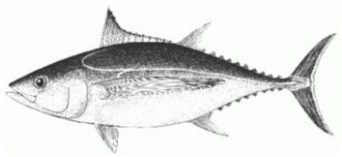
Availability: 10 October 2013

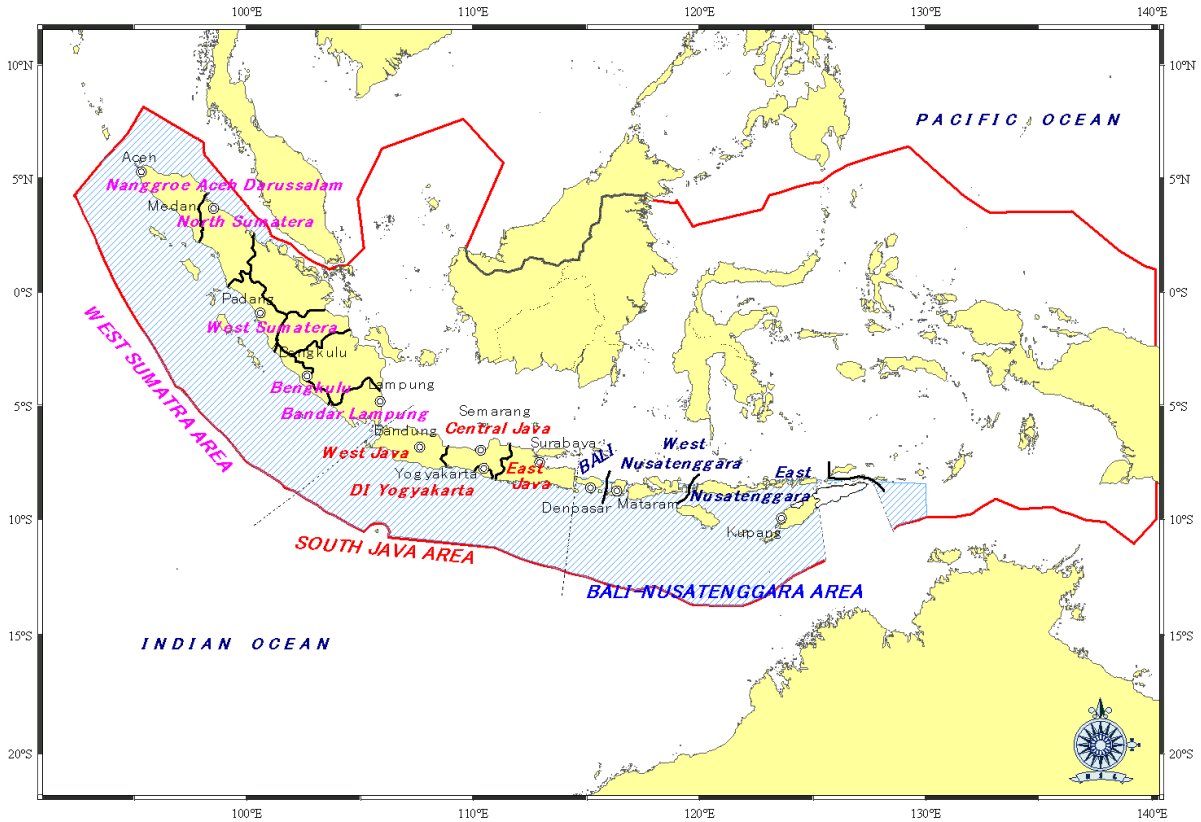


Report and documentation of the

# Indian Ocean Tuna Fisheries of Indonesia Albacore Catch Estimation Workshop: Review of Issues and Considerations

**Bogor, 21 June 2013**

**Jakarta, 24-25 June 2013**



## PREPARATION OF THIS DOCUMENT

During its last meeting, the IOTC Scientific Committee revised the status of albacore, including scientific estimates of catch of albacore in the Indian Ocean. The IOTC Scientific Committee expressed concern at the status of albacore and noted that, in recent years, the catches of albacore estimated for the fisheries of Indonesia have increased, to attain levels similar to those of the historically major fishery for albacore in the Indian Ocean, Taiwan Province of China. Nevertheless, while acknowledging the high catches of albacore estimated for the fisheries of Indonesia, the IOTC Scientific Committee also noted the highly uncertain nature of the estimates and requested the Directorate General of Capture Fisheries of Indonesia and the IOTC Secretariat to further revise and update the catch series of albacore by vessels flagged in Indonesia, where necessary.

This document contains the report of the workshop and the background information presented at the meeting. The report, and in particular the recommendations addressed by the workshop, will serve as basis for further work on strengthening the data collection and processing systems for the fisheries of Indonesia, in particular those fisheries that catch albacore.

