SKIPJACK TUNA

SUPPORTING INFORMATION

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

CONSERVATION AND MANAGEMENT MEASURES

Skipjack tuna (*Katsuwonus pelamis*) in the Indian Ocean is currently subject to a number of Conservation and Management Measures adopted by the Commission:

- Resolution 16/02 *On harvest control rules for Skipjack tuna in the IOTC Area of Competence*
- 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 (CPC's)*
- Resolution 15/06 *On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna and a recommendation for non-targeted species caught by purse seine vessels in the IOTC area of competence*
- Resolution 15/10 *On target and limit reference points and a decision framework*
- Resolution 15/11 *on the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating Non-Contracting Parties*
- Resolution 14/02 *for the conservation and management of tropical tunas stocks in the IOTC area of competence*
- 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 10/08 *concerning a record of active vessels fishing for tunas and swordfish in the IOTC area*

FISHERIES INDICATORS

Skipjack tuna – General

Skipjack tuna (*Katsuwonus pelamis*) life history characteristics, including a low size and age at maturity, short life and high productivity/fecundity, make it resilient and not easily prone to overfishing. **Table 1** outlines some of the key life history traits of skipjack tuna.

TABLE 1. Skipjack tuna: Biology of Indian Ocean skipjack tuna (*Katsuwonus pelamis*).

Parameter	**Description**
Range and stock structure	Cosmopolitan species found in the tropical and subtropical waters of the Indian, Pacific and Atlantic Oceans. It generally forms large schools, often in association with other tunas of similar size such as juveniles of yellowfin tuna and bigeye tuna. The tag recoveries from the RTTP-IO provide evidence of rapid, large scale movements of skipjack tuna in the Indian Ocean, thus supporting the current assumption of a single stock for the Indian Ocean. Skipjack recoveries indicate that the species is highly mobile, and covers large distances. The average distance between skipjack tagging and recovery positions is estimated at 640 nautical miles. Skipjack tuna in the Indian Ocean are considered a single stock for assessment purposes.
Longevity	7 years
Maturity (50%)	Age: females and males <2 years. Size: females and males 41–43 cm. Unlike in *Thunnus* species, sex ratio does not appear to vary with size. Most of skipjack tuna taken by fisheries in the Indian Ocean have already reproduced.
Spawning season	High fecundity. Spawns opportunistically throughout the year in the whole inter-equatorial Indian Ocean (north of 20°S, with surface temperature greater than 24°C) when conditions are favourable.
Size (length and weight)	Maximum length: 110 cm FL; Maximum weight: 35.5 kg. The average weight of skipjack tuna caught in the Indian Ocean is around 3.0 kg for purse seine, 2.8 kg for the Maldivian baitboats and 4–5 kg for the gillnet. For all fisheries combined, it fluctuates between 3.0–3.5 kg; this is larger than in the Atlantic, but smaller than in the Pacific. It was noted that the mean weight for purse seine catch exhibited a strong decrease since 2006 (3.1 kg) until 2009 (2.4 kg), for both free (3.8 kg to 2.4 kg) and log schools (3.0 kg to 2.4 kg).

Sources: Collette & Nauen 1983, Froese & Pauly 2009, Grande et al. 2010, Dortel et al. 2012, Eveson et al. 2012
NOAA http://www.nmfs.noaa.gov/fishwatch/species/atl_skipjack.htm 14/12/2011

Skipjack tuna - Fisheries and main catch trends

- Main fishing gear (2012–15): skipjack tuna are mostly caught by industrial purse seiners (≈39%), gillnet (≈26%) and pole-and-line (≈21%) (**Table 2; Fig. 1**).

- Main fleets (and primary gear associated with catches): percentage of total catches (2012–15):
  - Almost 70% of catches are accounted for by four fleets (**Fig. 2**):
  - ➢ Indonesia (coastal purse seine, troll line, gillnet): 21%; Maldives (pole-and-line): 17%; Sri Lanka (gillnet-longline): 15%; EU-Spain (purse seine): 15%.

- Main fishing areas:
  - Primary: Western Indian Ocean (West R2), in waters off Somalia (**Table 3; Figs.3 & 4**)
  - ➢ In recent years catches of skipjack in this area have dropped considerably as fishing effort has been displaced or reduced due to piracy – particularly catches from industrial purse seiners and fleets using driftnets flagged under I.R. Iran and Pakistan.
  - Secondary: Maldives (Area R2b)
  - ➢ Since the mid-2000s decreases in skipjack catches have also been reported by the Maldivian pole-and-line fishery – although the reasons remain unclear, but may possibly be related to a change in targeting to yellowfin tuna.

- Retained catch trends:

  Purse seine fisheries:

  The increase in catches of skipjack tuna in the last 30 years have largely been driven by the arrival of purse seiners in the early 1980s, and the development of the fishery in association with Fish Aggregating Devices (FADs) since the 1980s. In recent years, well over 90% of the skipjack tuna caught by purse seine vessels are taken from around FADs.

  Annual catches peaked at over 600,000 t in 2006. The constant increase in catches and catch rates of purse seiners until 2006 are believed to be associated with increases in fishing power and also an increase in the number of FADs (and technology associated with them) used in the fishery.

  Since 2006 catches have declined to around 340,000 t in 2012 – the lowest catches recorded since 1998 – although catches since 2013 have ranged between 390,000 t to 425,000 t.

  Pole-and-line fisheries:

  The Maldivian pole-and-line fishery effectively increased its fishing effort with the mechanisation of its fleet since 1974, including an increase in boat size and power, as well as the use of anchored FADs since 1981. Skipjack tuna represents around 80% of the total catch of Maldives, where catches of skipjack tuna increased regularly between 1980 and 2006 – from around 20,000 t to over 130,000 t.

  Catches of skipjack tuna reported by Maldives pole-and-line have since declined in recent years to as low as 55,000t - less than half the catches taken in 2006 - although the reasons for the decline remain unclear. One explanation may be improvements in the data collection with the introduction of logbooks and more accurate, albeit lower, estimates of skipjack landed; while the introduction of handlines and a shift in targeting from skipjack tuna to yellowfin tuna may also be a contributing factor.

  Gillnet fisheries:

  Several fisheries using gillnets have reported large catches of skipjack tuna in the Indian Ocean, including the gillnet/longline fishery of Sri Lanka, driftnet fisheries of I.R. Iran and Pakistan, and gillnet fisheries of Indonesia. In recent years gillnet catches have represented as much as 20% to 30% of the total catches of skipjack tuna in the Indian Ocean. Although it is known that vessels from I.R. Iran and Sri Lanka have been using gillnets on the high seas in recent years, reaching as far as the Mozambique Channel, the activities of these fleets are poorly understood, as no time-area catch-and-effort series have been made available for those fleets to date.

- Discard levels: Low, although estimates of discards are unknown for most industrial fisheries, excluding industrial purse seiners flagged in EU countries for the period 2003–07.

- ***Changes to the catch series*:** no major changes to the catch series since the WPTT meeting in 2015.

