-Pacific. ICES JMar Sci 67:125–134
- Griffiths S, Pepperell J, Tonks M, Sawynok W, Olyott L, Tickell S, Zischke M, Lynne J, Burgess J, Jones E, Joyner D, Makepeace C, Moyle K (2010b) Biology, fisheries and status of longtail tuna (*Thunnus tonggol*), with special reference to recreational fisheries in Australian waters. FRDC Final Report 2008/058, 101 pp
- Kaymaram F, Darvishi M., Parafkandeh F, Ghasemi S, Talebzadeh SA (2011) Population dynamic parameters of *Thunnus tonggol* in the north of the Persian Gulf and Oman Sea. IOTC–2011–WPNT01–18

⁴ Data at time of assessment

⁵ median = 140 326