DATA REVISIONS TO NOMINAL CATCH FOR IOTC SPECIES

PREPARED BY: IOTC SECRETARIAT[1], 14 NOVEMBER 2013

PURPOSE

To provide the Scientific Committee of the IOTC with an overview of changes to the nominal catch series of IOTC species and sharks (as of October 2013), as derived from new data reports (in accordance with IOTC Resolution 10/02) or major data revisions conducted by the IOTC Secretariat during the last year; and seek endorsement by the IOTC Scientific Committee of the best scientific estimates of catch derived for each species and used in the assessments of IOTC species during 2013.

BACKGROUND

Prior to each IOTC Working Party (WP) meeting the IOTC Secretariat prepares a number of tables, figures and datasets that highlight historical and emerging trends in the fisheries data held by the IOTC Secretariat. This information is used during WP to inform discussions around stock status and in developing advice to the Scientific Committee.

This document summarizes changes to the nominal catch series since the 2012 Scientific Committee, reflecting the latest information made available from IOTC Members and Cooperating non-Contracting Parties (CPCs), in addition to revisions to the catch series implemented by the Data Section of the IOTC Secretariat.

The report covers the following areas:

- Overview of changes to the catch series by IOTC species.
- Appendix 1: Revisions to the catch estimates for non-reporting fleets.
- Appendix 2: Summary of country-specific data reviews by the IOTC Secretariat during the last year.

For questions regarding the content of the report, contact:

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Bibliographic entry: J. Geehan; Pierre, L.; Herrera, M. (IOTC Secretariat), 2013. Data revisions to nominal catch for IOTC species. Busan, Republic of Korea, 29-30 November 2013. *IOTC–2013–WPDCS09–14.*

TROPICAL TUNA SPECIES – DATA REVISIONS: OVERVIEW

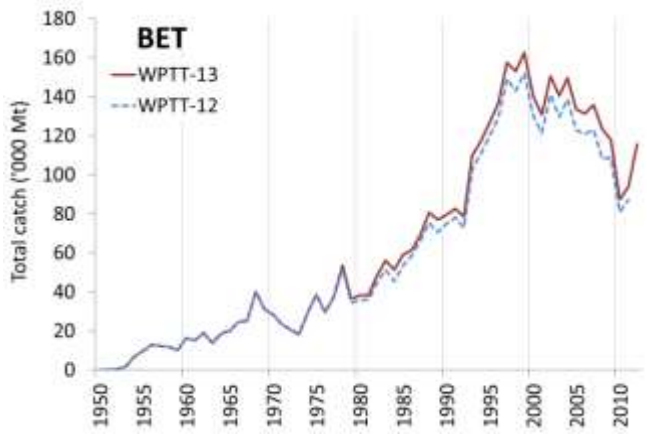


Fig. 1a. Bigeye: catches used by the WPTT in 2012 versus those estimated for the WPTT in 2013 (1950–2012).

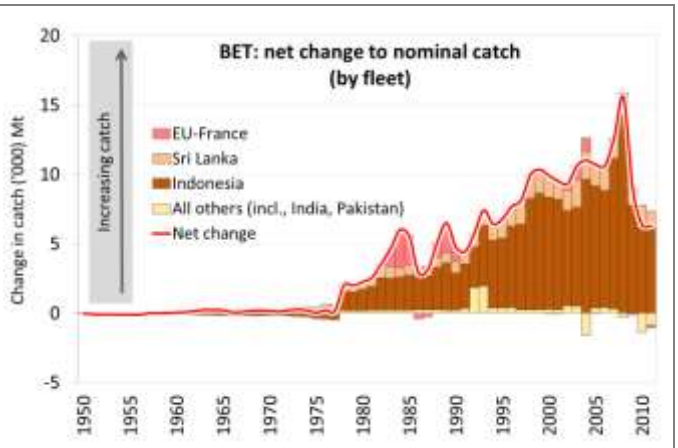


Fig. 1b. Bigeye: net change in total catch, by year and fleet.

Bigeye (Thunnus obesus):

- The catch series of bigeye tuna has changed since WPTT14-2012 following reviews of the catches of Indonesia, Sri Lanka, and, to a lesser extent, other fisheries (EU-France, India, Pakistan) (**Figs. 1a & 1b**).
- Overall, the estimates of catch for bigeye tuna are higher in 2013 than those used for the WPTT-2012, with marked increases to the catches since the early 1990s.

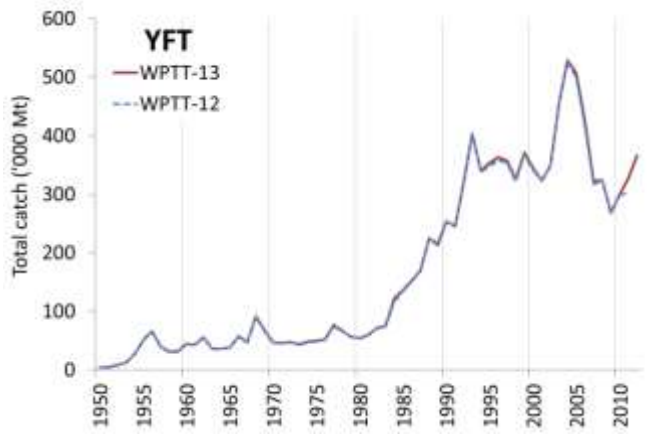


Fig. 2a. Yellowfin: catches used by the WPTT in 2012 versus those estimated for the WPTT in 2013 (1950–2012).

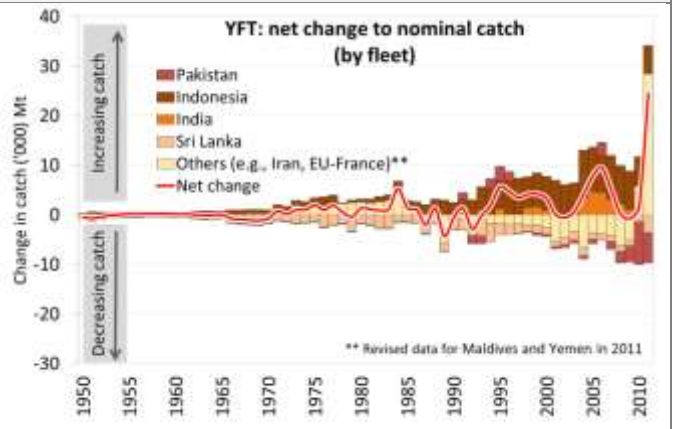


Fig. 2b. Yellowfin: net change in total catch, by year and fleet.

Yellowfin (Thunnus albacares):

- There have been no significant changes to the total catches of yellowfin since WPTT14-2012 (**Fig. 2a**).
- However, the IOTC Secretariat used new information compiled during 2012 and 2013 to rebuild the catch series for the coastal fisheries operated in some countries, in particular Pakistan, Indonesia, Sri Lanka, and India (**Fig. 2b**).
- In general, the new catches of yellowfin tuna estimated by the IOTC Secretariat are slightly higher than those used in the past by the WPTT.

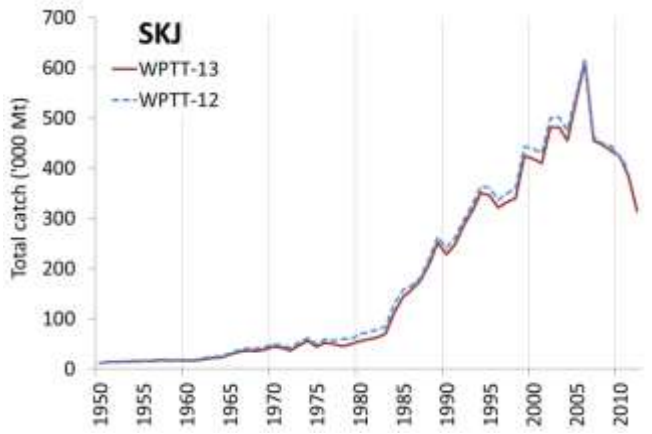


Fig. 3a. Skipjack: catches used by the WPTT in 2012 versus those estimated for the WPTT in 2013 (1950–2012).

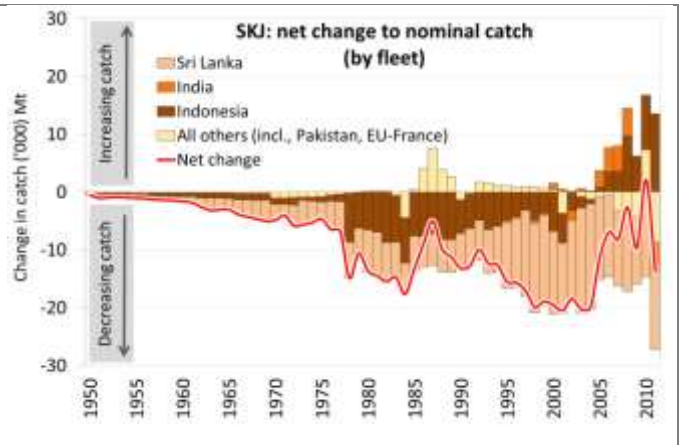


Fig. 3b Skipjack: net change in total catch, by year and fleet.

Skipjack tuna (Katsuwonus pelamis):

- There have been no major changes to the overall catches of skipjack tuna since the WPTT14-2012 (**Fig. 3a**).
- However, the IOTC Secretariat used new information compiled during 2012 and 2013 to rebuild the catch series for the coastal fisheries operated in some countries, in particular Indonesia and India (**Fig. 3b**).
- The new catches of skipjack tuna estimated by the IOTC Secretariat are lower than those used in the past by the WPTT.

TEMPERATE TUNA SPECIES – DATA REVISIONS: OVERVIEW

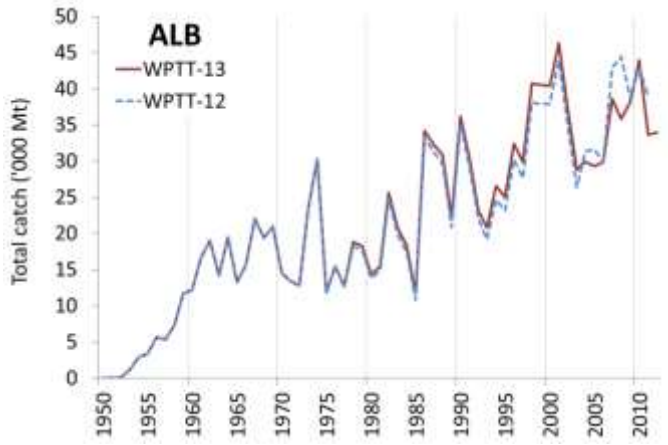


Fig. 4a. Albacore: catches used by the WPNT in 2012 versus those estimated for the WPNT in 2013 (1950–2012).