Table 2. Skipjack tuna: Best scientific estimates of the catches of skipjack tuna (*Katsuwonus pelamis*) by gear and main fleets [or type of fishery] by decade (1950–2009) and year (2006–2015), in tonnes. Catches by decade represent the average annual catch, noting that some gears were not used since the beginning of the fishery. Data as of September 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
BB	9,000	12,800	19,275	35,459	67,760	100,496	136,695	95,807	85,584	65,018	71,585	52,489	51,134	72,583	67,301	68,965
FS	0	0	0	13,658	25,197	24,342	32,684	23,567	14,863	9,498	8,708	8,930	2,924	5,625	6,467	7,546
LS	0	0	0	30,673	107,845	153,298	190,553	108,252	117,835	135,797	139,770	120,115	77,992	117,046	118,869	118,915
OT	6,015	14,067	27,597	49,997	118,867	198,114	256,228	237,993	220,143	227,486	203,928	201,671	206,667	239,038	228,793	198,529
Total	**15,015**	**26,867**	**46,872**	**129,788**	**319,670**	**476,251**	**616,161**	**465,620**	**438,425**	**437,799**	**423,991**	**383,205**	**338,718**	**434,292**	**421,430**	**393,955**

Gears: Pole-and-Line (**BB**); Purse seine free-school (**FS**); Purse seine associated school (**LS**); Other gears nei (**OT**) (e.g., troll line, handline, beach seine, Danish seine, liftnet).

Table 3. Skipjack tuna: Best scientific estimates of the catches of skipjack tuna (*Katsuwonus pelamis*) by area [as used for the assessment] by decade (1950–2009) and year (2006–2015), in tonnes. Catches by decade represent the average annual catch. Data as of September 2016.

	By decade (average)						By year (last ten years)									
	1950s	1960s	1970s	1980s	1990s	2000s	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
R1	4,524	9,951	19,284	34,584	80,744	118,318	109,014	137,692	139,937	151,486	154,434	153,882	149,769	167,639	145,972	130,356
R2	1,492	4,116	8,313	59,744	171,166	257,437	370,451	232,121	212,903	221,295	197,972	176,835	137,814	194,070	208,157	194,633
R2b	9,000	12,800	19,275	35,459	67,760	100,496	136,695	95,807	85,584	65,018	71,585	52,489	51,134	72,583	67,301	68,965
Total	**15,015**	**26,867**	**46,872**	**129,788**	**319,670**	**476,251**	**616,161**	**465,620**	**438,425**	**437,799**	**423,991**	**383,205**	**338,718**	**434,292**	**421,430**	**393,954**

Areas: East Indian Ocean (**R1**); West Indian Ocean, (**R2**); Maldives baitboat (R2b).

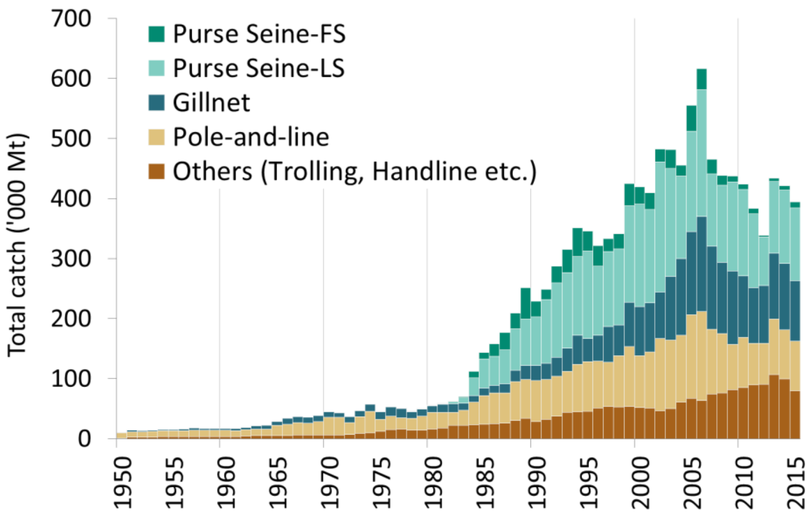


Fig.1. Annual catches of skipjack tuna by gear (1950–2015). Data as of October 2016.

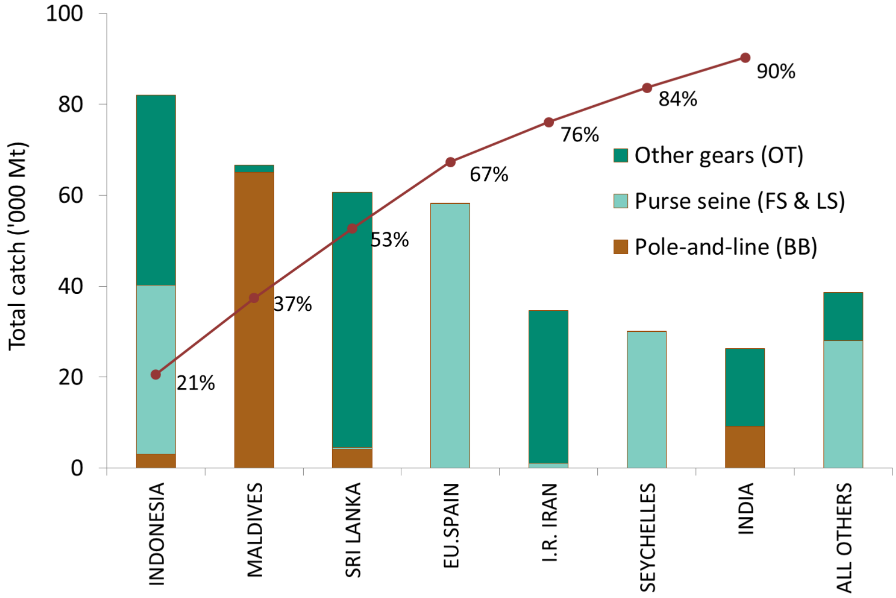


Fig.2. Skipjack tuna: average catches in the Indian Ocean over the period 2012–15, by country. Countries are ordered from left to right, according to the importance of catches of skipjack reported. The red line indicates the (cumulative) proportion of catches of skipjack for the countries concerned,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

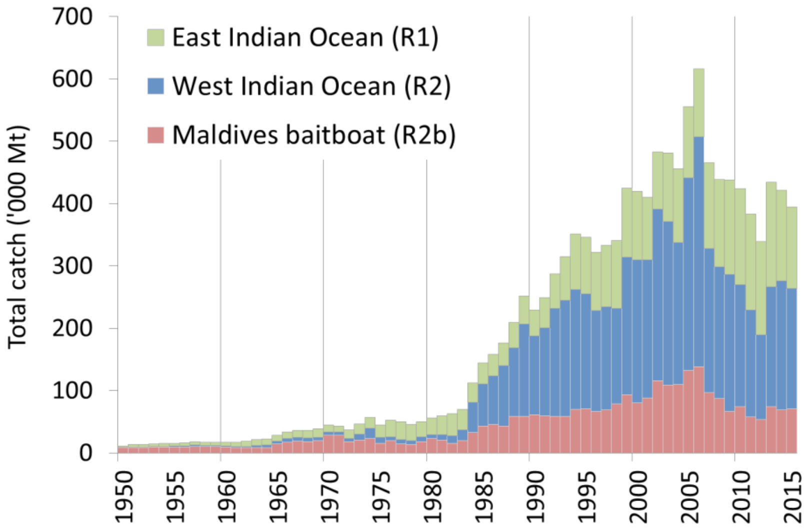


Fig.3. Skipjack tuna: Catches of skipjack tuna by area by year estimated for the WPTT (1950–2015). Areas: East Indian Ocean (R1); West Indian Ocean (R2); Maldives baitboat (R2b). Data as of October 2016.