The co-conveners of the workshop were Mr. Agus Budiman and Mrs. Erni Widjajanti (DGCF), and Mr. Miguel Herrera (IOTC). Mr. Herrera and Ms. Widjajanti (DGCF) prepared this meeting report that provides a record of activities at the meeting and outcomes of the meeting, including a new catch series of albacore for 2002-12, as agreed to by the DGCF of Indonesia.

**Distribution:**
Participants in the workshop
Directorate General for Capture Fisheries of Indonesia (DGCF)
Provincial, Regency, and District Fisheries Offices of Indonesia
Research Center for Fisheries Management and Conservation, Indonesia (RCFMC)
Secretariat of the Indian Ocean Tuna Commission (IOTC)
IOTC Scientific Committee (SC)
IOTC Working Party on Temperate Tunas (WPTmT)
Secretariat of the Western and Central Pacific Fisheries Commission (WCPFC)
Secretariat of the Pacific Community (SPC)
Commonwealth Scientific and Industrial Research Organization, Australia (CSIRO)
Overseas Fisheries Cooperation Foundation of Japan (OFCF)
Asosiasi Tuna Longline Indonesia (ATLI)
Asosiasi Tuna Indonesia (ASTUIN)
International Seafood Sustainability Foundation (ISSF)

IOTC Secretariat

Report and documentation of the Indian Ocean Tuna Fisheries of Indonesia Albacore Catch Estimation Workshop: Review of Issues and Considerations. Bogor-Jakarta, 21-25 June 2013. IOTC Technical Report. No. 2013/01. Bogor-Jakarta, IOTC. 2013. 40 pp.

## EXECUTIVE SUMMARY

The Indian Ocean Tuna Fisheries of Indonesia Albacore Catch Estimation Workshop was held in Bogor and Jakarta from 21 to 25 June 2013. The workshop was held in response to a request from the DGCF of Indonesia for the IOTC Secretariat to assist the DGCF with a review of catches of albacore in the Indian Ocean, following recommendations by the IOTC Scientific Committee and the Commission to assess the quality of the catches of albacore, in particular those reported by Indonesia. The main objective of the workshop was to review the catches of albacore derived from data collected from the tuna fisheries of Indonesia, and other alternative sources and, where required, produce a new catch series for albacore. During the workshop, invited experts discussed the data collection and data management systems currently in place in Indonesia, the catches derived from the data collected, and agreed to recommend further actions to improve the estimates of albacore, and other species, in the future. Their discussions were informed and stimulated by one document and four presentations that covered a wide range of topics (Page 2). These included: DGCF's sampling design, implementation, and official estimates of catches of albacore for the period 2002-12; status of implementation of Indonesia's Vessel Monitoring System and summary of results (2012); status of implementation of Indonesia's Logbook System and summary of results (2012-13); exports of tuna and tuna-like species recorded by the Dinas Perikanan Provincial Office in Bali (2002-12); catches of albacore by the fisheries of Indonesia in the IOTC Area (2002-12); catches of albacore by the fisheries of Indonesia in the WCPFC Area (2002-12); and imports of albacore recorded by canning factories cooperating with the International Seafood Sustainability Foundation (2009-12).

The Workshop concentrated its efforts in reviewing estimates of catch of albacore by vessels flagged in Indonesia, with a view to improve estimates of total catch, and catches by gear, focusing on the period 2002-11. The new catch series of albacore, as adopted by the Workshop, is presented in Table 5 (Page 9).

The Workshop identified various issues concerning the estimation of catches of albacore (page 12), in particular: incomplete reports from the fishing sector; insufficient monitoring of albacore in port, in particular frozen albacore; insufficient logbook coverage and poor quality of data reported on logbooks; insufficient monitoring of activities of Indonesia's foreign based fleet; poor species identification and insufficient training and supervision of enumerators; insufficient data management and validation, in particular due to the fact that data from the districts are processed by hand, not using Indonesia's centralized database system; and inordinate changes in the catches of albacore, and other species, and breakdown by gear, between consecutive years.

The Workshop noted that the above issues compromise the quality of estimates of catch of albacore, and other species, for the fisheries of Indonesia, and limit Indonesia's capacity to comply with international data requirements, in particular those agreed by the IOTC. In this regard, the Workshop proposed implementation of a range of actions (page 13) to address the issues identified and recommended that the DGCF make every possible effort to implement those actions, as required. The Workshop noted that the DGCF may require assistance in the implementation of some of the recommendations, and encouraged the continuation of coordinated advice and support from the IOTC, the OFCF, WCPFC, SPC, and other governmental and non-governmental organizations, in the strengthening of data collection and processing activities in Indonesia.