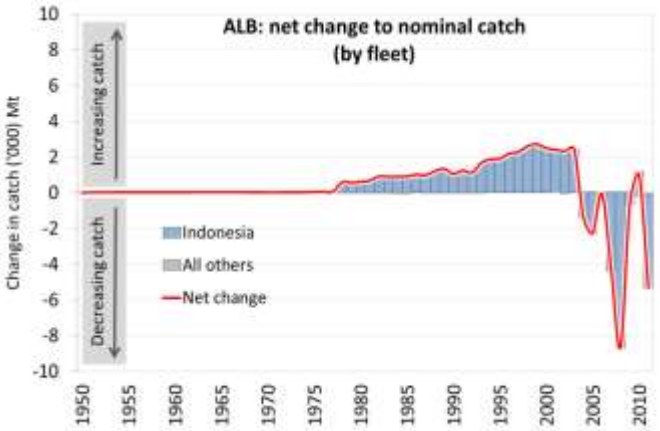


Fig. 4b. Albacore: net change in total catch, by year and fleet.

Albacore tuna (Thunnus alalunga):

- The catch series for albacore has changed since the WPTmT in 2012, following a review of the catch series of albacore for the fisheries of Indonesia.
- The major changes include revisions to the catch series for 2007 and 2008, with revised catches of between 30%-50% lower than those previously recorded by Indonesia (equivalent to a decrease in catch of ≈ 4,500 in 2007 and 8,500 in 2008)

NERITIC SPECIES –DATA REVISIONS: OVERVIEW

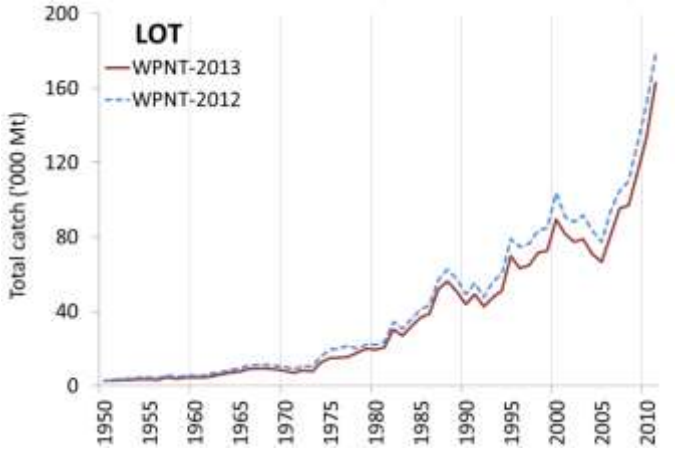


Fig. 5a. Longtail: catches used by the WPNT in 2012 versus those estimated for the WPNT in 2013 (1950–2012).

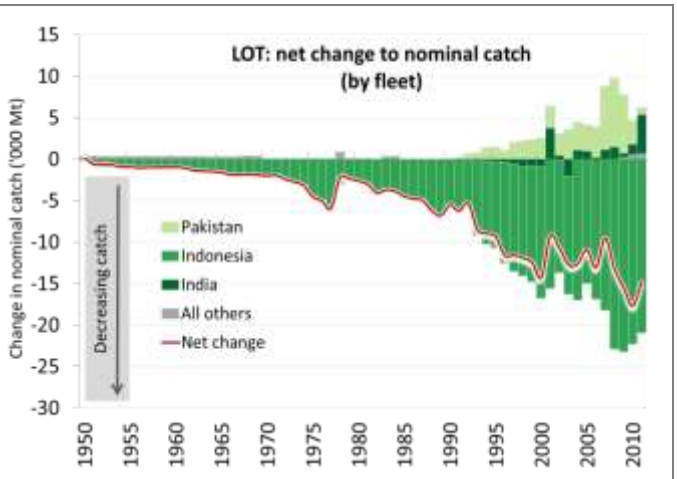


Fig. 5b. Longtail: net change in total catch, by year and fleet.

Longtail tuna (Thunnus tonggol):

- There have been significant changes to the catches of longtail tuna since the WPNT03-2012 (**Fig. 5a**), following major reviews of catch time series for Indonesia, India, and Sri Lanka by the IOTC Secretariat in 2012 (**Fig. 5b**).

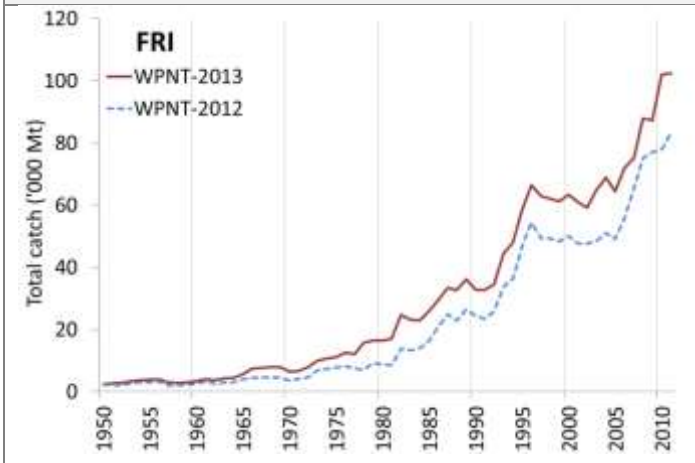


Fig. 6a. Frigate: catches used by the WPNT in 2012 versus those estimated for the WPNT in 2013 (1950–2012).

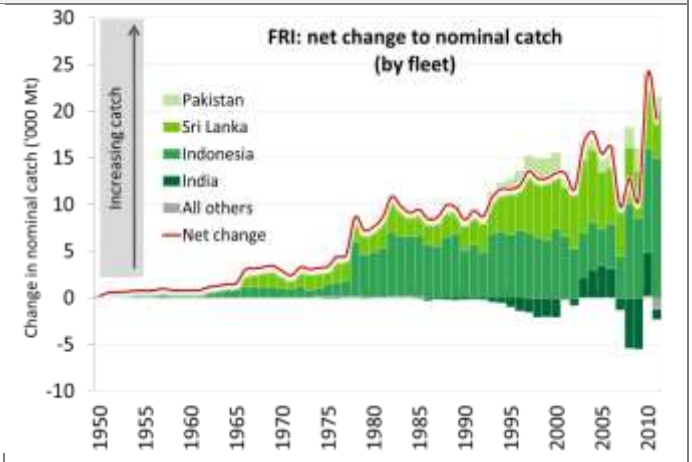


Fig. 6b. Frigate: net change in total catch, by year and fleet.

Frigate tuna (Auxis spp.):

- The catch series of frigate tuna has changed substantially since the WPNT03-2012 (**Fig. 6a**), following major reviews of catch time series for Indonesia, India, and Sri Lanka by the Secretariat in 2012 (**Fig. 6b**).

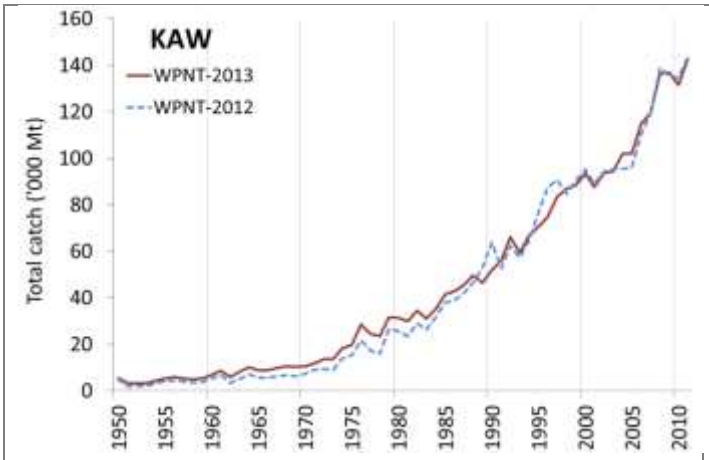


Fig. 7a. Kawakawa: catches used by the WPNT in 2012 versus those estimated for the WPNT in 2013 (1950–2012).

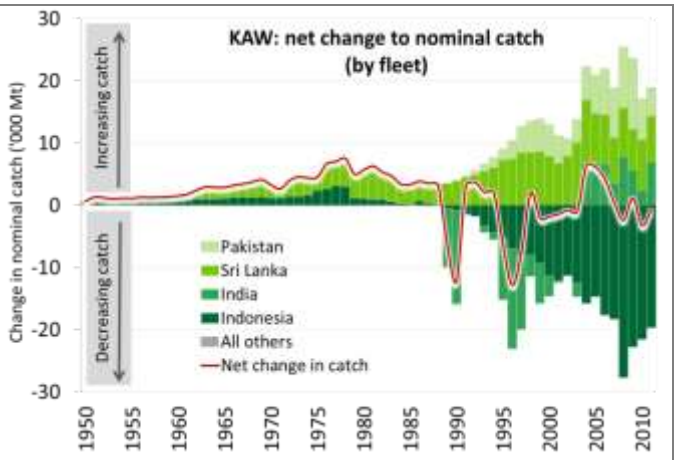


Fig. 7b Kawakawa: net change in total catch, by year and fleet.

Kawakawa tuna (Euthynnus affinis):

- Overall, the catch series of kawakawa has not changed substantially since the WPNT03-2012, and total catches of kawakawa remain at similar levels when compared to previous estimates (**Fig. 7a**).
- However, there have been large revisions to the catch estimates for individual countries and breakdown by gear; specifically a decrease to catches estimated for Indonesia, and increases to the catch series for Sri Lanka, Pakistan, and India following reviews of the data by the IOTC Secretariat in 2012 (**Fig. 7b**).