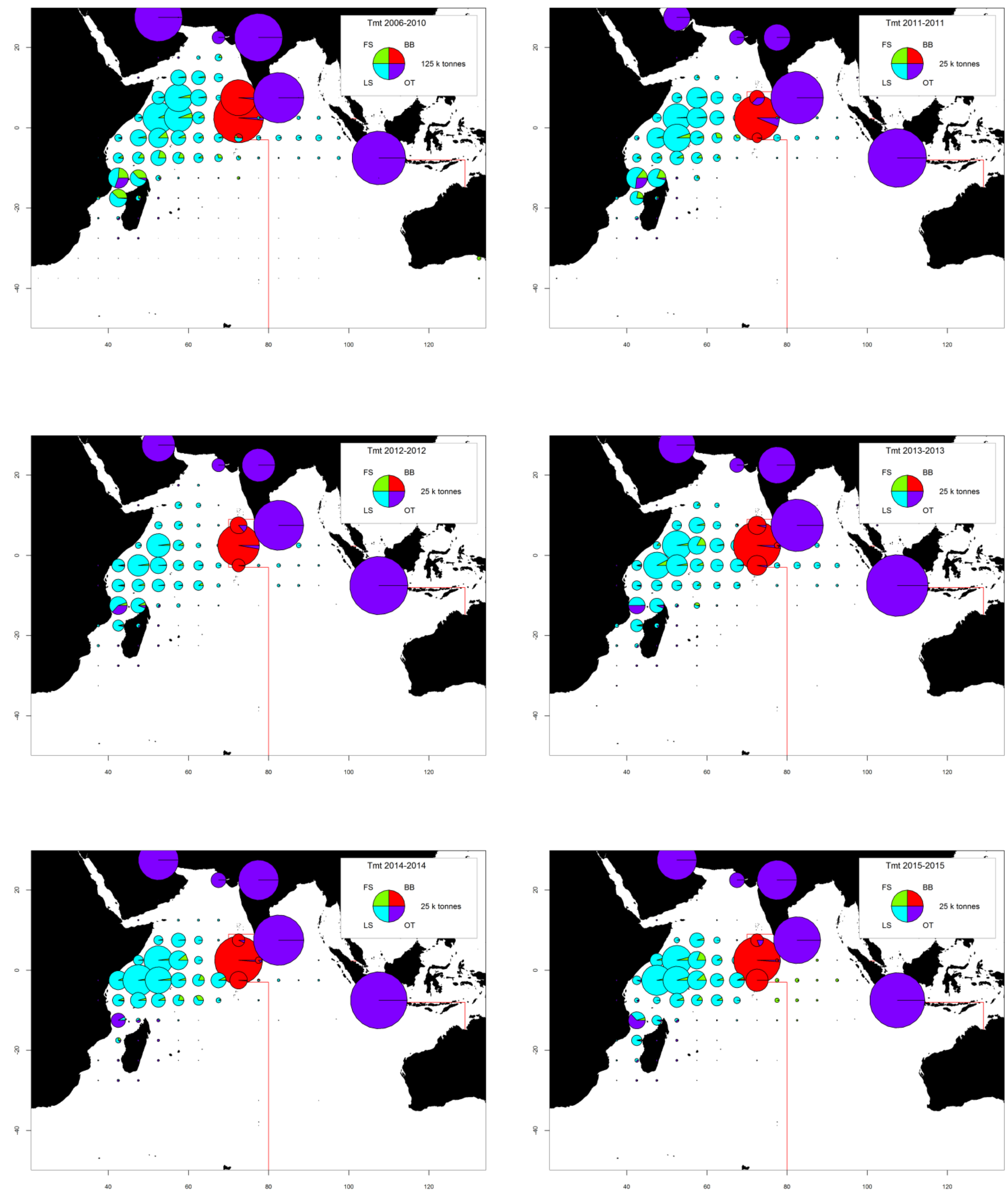


Fig. 4(a-f). Skipjack tuna: Time-area catches (total combined in tonnes) of skipjack tuna estimated for the period 2006–10 by type of gear and for 2011–15, by year and type of gear. Purse seine free-schools (**FS**), Purse seine associated-schools (**LS**), pole-and-line (BB), and other fleets (**OT**), including longline, drifting gillnets, and various coastal fisheries.

Catches of fleets for which the flag countries do not report detailed time and area data to the IOTC are recorded within the area of the countries concerned, in particular driftnets from I.R. Iran and Pakistan, gillnet and longline fishery of Sri Lanka, and coastal fisheries of Comoros, Indonesia and India.

Skipjack tuna: data availability and related data quality issues

Retained catches

- Retained catches are considered to be generally well known for the major industrial fleets, with the proportion of catches estimated, or adjusted, by the IOTC Secretariat relatively low (**Fig.5a**). Catches are less certain for many artisanal fisheries for a number of reasons, including:
  - catches not fully reported by species;
  - uncertainty in the catches from some significant fleets including the Sri Lankan coastal fisheries, and coastal fisheries of Comoros and Madagascar.

Catch-per-unit-effort (CPUE) trends

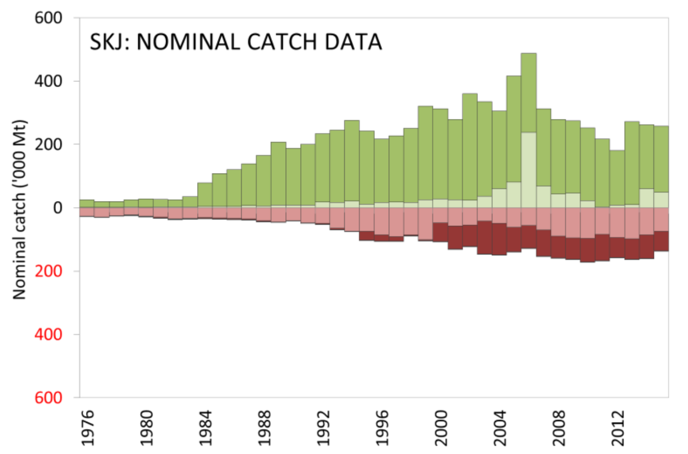
- Catch-and-effort series are available for the various industrial and artisanal fisheries (e.g., Maldives pole-and-line fishery, EU-France purse seine).

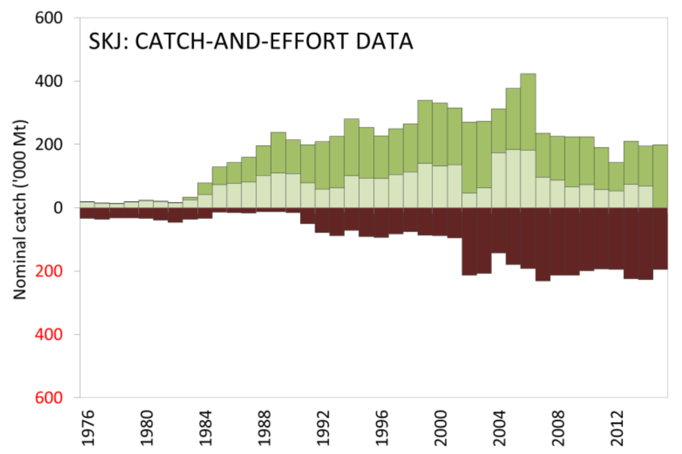
  However for a number of other important fisheries catch-and-effort are either not available (**Fig.5b**), or are considered to be of poor quality, notably:
  - ➢ insufficient data available for the gillnet fisheries of I.R. Iran and Pakistan;
  - ➢ poor quality effort data for the gillnet-longline fishery of Sri Lanka. In previous years catch-and-effort has not been reported fully by area, or disaggregated by gear (i.e., gillnet-longline) according to the IOTC reporting standards – however in 2014 detailed information by EEZ area (for coastal fisheries) and grid area (for offshore fisheries) and gear was submitted to the IOTC Secretariat for the first time;
  - ➢ no catch-and-effort data are available for important coastal fisheries using hand and/or troll lines, in particular Indonesia, India and Madagascar.

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

- Average fish weight: trends in average weights cannot be assessed before the mid-1980s and are also incomplete for most artisanal fisheries, namely hand lines, troll lines and many gillnet fisheries (e.g., Indonesia) (**Fig.5c & 6**).
- Catch-at-Size (and Age) table: are available but the estimates are uncertain for some years and fisheries due to:
  - ➢ a general lack of size data before the mid-1980s, for all fleets/fisheries;
  - ➢ lack of size data available for some artisanal fisheries, notably most hand lines and troll line fisheries (e.g., Madagascar, Comoros) and many gillnet fisheries (e.g., Indonesia, Sri Lanka) – although in 2014 Sri Lanka reported size information for gillnets for the first time since the early-1990s.

- Catch at length trends: are available for Purse seine free swimming school and purse seine FAD associated school length frequency distributions and total number of specimens sampled for lengths (**Fig.7**).





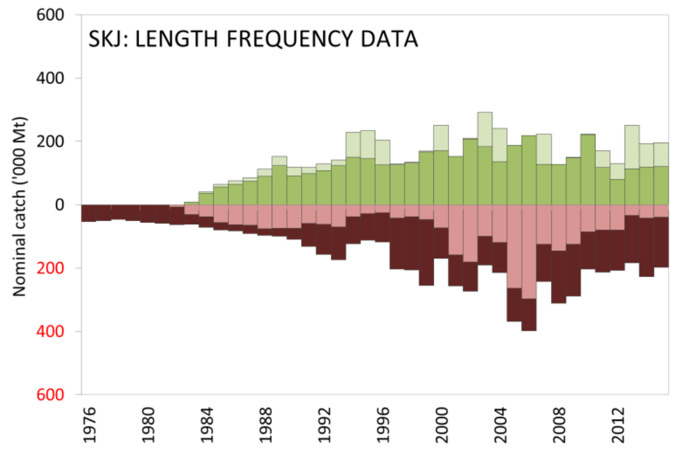


Fig.5a-c. Skipjack tuna: data reporting coverage (1976–2015).

Each IOTC dataset (nominal catch, catch-and-effort, and length frequency) are assessed against IOTC reporting standards, where: a score of 0 indicates the amount of nominal catch associated with each dataset that is fully reported according to IOTC standards; a score of between 2 – 6 refers to the amount of nominal catch associated with each dataset that is partially reported by gear and/or species (i.e., adjusted by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document; a score of 8 refers to the amount of nominal catch associated with catch-and-effort data that is not available.

Data as of September 2016.

IOTC Data reporting score:

Nominal Catch	By species	By gear
Fully available according the minimum reporting standards	0	0
Partially available (part of the catch not reported by species/gear)*	2	2
Fully estimated (by the IOTC Secretariat)	4	4

*E.g., Catch assigned by species/gear by the IOTC Secretariat; or 15% or more of the catches remain under aggregates of species

Catch-and-Effort	Time-period	Area
Fully available according to the minimum reporting standards	0	0
Partially available according to the minimum reporting standards*	2	2
Low coverage (less than 30% of total catch covered through logbooks)	2	
Not available at all	8	

* E.g., Catch-and-effort not fully disaggreaged by species, gear, area, or month.

Size frequency data	Time-period	Area
Fully available according to the minimum reporting standards	0	0
Patially available according to the minimum reporting standards*	2	2
Low coverage (less than 1 fish measured by metric ton of catch)	2	
Not available at all	8	

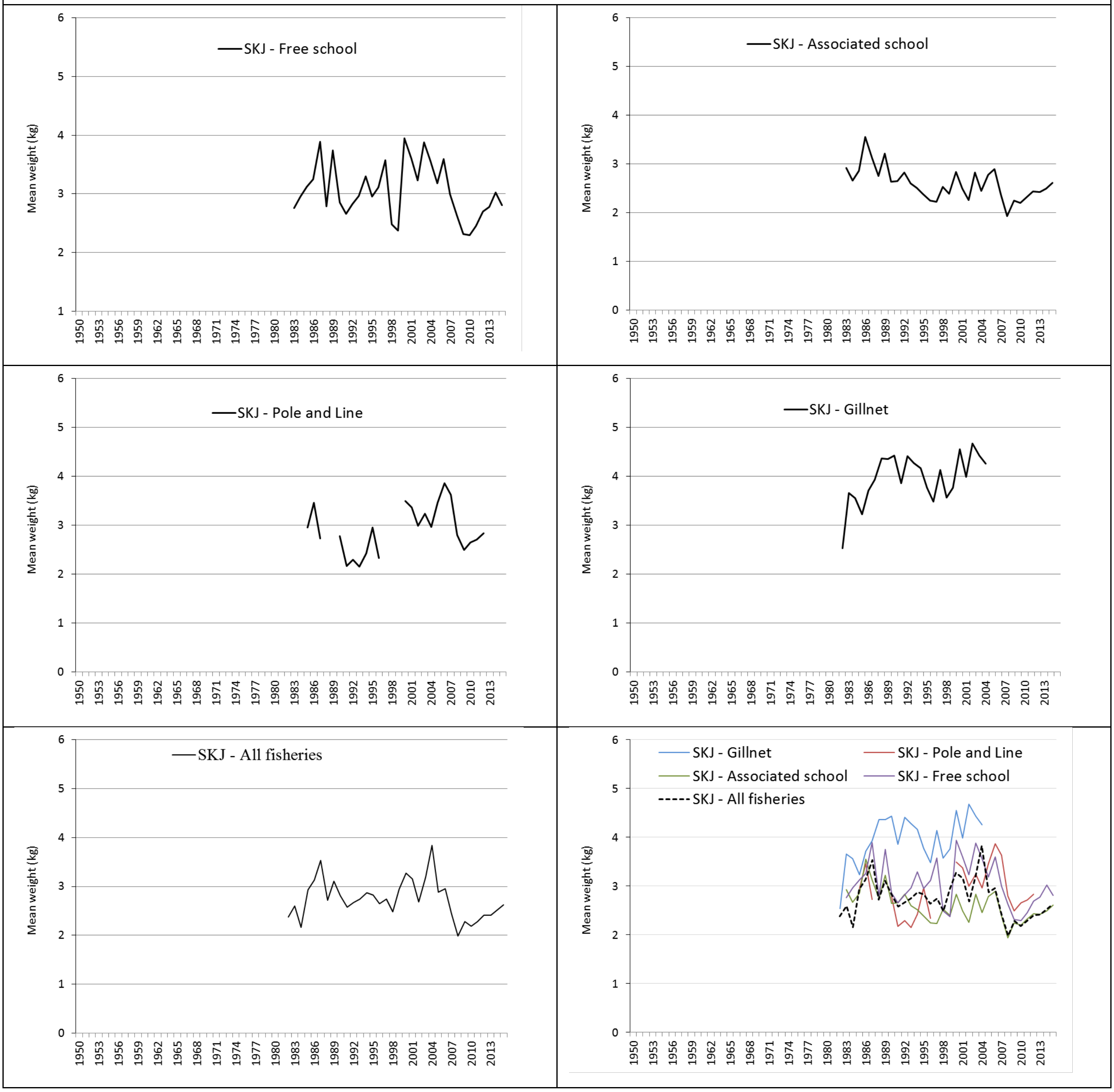
* E.g., Size data not fully available by species, gear, gear, month, or recommended size interval.