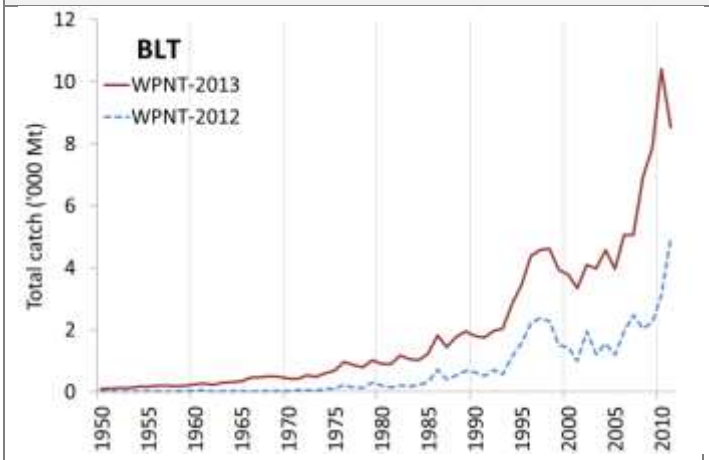


Fig. 8a. Bullet tuna: catches used by the WPNT in 2012 versus those estimated for the WPNT in 2013 (1950–2012).

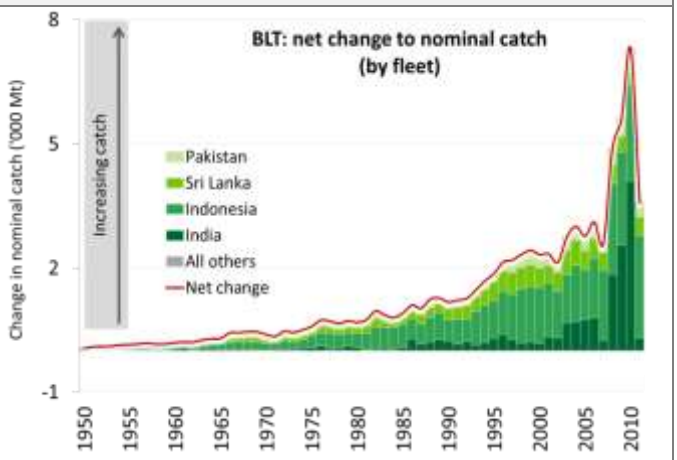


Fig. 8b Bullet tuna: net change in total catch, by year and fleet.

Bullet tuna (Auxis rochei):

- The catch series of bullet tuna has changed substantially since the WPNT03-2012 (**Fig. 8a**), with catches more than doubling over the entire time series, following major reviews of catch time series for Indonesia, India, and Sri Lanka by the IOTC Secretariat in 2012 (**Fig. 8b**).

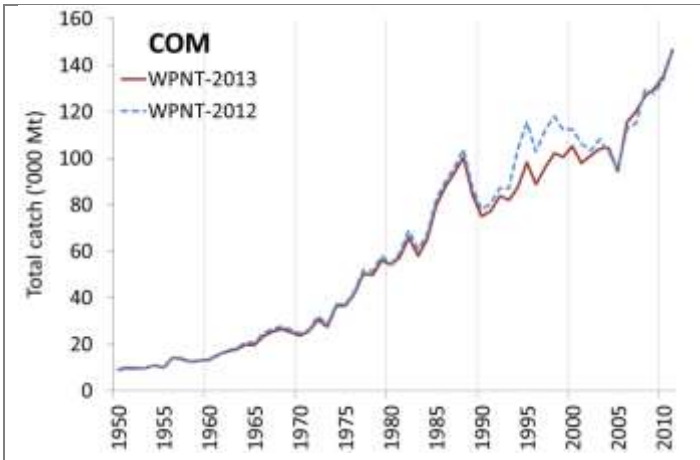


Fig. 9a. Narrow-barred Spanish mackerel: catches used by WPNT 2012 versus those estimated for WPNT in 2013 (1950–2012).

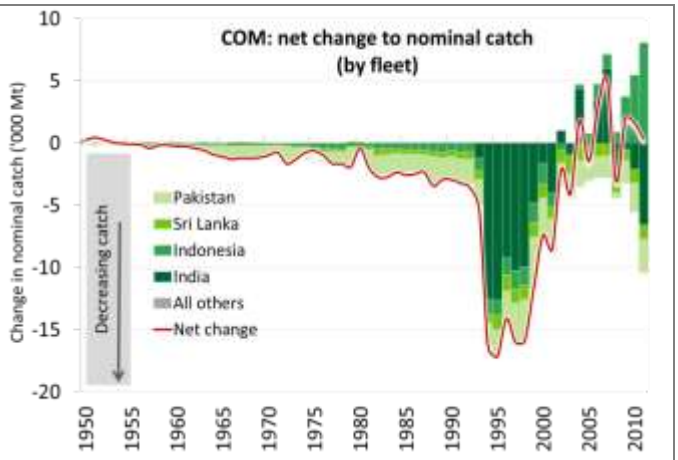


Fig. 9b Narrow-barred Spanish mackerel: net change in total catch, by year and fleet.

Narrow-barred Spanish mackerel (Scomberomorus commerson):

- The catch series of narrow-barred Spanish mackerel has not changed substantially since the WPNT03-2012, with the exception of catches estimated around the mid-late 1990s (**Fig. 9a**).
- The revised catch series for WPNT03-2013 show lower catches between the mid-1990's and early 2000's, following a review of the catch series in India by the IOTC Secretariat in 2012 (**Fig. 9b**).

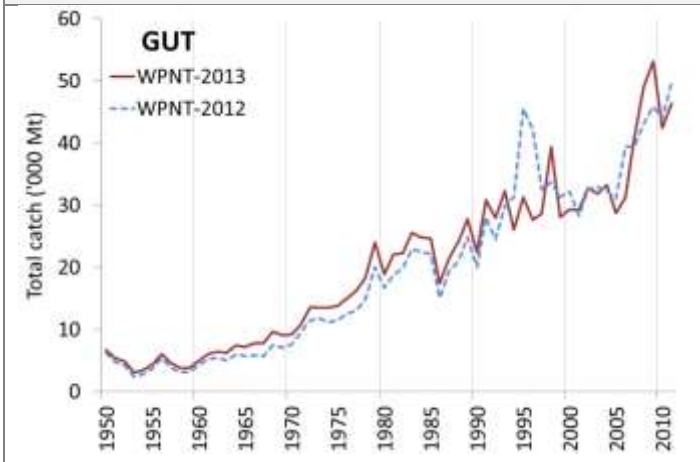


Fig. 10a. Indo-Pacific king mackerel: catches used by the WPNT in 2012 versus those estimated for the WPNT in 2013 (1950–2012).

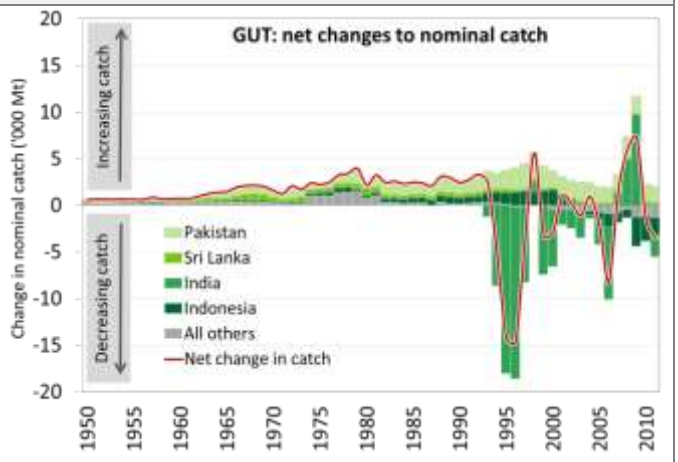


Fig. 10b Indo-Pacific king mackerel: net change in total catch, by year and fleet.

Indo-Pacific king mackerel (Scomberomorus guttatus):

- There have been relatively minor changes to the catches of Indo-Pacific king mackerel since WPNT03-2012, following reviews of the artisanal catch series of Indonesia, India and Sri Lanka in 2012 (**Fig. 10a**).
- The largest revisions affect catches estimated for the mid-1990s and mid-2000s, with catches revised downwards by around 10%-20% (**Fig. 10b**).

BILLFISH SPECIES – DATA REVISIONS: OVERVIEW

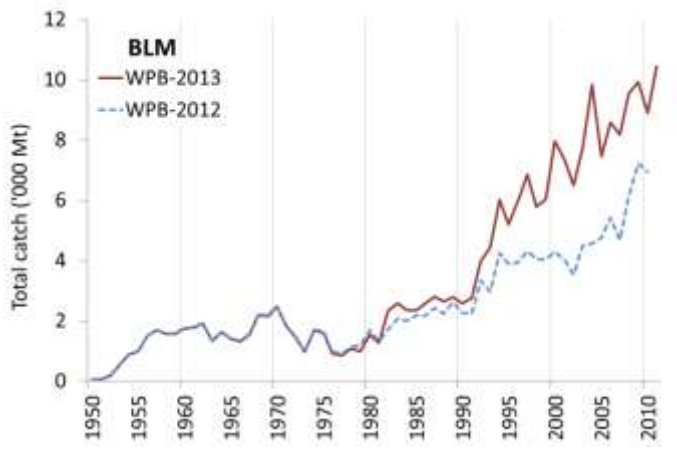


Fig. 11a. Black marlin: catches used by the WPB in 2012 versus those estimated for the WPB in 2013 (1950–2012).

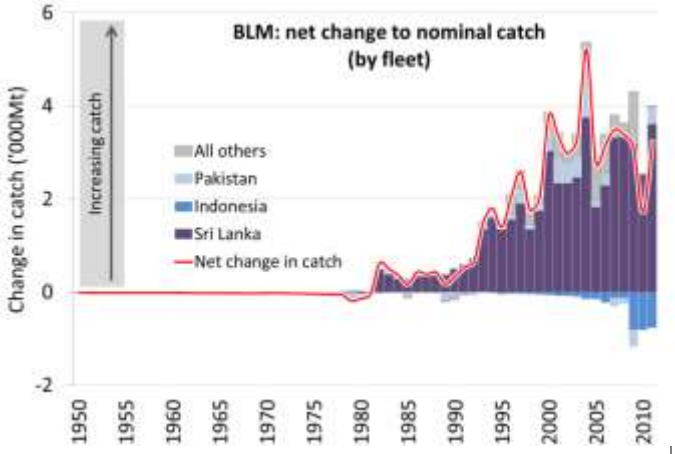


Fig. 11b. Black marlin: net change in total catch, by year and fleet.

Black marlin (Makaira indica):

- There have been relatively large changes to catches of black marlin since the WPB10-2012 (**Fig. 11a**), with catch estimates revised upwards by over 80% for a number of years since the mid-1990s.
- The changes are mostly the result of revisions to the catches estimates for Sri Lanka (**Fig. 11b**). Catches of marlins in Sri Lanka have frequently been misidentified, making catches in previous years highly uncertain and subject to sharp fluctuations between years.
- Estimates of black marlins in Sri Lanka have subsequently been revised upwards by IOTC – from around 1,000 t to over 4,000 t in the last decade – in response to inconsistencies identified in the reported data; with most of the increase the result of reallocation of catch previously reported as blue marlin.

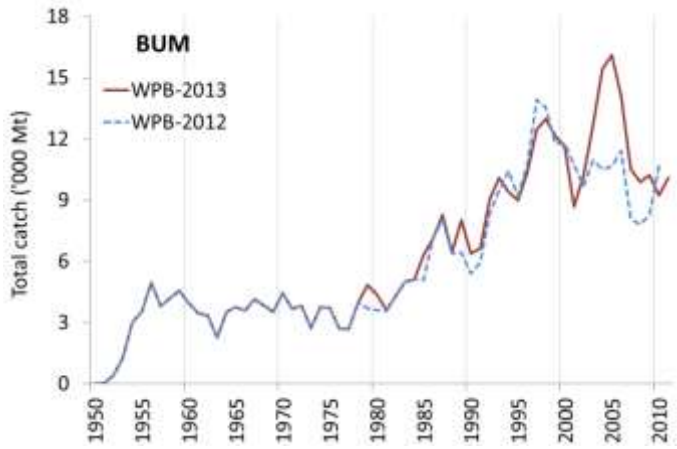


Fig. 12a. Blue marlin: catches used by the WPB in 2012 versus those estimated for the WPB in 2013 (1950–2012).

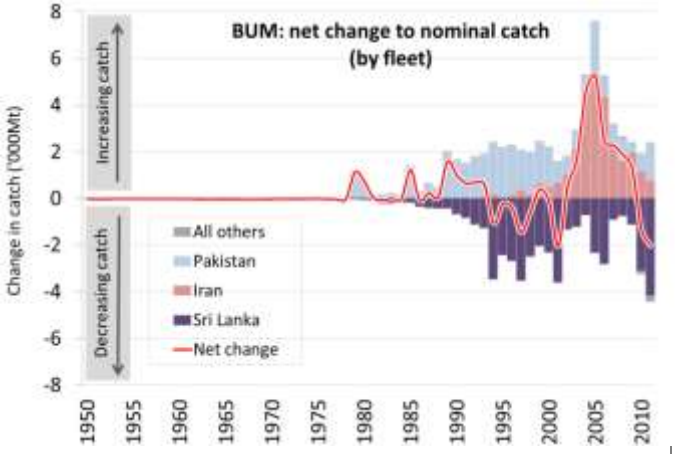


Fig. 12b. Blue marlin: net change in total catch, by year and fleet.

Blue marlin (Makaira nigricans):

- There have been relatively large changes to the catches of blue marlin since the WPB10-2012, mainly for years around the mid-2000s (**Fig. 12a**).
- Catches for Iran and Pakistan have been revised upwards following improvements by IOTC in the disaggregation by species of catches reported as (aggregated) billfish catches; while some of the catches for Sri Lanka reported as blue marlin have been reassigned as black marlin in response to large fluctuations in the reported catch estimates due to misidentification of the two species (**Fig. 12b**).

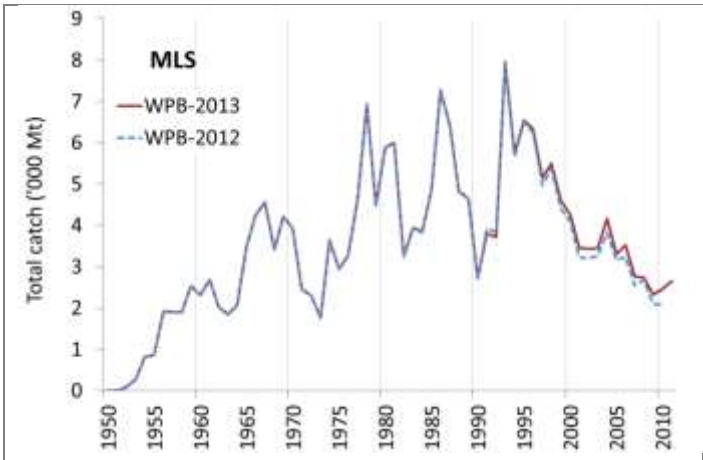


Fig. 13a. Striped marlin: catches used by the WPB in 2012 versus those estimated for the WPB in 2013 (1950–2012).

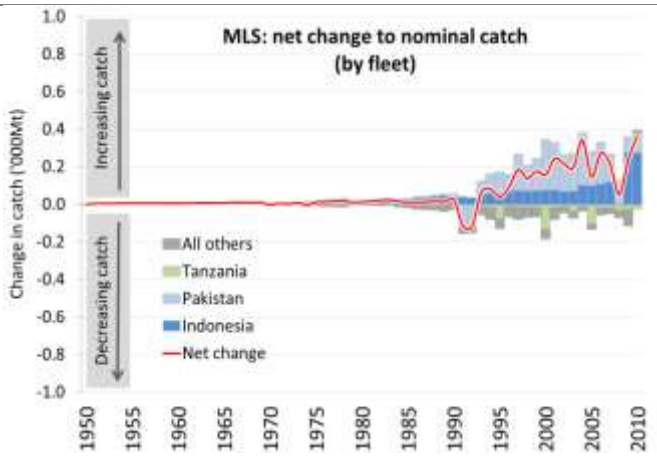


Fig. 13b Striped marlin: net change in total catch, by year and fleet.

Striped marlin (Tetrapturus audax):

- There have been relatively minor revisions to catches of striped marlin since the WPB10-2012 (**Fig. 13a**).
- The catch series remains largely unchanged following reviews of the data series for Iran, Pakistan, Indonesia, Sri Lanka and Indonesia which have been used to adjust the catches of other billfish species (**Fig. 13b**).

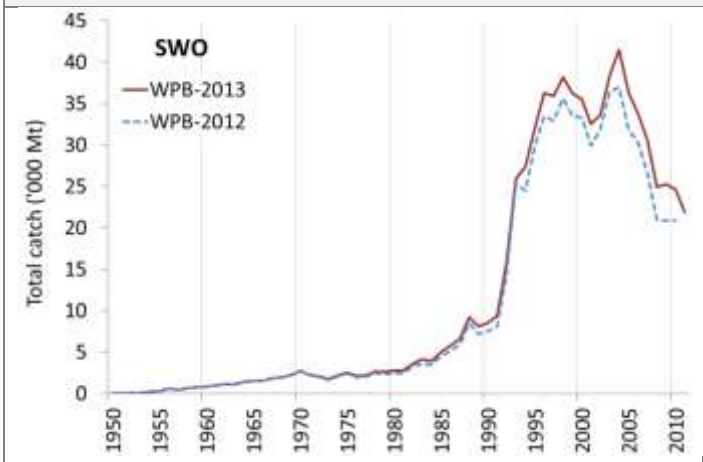


Fig. 14a. Swordfish: catches used by the WPB in 2012 versus those estimated for the WPB in 2013 (1950–2012).

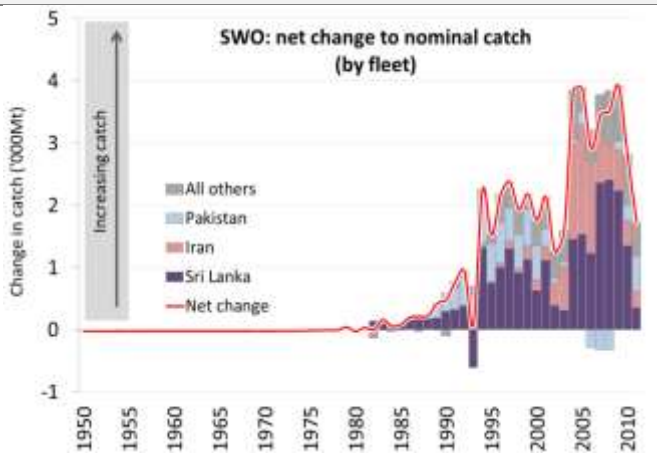


Fig. 14b Swordfish: net change in total catch, by year and fleet.

Swordfish (Xiphias gladius):

- There have been relatively minor changes to the catches of swordfish since the WP10-2012 (**Fig. 14a**).
- Most changes made to the data series since the last WPB meeting are relatively small increases to the nominal catch as a result of improvements in the estimation of catch-by-species by IOTC; specifically, the disaggregation of billfish catches (reported as sailfish) by Iran, as well as a review of Sri Lanka's catch series by the IOTC Secretariat in 2012 (**Fig. 14b**).

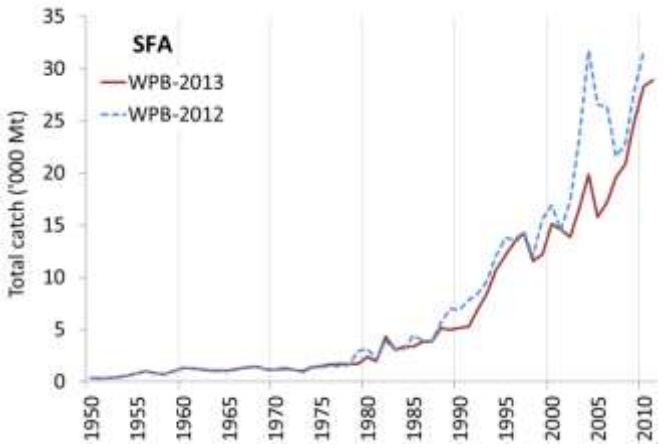


Fig. 15a. Indo-Pacific Sailfish: catches used by WPB 2012 versus those estimated for WPB in 2013 (1950–2012).