Key to colour coding

- Total score is 0 (or average score is 0-1)
- Total score is 2 (or average score is 1-3)
- Total score is 4 (or average score is 3-5)
- Total score is 6 (or average score is 5-7)
- Total score is 8 (or average score is 7-8)

Fig.6. Average weight of skipjack tuna (SKJ) taken by:

- Purse seine on free (top left) and associated (top right) schools,
- Pole-and-line from Maldives and India (second row left), and gillnets from Sri Lanka, Iran, and other countries (second row right)
- All fisheries (bottom row left), and all fisheries and main gears (bottom row left)



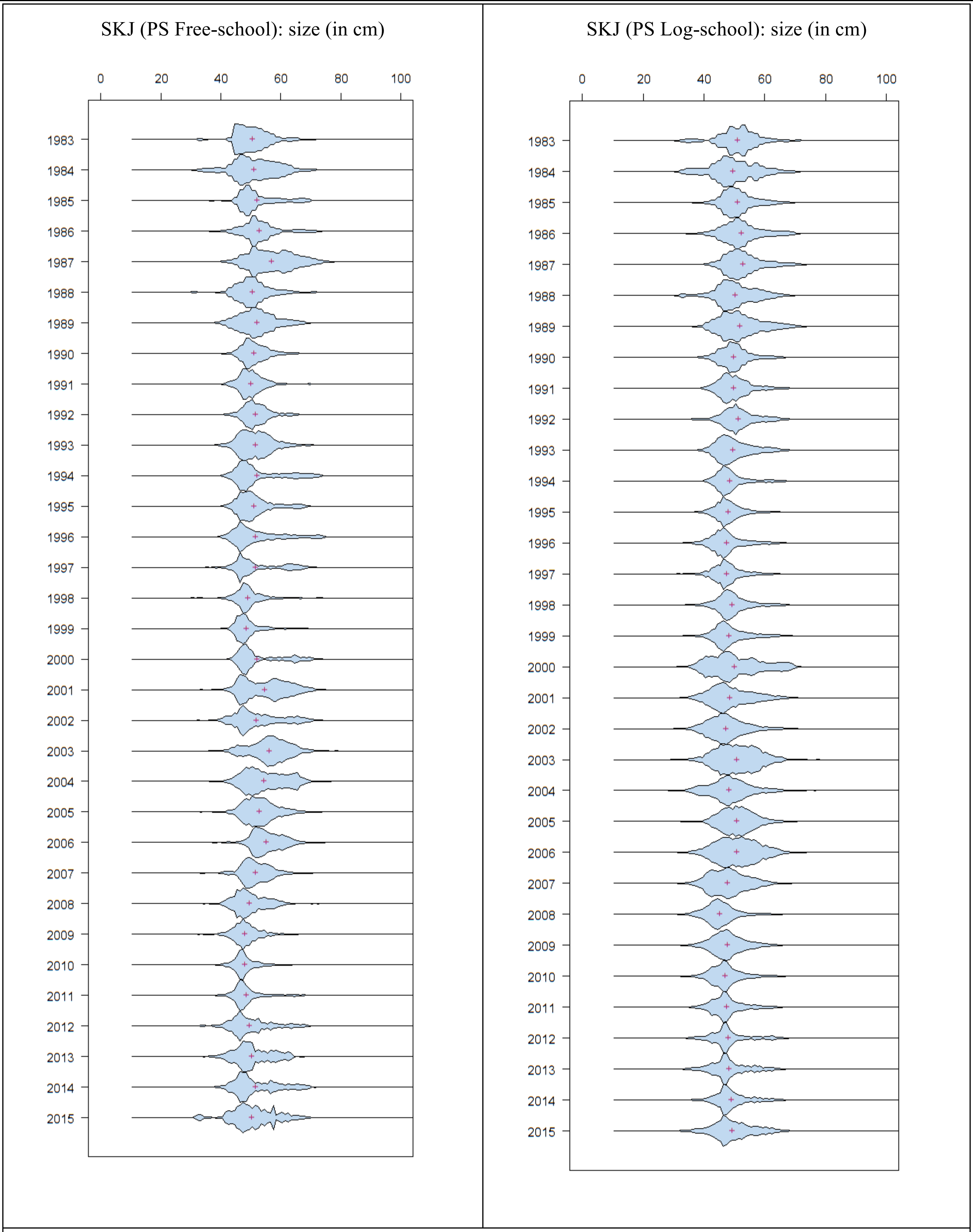


Fig.7. Skipjack tuna (purse seine): **Left:** length frequency distributions for BET PS Free school fisheries (by 2 cm length class). **Right**: Length frequency distributions for BET PS Associated (log) school fisheries (by 2 cm length class). Source: IOTC database.

Skipjack tuna: Tagging data

- A total of 101,212 skipjack (representing 50.2% of the total number of fish tagged) were tagged during the Indian Ocean Tuna Tagging Programme (IOTTP). Most of them, 77.4%, were released during the main Regional Tuna Tagging Project-Indian Ocean (RTTP-IO) and were released around Seychelles, in the Mozambique Channel and off the coast of Tanzania, between May 2005 and September 2007 (**Fig.8**). The remaining specimens were tagged during small-scale tagging projects, and by other institutions with the support of IOTC, around the Maldives, India, and in the south west and the eastern Indian Ocean.
- To date, 17,667 specimens (17.5% of releases for this species), have been recovered and reported to the IOTC Secretariat. Around 69.6% of the recoveries were from the purse seine fleets operating from the Seychelles, and around 28.8% by the pole-and-line vessels mainly operating from the Maldives. The addition of the data from the past projects in the Maldives (in 1990s) added 14,506 tagged skipjack tuna to the databases, or which 1,960 were recovered mainly in the Maldives.

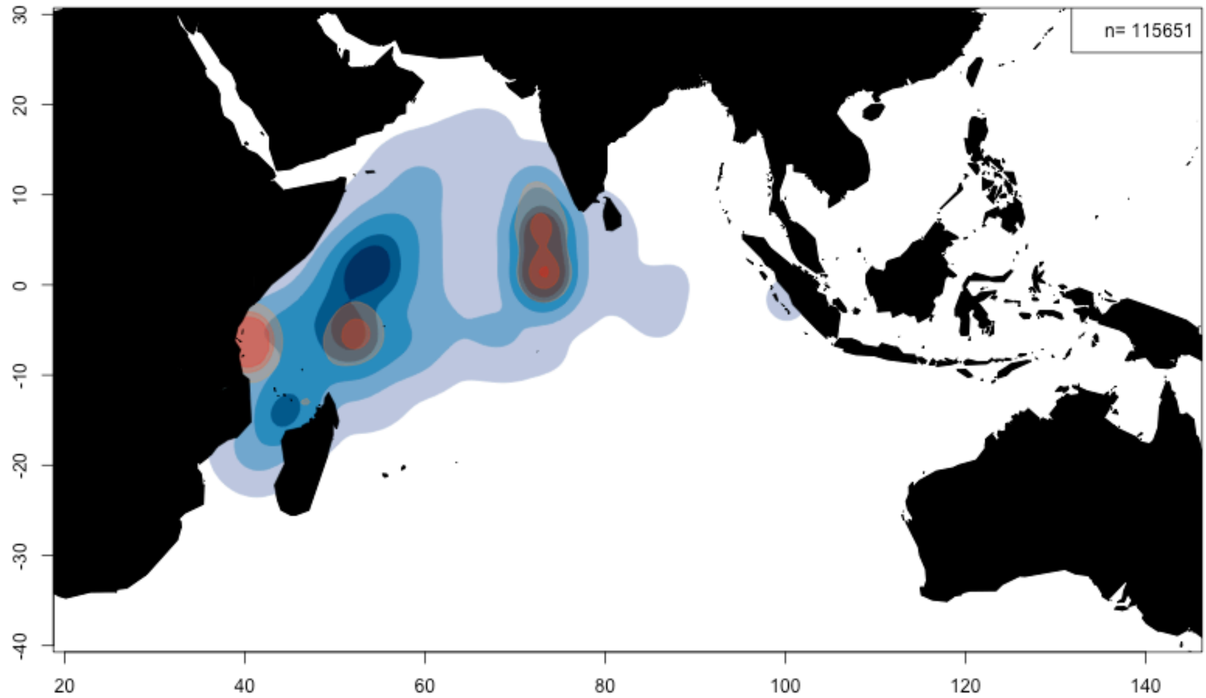


Fig.8. Skipjack tuna: Densities of releases (in red) and recoveries (in blue). Includes specimens tagged during the IOTTP and also Indian Ocean (Maldivian) tagging programmes during the 1990s.

Skipjack tuna – Effort trends

Total effort from longline vessels flagged to Japan, Taiwan,China and EU,Spain by five degree square grid in 2014 and 2015 are provided in **Fig.9**, and total effort from purse seine vessels flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2013 and 2014 are provided in **Fig. 10**.

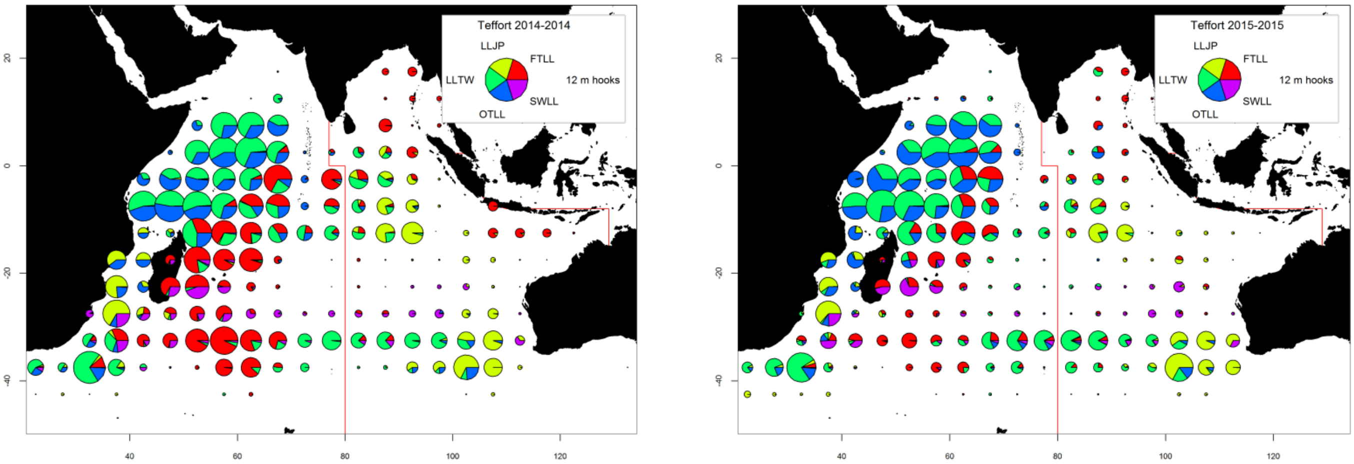


Fig.9. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2014 (left) and 2015 (right) (Data as of October 2016). Definition of fisheries:

- **LLJP** (light green): deep-freezing longliners from Japan
- **LLTW** (dark green): deep-freezing longliners from Taiwan,China
- **SWLL** (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)
- **FTLL** (red) : fresh-tuna longliners (China, Taiwan,China and other fleets)
- **OTLL** (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, South Korea and various other fleets)

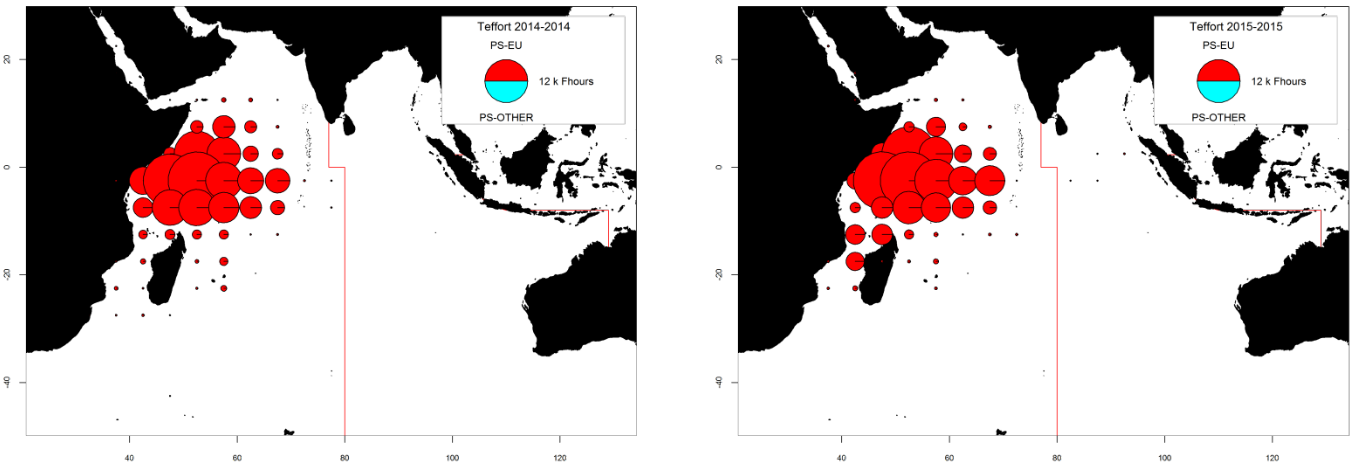


Fig.10. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2014 (left) and 2015 (right) (data as of October 2016). Definition of fisheries:

- **PS-EU** (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags)
- **PS-OTHER** (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand, and days-at-sea recorded for Australia)

Skipjack tuna: Standardised catch–per–unit–effort (CPUE) trends

The CPUE series presented at the WPTT16 meeting in 2014 are detailed below:

1. ***EU,France purse seine CPUE*** from paper IOTC–2014–WPTT16–41 (**Fig.11**) which examined skipjack tuna CPUE trends using alternative indices from the EU,France purse seine logbooks.