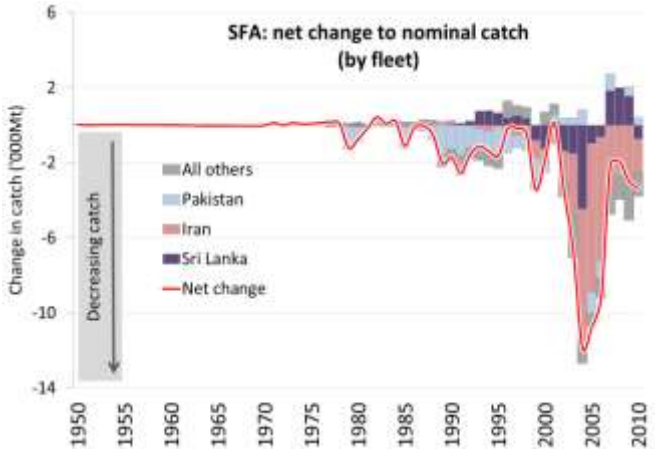


Fig. 15b. Indo-Pacific Sailfish: net change in total catch, by year and fleet.

Indo-Pacific Sailfish (Istiophorus platypterus):

- Catches of sailfish since the WPB10-2012 have been revised, in particular around the mid-2000s (Fig. 15a).
- The changes mostly affect catch estimates for Iran (Fig. 15b), which have been reduced following improvements in the estimation of catch-by-species; specifically, reported catches of sailfish that more likely refer to a combination of billfish species.

APPENDIX I

ESTIMATION OF CATCHES OF NON-REPORTING FLEETS

The estimates of catches of non-reporting fleets were updated in 2013:

The high number of non-reporting fleets operating in the Indian Ocean between the mid-1980's and the late 1990's led to large increases in the amount of catch that had to be estimated for that period. This reduced confidence in the catch estimates for yellowfin tuna and bigeye tuna, and to a lesser extent, skipjack tuna during those years. In recent years the number of fleets from non-IOTC Parties has decreased significantly. However, the decrease in the numbers of industrial vessels fishing in the Indian Ocean from non-IOTC parties has coincided with an increase in the numbers of vessels fishing under flags of some IOTC parties, including coastal countries in the IOTC region (India, Indonesia, Iran, Kenya, Malaysia, Oman, Seychelles, Tanzania and Thailand) and deep-water fishing nations (Belize, Guinea and Senegal), the quality of the statistics collected by these countries varying depending on the case.

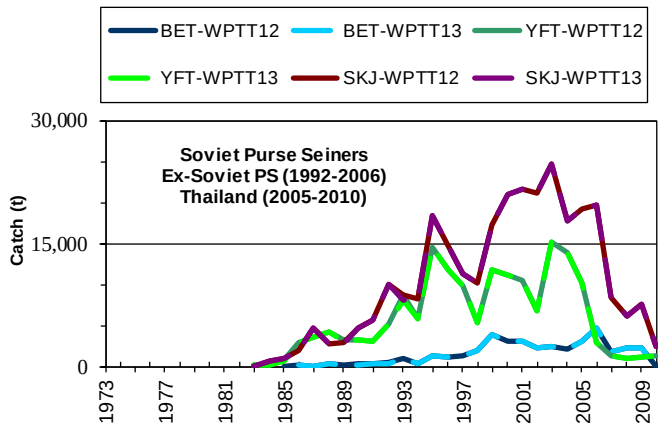


Fig. 16. Catches of Soviet, ex-Soviet and Thai purse seiners estimated in 2012 versus previous catches estimated in 2011 (1983–2010)

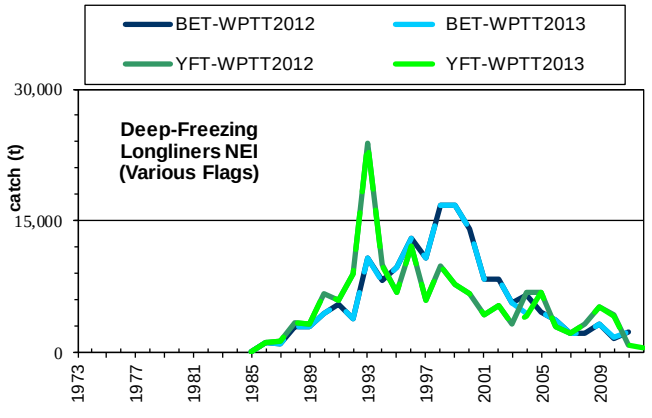


Fig. 17. Catches of deep-freezing longline vessels in the Indian Ocean estimated in 2013 versus catches estimated in 2012 (1985–2012)

- **Purse seine** (**Fig. 16**): Catches for the six former Soviet Union purse seiners, currently under the Thailand flag, were estimated for January-August 2005 and those for the remaining purse seiner (Equatorial Guinea) for 2005–2006. Total catches were estimated using the number of vessels available, the average catches of the former Soviet Union purse seiners in previous years, and average catches available for other fleets for 2005–2006. Total catches were assigned to species and type of school fished according to data available for Thailand purse seiners during the same period (2005–2006). The amount of catch that the Secretariat has to estimate for this fleet has decreased considerably in recent years. It is thought that there are no longer purse seiners operating under flags of non-reporting countries.
- **Deep-freezing longline** (**Fig. 17**): The catches by large longliners from several non-reporting countries were estimated using IOTC vessel records and the catch data from Taiwanese, Japanese or Spanish longliners, based on the assumption that most of the vessels operate in a way similar to the longliners from Taiwan,China, Japan, or EU-Spain. The collection of new information on the activities of non-reporting fleets during the last year, in

particular the numbers and characteristics of non-reporting longliners, led to improved estimates of catches. Since 1999 the number of non-reporting longliners in the Indian Ocean has decreased considerably leading to a marked decrease in catch levels. Such decrease has coincided with an increase in the numbers of vessels operated by some IOTC CPC's. Although these countries usually report catches to the Secretariat, the data reported are, in some cases, considered incomplete (as indicated in Section 3)

- **Fresh tuna longline** (**Fig. 18-19**): Fresh tuna longline vessels, mainly from China, Taiwan,China, India, Malaysia, Belize and Indonesia, have been operating in the Indian Ocean since the early 1970's. The catches of these fleets have been estimated by the IOTC Secretariat by using information from the following three sources:
    - Catches reported by the flag countries: Although China reported total catches for its longline fleet they were not reported by type of longline until 2006 (fresh-tuna longline or deep-freezing longline). The Secretariat estimated the catches of fresh-tuna longliners for 1999–2005 by using the total catches reported, the numbers of fresh-tuna longline vessels provided by China and catch rates for fresh-tuna longliners available from other years.
    - Information on catches and vessel activity collected through several catch monitoring schemes implemented in the main ports of landing for these vessels, involving the IOTC-OFC[2] and/or institutions in the countries where the fleets are based and/or foreign institutions. This applies to Indonesia (2002–2006), Thailand (1998–2006), Sri Lanka (2002–03), Malaysia (2000–2006), Oman (2004–2005) and Seychelles (2000–2002). Since 2007 Indonesia and Malaysia have reported catches for their longline fleets. However, the catches reported are thought to be incomplete as Indonesia and Malaysia do not monitor the activities of vessels under their flags based in other countries. The Secretariat estimated the catches of this component as for the countries indicated below.
    - Information available on the number of fresh-tuna longline vessels operating in other ports or on the activity of those vessels (e.g. the number of vessel unloading or total catches unloaded). This applies to India (2005-12), Indonesia (1973–2001), Thailand (1994–2012), Sri Lanka (1990–2001; 2004–12), Malaysia (1989–2012), Singapore, Mauritius and Maldives (recent years). The catches in these ports and years were estimated from the known/presumed levels of activity of the vessels and the average catches obtained in ports that were covered through sampling.

  In 2006 Taiwan,China provided total catches for its longline tuna fleet operating in the Indian Ocean for the period 2000 to 2005. The catches for 2006-12 have also been provided, including time area catches and effort for 2007-12. The catches published by Taiwan,China were slightly higher than those that the IOTC Secretariat had estimated from the data collected through port sampling. The new catches provided for 2001-05 were used to replace those in the IOTC database. This was done on the assumption that vessels from Taiwan,China had operated in ports of non-reporting countries, their catches not accounted for in estimates made by the Secretariat. The Secretariat has been using the catches published by Taiwan,China since 2006.

[2] Overseas Fishery Cooperation Foundation of Japan

The catches for fleets other than Taiwan,China for 1973–2012 and for Taiwan,China in years prior to 2001 were estimated as explained in the three bullet points above.

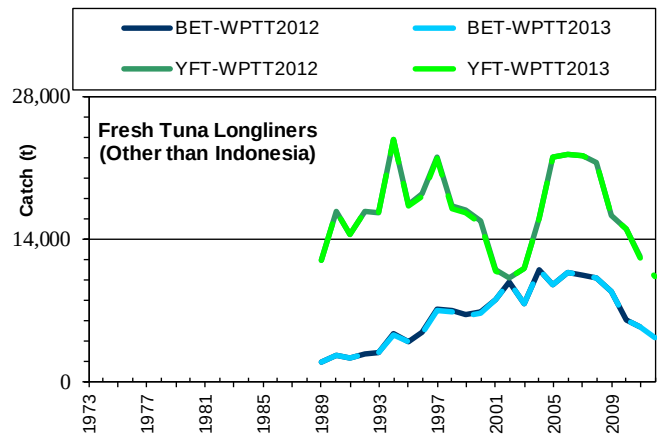


Fig. 18. Catches of fresh-tuna longline vessels based in India, Malaysia, Maldives, Mauritius, Oman, Seychelles, Singapore, Sri Lanka, Thailand and Yemen (mainly registered in China, Taiwan,China and Indonesia) estimated in 2012 versus catches estimated in 2013 (1989–2012).

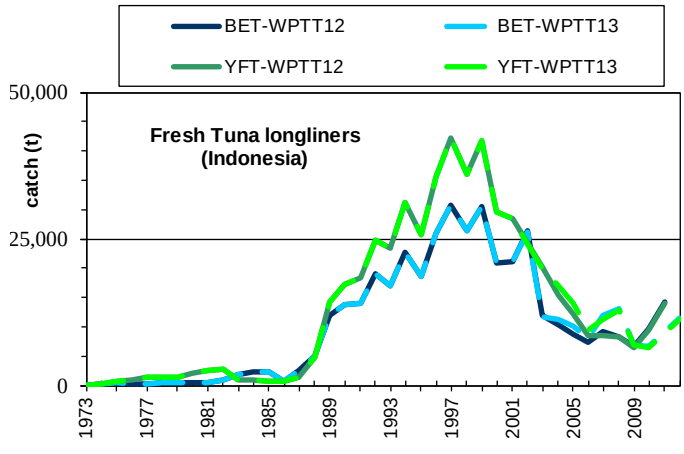


Fig. 19. Catches of fresh-tuna longline vessels based in Indonesia (domestic and foreign) estimated in 2012 versus catches estimated in 2013 (1973–2012)

APPENDIX II

COUNTRY-SPECIFIC REVISIONS TO CATCH SERIES

In 2012 a comprehensive review of the historical catch series for India, Sri Lanka and Indonesia was conducted by an IOTC consultant[3]. The report included a number of recommendations to changes in the catch series, and which were partially entered in the IOTC database in late 2012, mostly related to India. Data revision activities in 2013 have focused on implementing the remainder of the report's recommendations, as well as further improvements to the quality of catch estimates for each of the three countries by the Data Section of the IOTC Secretariat.