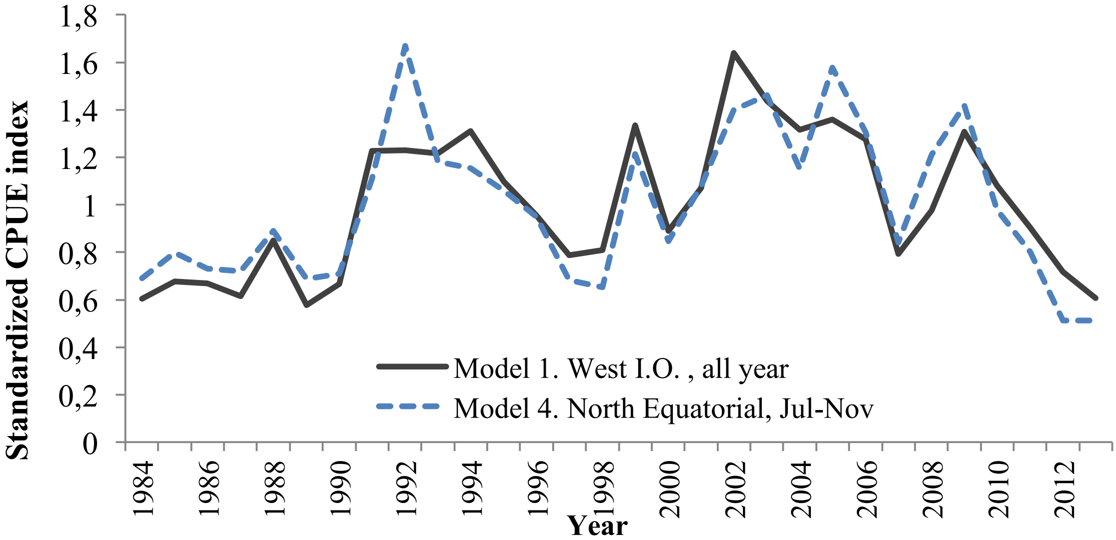


Fig.11. Skipjack tuna: EU,France purse seine standardised CPUE series for skipjack tuna from 1984–13.

2. ***Maldives pole and line CPUE standardisation*** from paper IOTC–2014–WPTT16–42 (**Fig.12**) which provided a standardised CPUE series for the Maldives skipjack pole and line fishery from 2004 to 2012, including the reconstruction of historic CPUE until 1985. The CPUE indices for the Maldives are likely to provide a representative index of abundance only for the Maldives area.

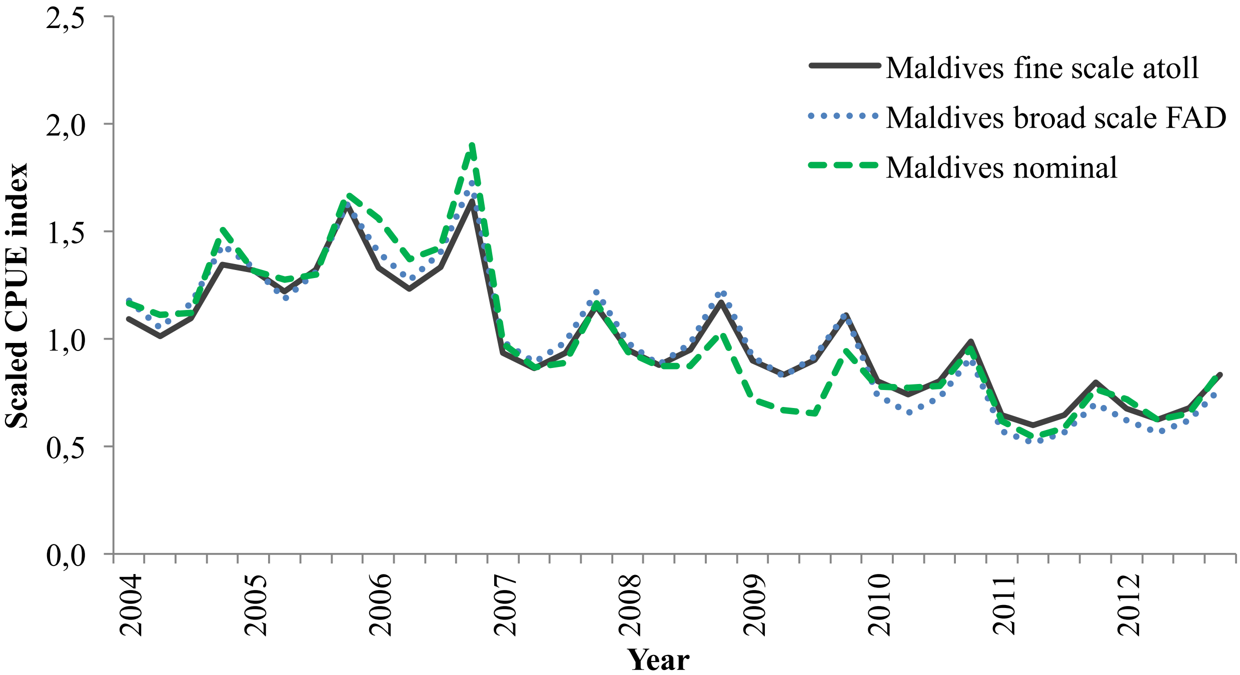


Fig.12. Skipjack tuna: Maldives pole-and-line nominal and standardised CPUE series for skipjack tuna from 2004–13.

3. ***European Union and Associated purse seine CPUE*** from paper IOTC–2014–WPTT16–INF05 (**Fig. 13**) which examined skipjack tuna CPUE trends using alternative indices from the European Union and Associated purse seine logbooks.