India – Artisanal Fisheries

- The latest data published by India's Central Marine Fisheries Research Institute (CMFRI) indicates catch levels and fishing activities are lower than those previously reported by India official sources[4], and also lower than revisions to the historical series published by Bhatal[5], particularly for the period 1990 to 2000.
- Secondly, a new artisanal fishery – shrimp trawlers converted to longline and troll vessels – which started in early 2000 has also been added to the total artisanal catch for India. Details of the fishery were provided to the IOTC Scientific Committee in December 2011; the main targets of the fishery are yellowfin tuna and skipjack tuna. Vessels have been in operation from early 2000, and (higher) catches from 2002 to 2009 have been estimated based on the information of catch reported for 2010.
- The artisanal data series has subsequently been revised to take account of the new data sourced from CMFRI publications, research by IOTC consultant and additional fishery data. The revised data updates previous IOTC estimates, which were largely based on the results of the historical series published by Bhatal[6].

<u>Main findings</u>

- The largest revisions relate to years 1989-1990 and 1995-2000 which report large discrepancies between figures published by CMRFI and estimates by Bhatal. Substantially higher catches have previously been estimated by Bhatal for these years, with no explanation on the rationale for the sharp increases in catch. In light of the latest data published by CMFRI, the decision was made by to follow the (lower) official catch series reported by CMRFI for this period.
- For this reason, revisions to the historical catch series in 2012 and 2013 relate mainly to data from 1990 onwards (**Fig. 20**).
- Also, due to the lack of information on data for earlier years, minimal changes have been made to data for years prior to 1988.

[3] See the research findings and data collated by Moreno, G. (IOTC) in 2012.

[4] Previous data published by the Ministry of Animal Husbandry, Dairying, and Fisheries.

[5] Bhatal, B. (2005), 'Historical reconstruction of Indian marine fisheries catches, 1950-2000, as a basis for testing the Marine Trophic Index', Fisheries Centre, University of British Columbia, Canada.

[6] Bhatal, B. (2005), 'Historical reconstruction of Indian marine fisheries catches, 1950-2000, as a basis for testing the Marine Tropical Index', Fisheries Centre, University of British Columbia, Canada.

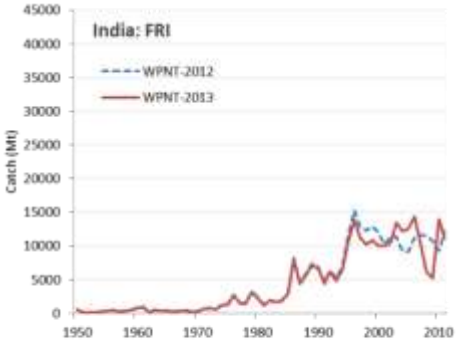
Frigate and Bullet tuna

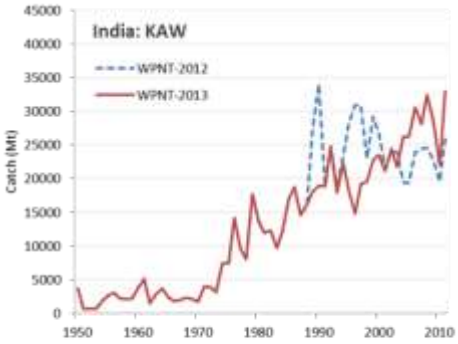
- The main issue with frigate and bullet tuna is the similarity between the two species, which often leads to misidentification of species and misreporting of catch. Previously, the two species have been grouped together and reported as *Auxis spp.* by India.
- The data series for both species have been revised as part of the independent review by the IOTC Secretariat, using the latest catch data published by CMFRI, as well as fixed ratios from CMRFI reports to assign the catch to each species (using an average proportion of 0.89 for frigate tuna and 0.11 for bullet tuna).
- The new catch series revises the catch estimates for frigate by as much as +/-50% (e.g., in 2009 from 10,700 t to 5,200 t, and 2010 from 9,300 t to 14,000 t) as a result of improvements in the allocation of the catch-by-species.
- The revisions have also generally increased the nominal catch for bullet tuna through changes to the species disaggregation. Again, the largest changes are for the most recent years (e.g., in 2009 catch has increased from 940 t to 3,500 t, while 2010 catch has increased from 800 to 4,000 t).

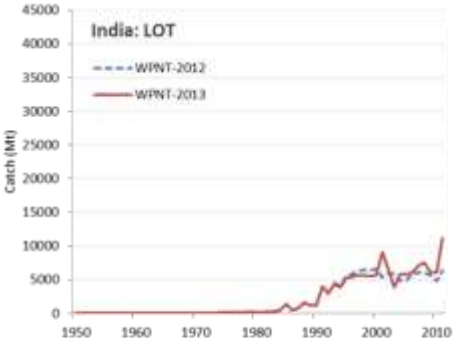
Kawakawa and Longtail

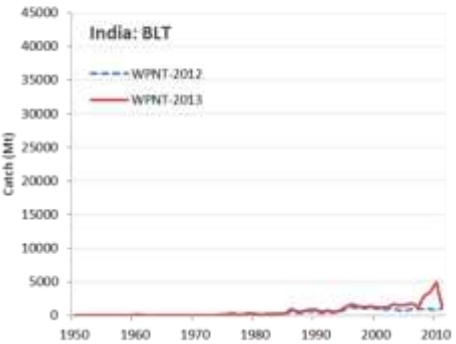
- Although India has previously reported catches of longtail tuna and kawakawa, until recently the catches have not been reported by gear. The catches of India were also similarly reviewed by the IOTC consultant in 2012 and assigned by gear on the basis of official reports from CMRI.
- In the case of both species the catch has generally been reduced for the mid-1990s, reflecting lower catch estimates in the revised data than previously reported by Bhatal, while catch has been revised upwards from the mid-2000s based on the latest data from CMFRI.
- Of the two species, the revisions to kawakawa are the greatest, with changes of up to +/-30% for selected years between the mid-1990s to the mid-2000s.

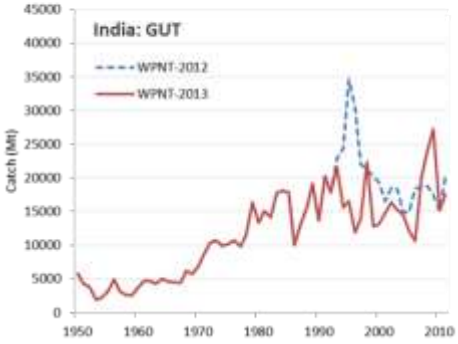
Fig. 20 India: comparison of catch series for Working Party on Neritic Tunas (WPNT) 2012 and 2013.

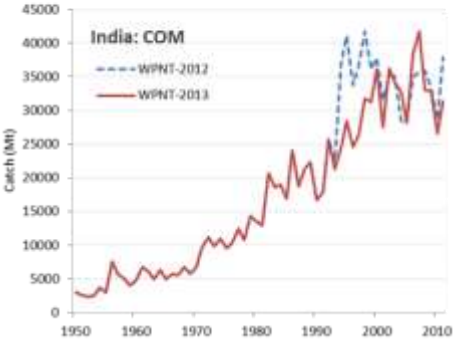

India: FRI
WPNT-2012
WPNT-2013
Catch (Mt)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1950
1960
1970
1980
1990
2000
2010


India: KAW
WPNT-2012
WPNT-2013
Catch (Mt)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1950
1960
1970
1980
1990
2000
2010


India: LOT
WPNT-2012
WPNT-2013
Catch (Mt)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1950
1960
1970
1980
1990
2000
2010


India: BLT
WPNT-2012
WPNT-2013
Catch (Mt)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1950
1960
1970
1980
1990
2000
2010


India: GUT
WPNT-2012
WPNT-2013
Catch (Mt)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1950
1960
1970
1980
1990
2000
2010


India: COM
WPNT-2012
WPNT-2013
Catch (Mt)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1950
1960
1970
1980
1990
2000
2010

Sri Lanka – Artisanal Fisheries

- As with India, an independent review of Sri Lanka was conducted in 2012 by a consultant working for the IOTC Secretariat.
- Catch estimates for a number of tropical and neritic species for Sri Lankan fisheries since 2006 have been estimated by assigning a fixed proportion of the total catch reported by the Statistical Unit of Sri Lanka.
- A substantial increase in coastal catch has been reported by Sri Lanka relative to the number of coastal boats, which prompted a reassessment of the accuracy of catch estimates.
- In 2012 a new estimation method was introduced which takes 1995 as the baseline for the catch. The average catch from the one-day boats reported in 1995 was applied to the total number of one-day boats reported from 1996–2011. The assumption is that these vessels are mainly catching tuna and tuna-like species. Species and gear type have been assigned based on proportions taken from the IOTC database.

Main findings –

- A key issue of the review was the allocation of catch to species classified as unknown tunas (TUX). Catches reported in this category have previously been assumed to be mostly skipjack, while the findings of the review concluded the catch to be more likely kawakawa and frigate juveniles.
- Consequently, the data series across most tuna species has been revised – with the majority of catch reported as TUX reassigned as kawakawa and frigate.
- Changes in the revised catch series of these two species are considerable; for example, from the mid-1990s revised estimates of frigate are as much as five times higher than previous estimates (from around 1,5000 t to 6,000 t), while estimates of kawakawa are up to seven time higher (from around 1,500 t to over 10,000 t) (**Fig. 21**).
- Changes to the data series of tropical tunas in Sri Lanka mostly affect catches of skipjack which have been reallocated to neritic tuna species (**Fig. 22**).

Fig. 21. Sri Lanka: comparison of catch series for Working Party on Neritic Tunas (WPNT) 2012 and 2013.

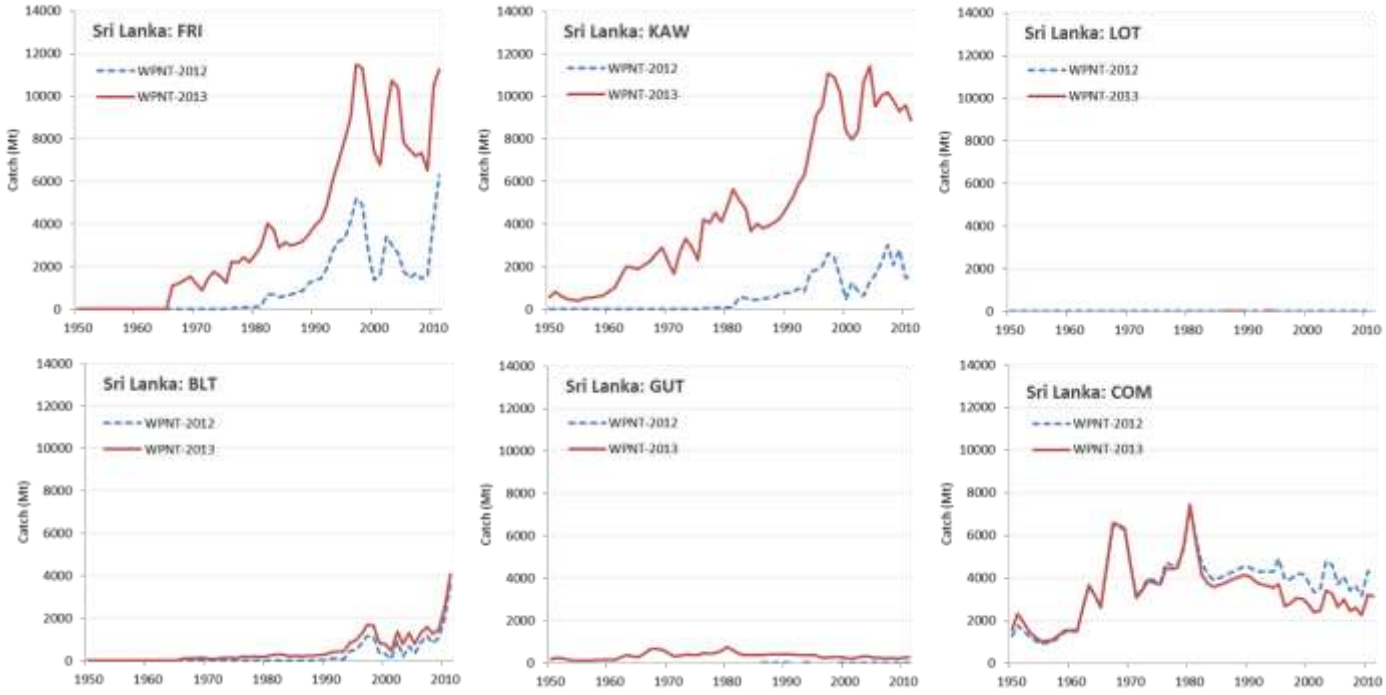
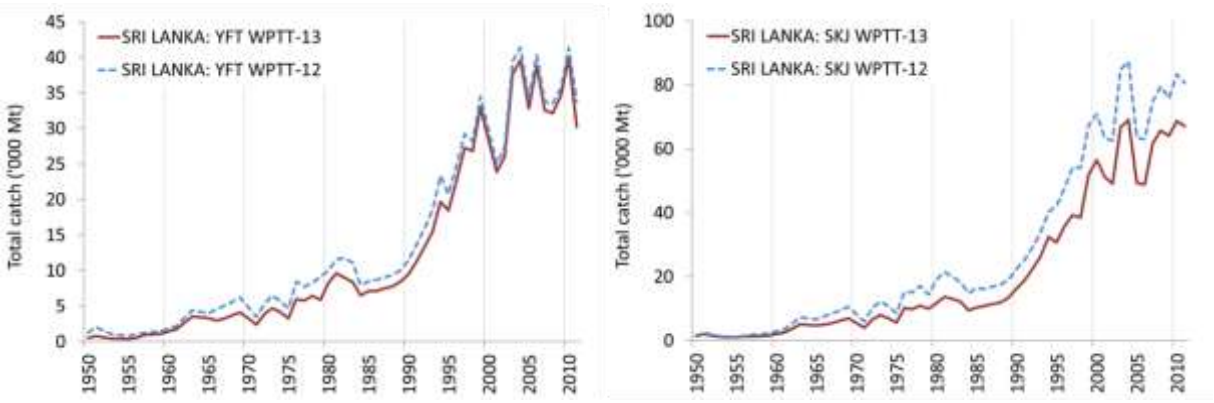


Fig. 22. Sri Lanka: comparison of catch series for Working Party on Tropical Tunas (WPTT) 2012 and 2013.



Indonesia – Artisanal Fisheries

- Indonesia was the third country (in addition to India and Sri Lanka) that was the subject of an independent review by an IOTC consultant in 2012, given the importance of the fishery as the largest tuna and tuna-like coastal country in the Indian Ocean.
- The main aim of the review was to quality assure and re-estimate the catch-by-species and gear breakdown, ensuring greater consistency in the time series and that changes to the fishery (including the introduction of new gears) are reflected more accurately in the revised data series. The revised data series is based on information combined from a number of documents including IOTC, IPTP and DGCF.
- The main issues with previous catch series for Indonesia include:

  i.) Lack of historical catch time series: Indonesia only officially began reporting catches by IOTC species and gears in 2004; prior to 2004, data has largely been reported as species aggregates (e.g., *Tongkol*, or TUX).

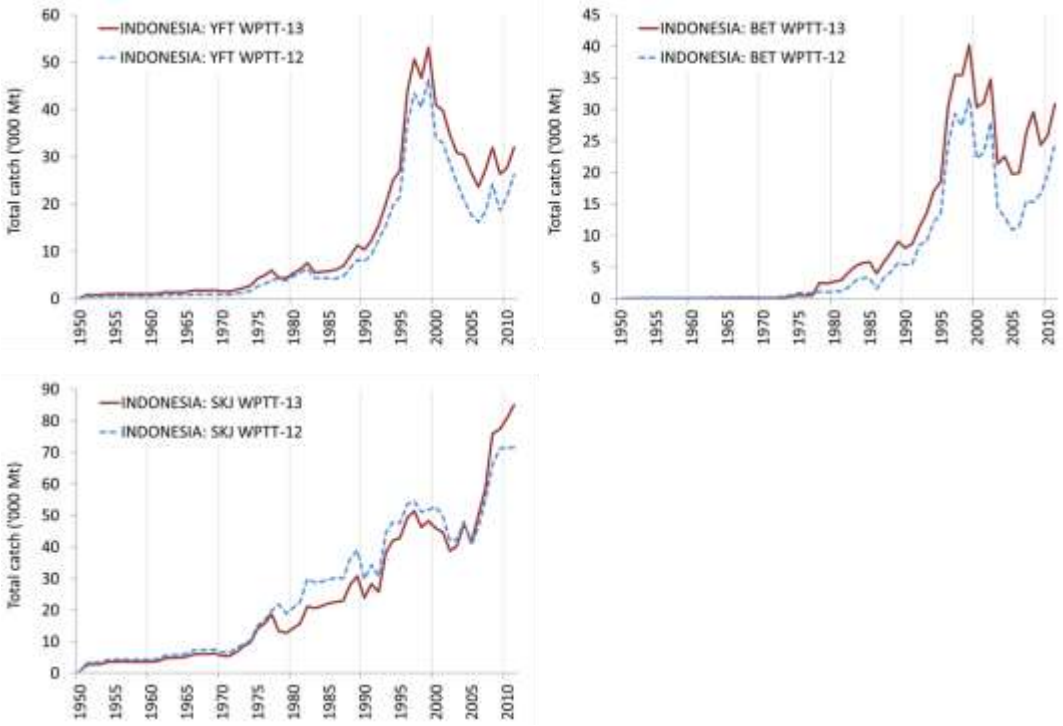
  ii.) Reliability of data post-2004: Official data from 2005 reports species that appear and disappear apparently at random, while catches fluctuate wildly that suggest issues with the quality of the data reported.

  iii.) Conflicting data from national institutions: More than one institution is responsible for collecting fisheries data in Indonesia (e.g., Directorate General of Capture Fisheries (DGCF), Department of Oceans and Fisheries (DINAS), but poor communications between the institutions compromises the quality of reporting and often leads to conflicting and contradictory data being reported to IOTC.

  iv.) Estimation methodology: In the past, the IOTC Secretariat has used the catches reported since 2005 to break the aggregates for 1950–2004 by gear and species – however fluctuations in the species and gear breakdown reported in recent years undermine IOTC estimates for earlier years.

- While Indonesia's total catch estimates for IOTC species have not been altered, the composition by species and gears were reassigned based on a variety of documents including IOTC, IPTP and other related publications and included revisions to the catch series for tropical and neritic tunas (**Figs. 23 & 24**).

Fig. 23. Indonesia: comparison of catch series for Working Party on Tropical Tunas (WPNT) 2012 and 2013.



Narrow-barred Spanish mackerel

- Indonesia has only recently reported catches of narrow-barred Spanish mackerel by species and gear. In the past, the IOTC Secretariat used the most recent gear breakdown to assign aggregates for previous years, by gear and species.
- However in the recent review conducted by an independent consultant in 2012, the catches of Spanish mackerel were reassigned using a range of species-gear ratios at different points to reflect changes in the fishery and found that the catches for India up to the early 2000s have been overestimated by around 10%-15%.