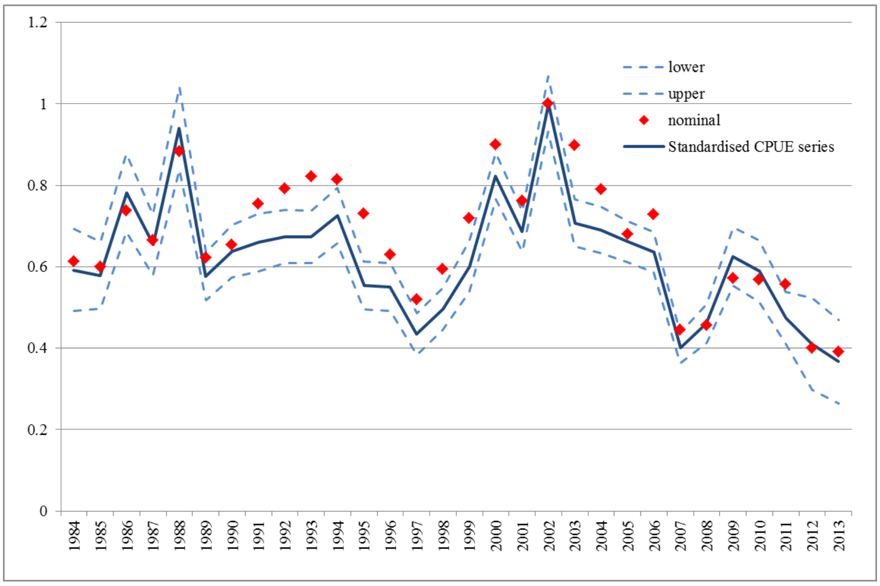


Fig.13. Skipjack tuna: European Union and Associated purse seine nominal and standardised CPUE series for skipjack tuna from 1984–13.

Stock Assessment

A last stock assessment for skipjack tuna was carried out during WPTT16 in 2014. The following was noted with respect to the SS3 modelling approach presented at the WPTT16 meeting:

- The runs with a high weighting of the tags showed bad fit to tagging data resulting in too many pessimistic results. Thus, an alternative grid that used the M (0.7, 0.8 and 0.9), and h(0.7,0.8 and 0.9), lower weighting of tags along with length composition and CPUE series was proposed and presented.
- The model had issues with estimating MSY related to reference points. C/C_{MSY} was used as in previous assessments (although it should be noted there are concerns with the estimation of this value as well), for the Kobe trajectories.

Some fishery indicators may indicate a lower MSY reference points than SS3, as follows:

- A decline of catches of large skipjack tuna in the last 10 years resulting in a decline of average weight observed for pole-and-line and purse seine fisheries;
- A decline of FAD catch per set by purse seine, during a period of major increase in FAD seeding;
- A decline in the purse seine CPUE of free swimming schools skipjack tuna in most areas;
- A lesser proportion of skipjack tuna relative to other species in the FAD sets;
- There were still issues on the spatial complexity and the use of tags that needed to be further understood. The present model based on a single area does not take into account the complex movement patterns that have been observed from the tagged skipjack tuna recoveries. A new model structure based on MFCL/SS3 could be investigated in future years;
- Mixing rates need to be evaluated under a new model structure with more areas to avoid discounting the first three quarters, as this leads to eliminating more than 70% of the recoveries;
- There were concrens raised about the pole-and-line and purse seine indices of abundance used in the assessment;
- Thus, a stock trajectory based on B_t/B_0 (with a reference at 40% as a proxy MSY as is used for other fisheries) along with a plot of the increasing fishing mortality, F as shown in **Fig.14**, was agreed to be used.

Further analysis should be conducted or better indices of abundance should be developed.

- The grid based approach accounted for uncertainty in natural mortality, h, CPUE and growth, but for the future assessments models that estimate M within the model structure, and uses a wider range of precision in the variability of growth than the current estimate does (CV=0.2).

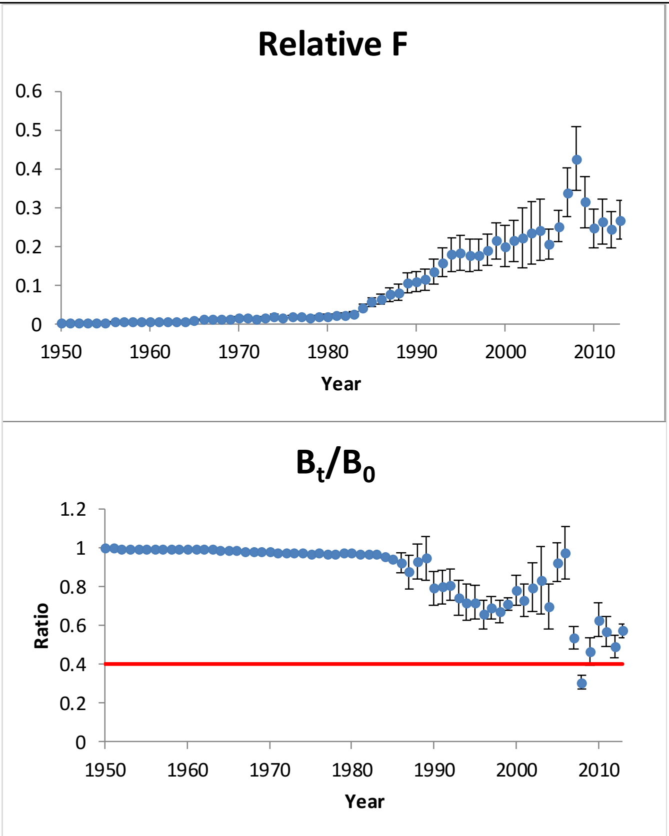


Fig.14. Skipjack tuna: Top: relative fishing mortality over time. Bottom: B_{MSY}/B_0. Note, these figures were suggested as alternative figures for evaluation as F_{MSY} is not estimated well, reference point $0.4B_0$ was suggested as a target and $0.2B_0$ as a limit for skipjack tuna by the WPTT.

The advice on the status of skipjack tuna in 2014 (**Table 4**) was derived from the grid agreed using an integrated statistical assessment method. 81 model formulations were investigated to ensure that various plausible sources of uncertainty were incorporated and represented in the final result. In general, the data did not seem to be sufficiently informative to justify the selection of any individual model, and the results are shown as a grid and the median value of the grid. The grid based approach covered the uncertainty in the assessment which is large.

Table 4. Skipjack tuna: Key management quantities from the SS3 assessment, for the Indian Ocean.**

Management Quantity	Indian Ocean
2013 catch estimate	424,580
Mean catch from 2009–2013	401,100
MSY (1,000 t) (80% CI)	684 (550–849)
Data period used in assessment	1950–2013
F_{MSY} (80% CI)*	0.65 (0.51–0.79)
SB_{MSY} (1,000 t) (80% CI)	875 (708.5–1,075)
F_{2013}/F_{MSY} (80% CI)*	0.42 (0.25–0.62)
C_{2013}/C_{MSY} (80% CI)*	0.62 (0.49–0.75)
B_{2013}/B_{MSY} (80% CI)	n.a.
SB_{2013}/SB_{MSY} (80% CI)	1.59 (1.13–2.14)
B_{2013}/B_{1950} (80% CI)	n.a.
SB_{2013}/SB_{1950} (80% CI)	0.58 (0.53–0.62)
$B_{2013}/B_{1950, F=0}$ (80% CI)	n.a.
$SB_{2013}/SB_{1950, F=0}$ (80% CI)	n.a.

* Not estimable accurately in SS-III as ascending limb missing from equilibrium yield curve. Instead the target proxy would be C_{2013}/C_{MSY} (80% CI) is 0.62 (0.49-0.75).
** Management quantities based on the catches as reported for WPTT16 in 2014.

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