Kawakawa and longtail

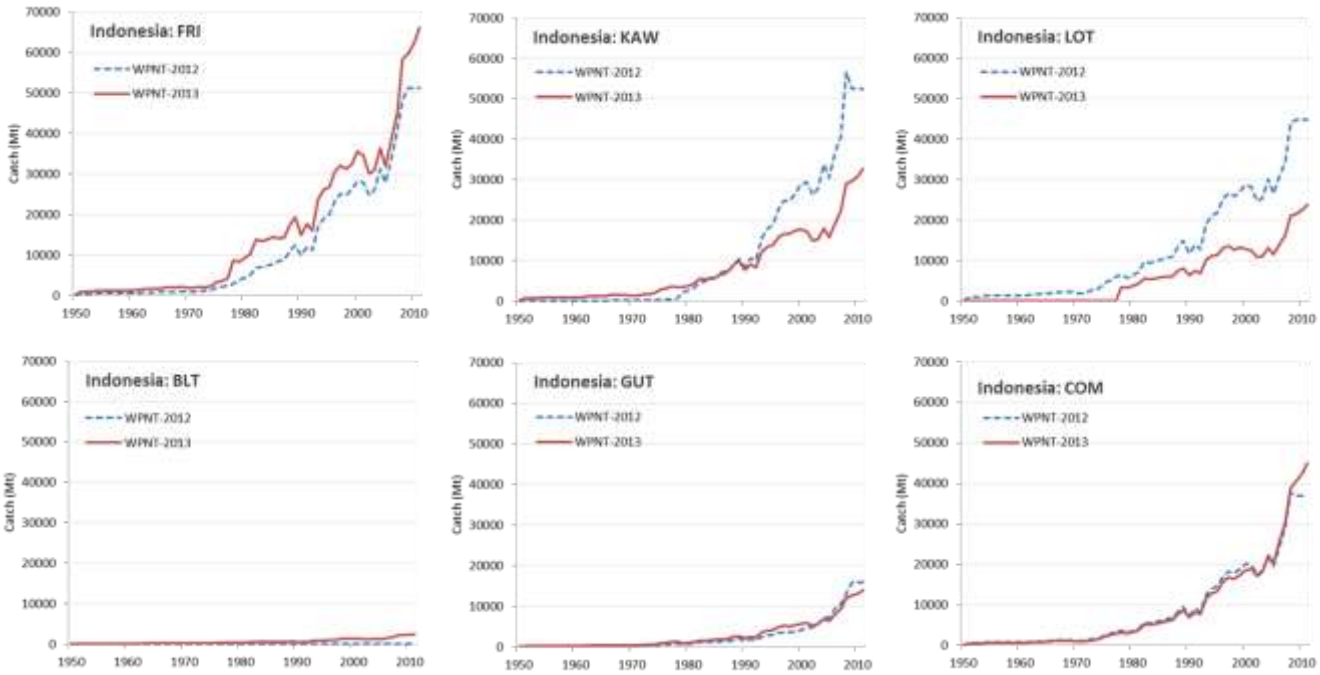
- Indonesia did not report catches of kawakawa by species or by gear for 1950–2004; catches of kawakawa, longtail tuna and, to a lesser extent, other species were reported as species aggregates for this period. In the past, the IOTC Secretariat has used the catches reported since 2005 to break the aggregates for 1950–2004, by gear and species.
- However, in a recent review conducted by an independent consultant in 2012 indicated that the catches of kawakawa had been overestimated by Indonesia.
- While the new catches estimated for the kawakawa in Indonesia remain uncertain, representing around 23% (38% in the past) of the total catches of this species in the Indian Ocean in recent years (2009-11), the new figures are considered more reliable than those previously recorded in the IOTC database.

Frigate and bullet

- Indonesia did not report catches of frigate tuna by species or by gear for 1950–-2004; catches of frigate tuna, bullet tuna and other species were reported as species aggregates for this period.

- In the past, similar to other species, the IOTC Secretariat used the catches reported since 2005 to break the aggregates for 1950–2004, by gear and species. However, in a recent review conducted by an independent consultant in 2012 he indicated that the catches of frigate tuna had been underestimated by Indonesia
- While the new catches estimated for the frigate tuna in Indonesia remain uncertain, representing around 64% of the total catches of this species in the Indian Ocean in recent years (2009-11), the new figures are considered more reliable than those estimated in the past.

Fig. 24. Indonesia: comparison of catch series for Working Party on Neritic Tunas (WPNT) 2012 and 2013.



Other countries:

Pakistan

- Pakistan has recently reported to IOTC revised estimates of nominal catch (from 2006 onwards), based on results of WWF-funded sampling. The sampling is the first formal update of nominal catch estimates from Pakistan since Indo-Pacific Tuna Programme (IPTP) sampling conducted in the late 1980s/early 1990.
- Improvements to the catch-series for Pakistan have been made in three areas:

1.) <u>Updated catch estimates from 2006</u>

The revised nominal catch estimates reported by Pakistan substantially increase the catch for the main neritic tuna species from 2006. For example, for 2006:

- Kawakawa: revised from 2,1000Mt to 10,600Mt;
- Longtail: revised from 4,700Mt to 9,000Mt;
- Frigate: revised from 45Mt to over 3,100Mt;

2.) <u>Revisions of historical time-series in line with catch sampling surveys</u>

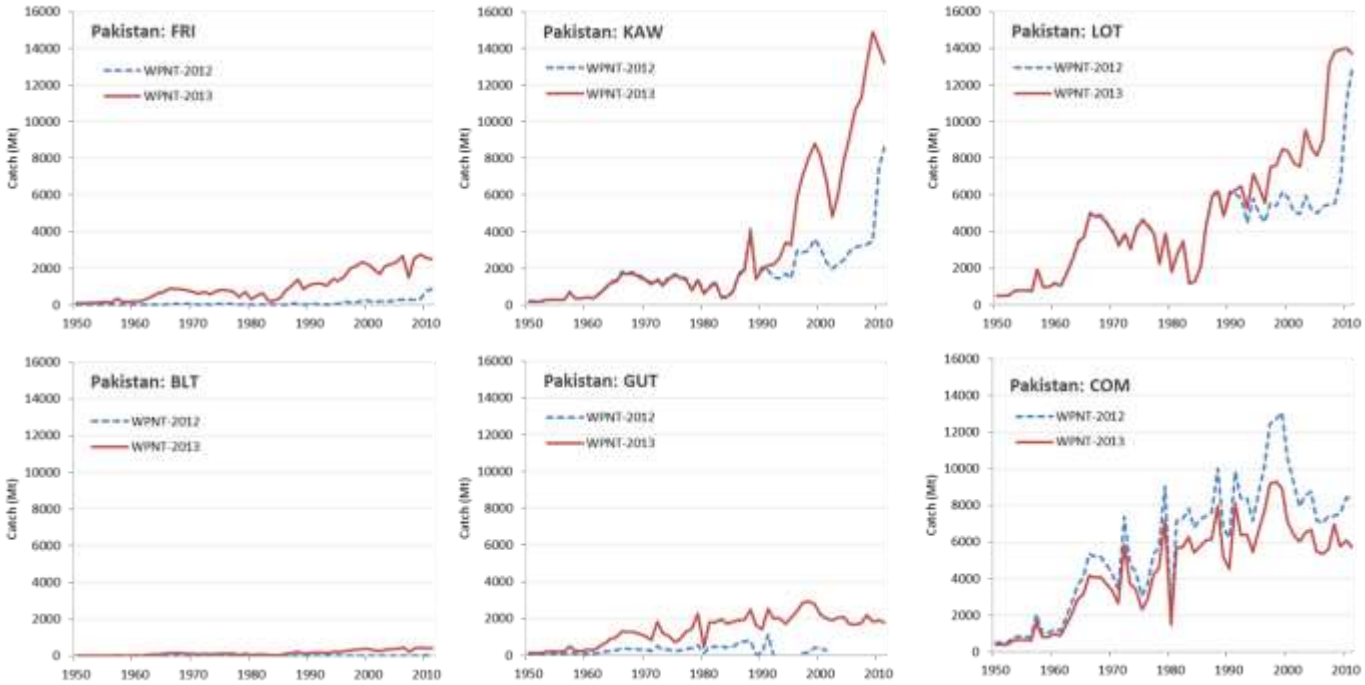
The catch series for earlier years has also been adjusted by IOTC Data Section in line with catch levels reported by the latest sampling to avoid a break in the data series, while also respecting the catch estimates derived from IPTP sampling in the early 1990s.

3.) Disaggregation of species composition

The results of the latest sampling also provide greater detail on the species composition. In addition, IOTC Data Section have reallocated catch reported under species aggregates (e.g., KGX and FRZ) using information on species ratios from India as a proxy fleet.

- The biggest revisions in changes to the species composition are figures for seerfish nei (KGX), which have been aggregated with narrow-barred Spanish mackerel (COM) and then reallocated as COM and Indo-Pacific king mackerel (GUT) (based on the species ratio from India).
- Figures for Longtail (LOT) have been aggregated with FRZ and then reallocated to LOT and Bullet Tuna (BLT), similarly using the species ratio from India.

Fig. 25. Pakistan: comparison of catch series for Working Party on Neritic Tunas (WPNT) 2012 and 2013.



Comoros

- The historical catch series has been revised by the Data Section of the IOTC Secretariat, following an appraisal of the existing data sources (e.g., IPTP) and the latest results of sampling and vessel census conducted in 2011/12 funded by the OFCF-IOTC project.
- The new catch series substantially revise previous (FAO) estimates of total catches of IOTC species – which assumed an incremental increase in catch levels since the last catch assessment survey in the mid-1990s. Overall catch levels have been revised downwards from 1995 (from around 20,000Mt in recent years to ≈8,000Mt), based on results of the latest catch survey in 2011, as well as reports of a decline in FAD-based fishing and decrease in vessel activity rates (currently estimated at ≈40%) reported by the 2011/12 fishing vessel census.
- The revisions mainly affect estimates of skipjack and yellowfin tuna:
  - between 1950s–1980s catches of skipjack have been reassigned as yellowfin, given handline is the principal gear (targeting skipjack), and prior to motorization of the fleet in the mid-1970s and start of trolling and skipjack targeted fishery;
  - mid-1990s–present: catches of yellowfin have been revised downwards, having been overestimated from a baseline of 1994 Catch Assessment Survey which reported an unusually high catch of yellowfin.

EU-France-PS

- Updated catch-and-effort and nominal catch reported to the IOTC Secretariat for the period (1981-2011). No changes were made to the overall to the overall catch, however catches have been were reassigned by species. The revisions mainly affect early-late 1980s and early 2000s.

Yemen and Maldives

- Updated catch estimates for Yemen (YFT) and Maldives (SKJ & YFT) have been received by the IOTC Secretariat for 2010 and 2012, and which have revised catch levels upwards by between two to three times compared to the previous catch estimates.