## ACRONYMS USED

| | |
|---|---|
| ACIAR | Australian Centre for International Agricultural Research |
| ASTUIN | Asosiasi Tuna Indonesia (Indonesia Tuna Association) |
| ATLI | Asosiasi Tuna Longline Indonesia (Indonesia Tuna Longline Association ) |
| CCSBT | Commission for the Conservation of Southern Bluefin Tuna |
| CDS | Centralized Database System |
| CPC | IOTC Contracting Parties and Co-operating Non-Contracting Parties |
| CSIRO | Commonwealth Scientific and Industrial Research Organization (Australia) |
| DAFF | Department of Agriculture, Fisheries and Forestry (Australia) |
| DGCF | Directorate General for Capture Fisheries of Indonesia (Directorat Jenderal Perikanan Tangkap) |
| DKP | Dinas Kelautan dan Perikanan (Fisheries and Marine Agency) |
| FAO | Food and Agriculture Organization of the United Nations |
| FMA | Fisheries Management Area (Indonesia) |
| GT | Gross Tonnage |
| IATTC | Inter-American Tropical Tuna Commission |
| IOTC | Indian Ocean Tuna Commission |
| ISSF | International Seafood Sustainability Foundation |
| LOA | Length Over All |
| MMAF | Ministry of Marine Affairs and Fisheries |
| OFCF | Overseas Fishery Cooperation Foundation of Japan |
| RCFMC | Research Center for Fisheries Management and Conservation (Indonesia), and Formerly Research Center for Capture Fisheries (RCCF) |
| RFMO | Regional Fisheries Management Organization |
| SISKA | Sistem Infomasi Statistik Perikanan Tangkap (Information System of Capture Fisheries Statistics) |
| SPC | Secretariat of the Pacific Community |
| VMS | Vessel Monitoring System |
| WCPFC | Western and Central Pacific Fisheries Commission |

## CONTENTS

## PART 1. Report of the Indian Ocean Tuna Fisheries of Indonesia Catch Estimation Workshop: Review of issues and considerations

# 1. BACKGROUND

The "Indian Ocean Tuna Fisheries of Indonesia Albacore Catch Estimation Workshop" was held in Bogor on 21 June 2013, and Jakarta from 24 to 25 June 2013.

Indonesia's fisheries are amongst the most important in the world. During 2009-11, the fisheries of Indonesia reported high levels of catch of albacore in the Indian Ocean, with catches accounting for as much as 34% of the total catches of albacore reported, from all fisheries, in the Indian Ocean, at similar levels to those recorded for vessels flagged in Taiwan Province of China. Over the last decade, the Directorate General for Capture Fisheries (DGCF) and the Research Center for Fisheries Management and Conservation[1] (RCFMC) of Indonesia have implemented a range of measures intended to strengthen the collection and processing of fisheries statistics in Indonesia, both in the Indian Ocean and the Pacific Ocean areas. The implementation of some of those measures has come in response to recommendations from CCSBT, IOTC and WCPFC, calling for Indonesia to strengthen its data collection and processing systems for tuna fisheries and, in doing so, allow Indonesia to report fisheries statistics to each Regional Fisheries Management Organization (RFMO). Among the measures introduced the implementation of vessel marking programmes, logbook programmes, Vessel Monitoring Systems, and the strengthening of data collection systems towards improved catch species and gear breakdown, and collection of length frequency data on unloadings of longliners in Indonesian ports, are worth noting. These changes in the fisheries statistical system of Indonesia has led to marked improvements in the estimation of total catches of tropical tunas, by species, for Indonesia's home-based longline fleet, during the period 2003-09; and has allowed the DGCF to derive catches by species, and gear, for other fisheries in Indonesia, the majority small-scale.

Notwithstanding the referred improvements, the implementation of the above measures has not been successful in all areas and the catches reported for some species and fisheries, in particular albacore and the coastal fisheries, remain uncertain. In the Indian Ocean, and for the period 2004-11 Indonesia has reported catches of albacore that differ considerably over consecutive years, both in terms of total catches and breakdown of catches by gear. In addition, information provided by the International Seafood Sustainability Foundation (ISSF) for the years 2009-12, including imports of albacore from vessels flagged in Indonesia fishing in the Indian Ocean, by canning factory, vessel, and date of export, is in conflict with the total catches of albacore reported by the DGCF in 2009, with imports of albacore more than two-fold the catches reported by the DGCF.

The Workshop was held in response to a request from the DGCF of Indonesia for the IOTC Secretariat to assist the DGCF with a review of catches of albacore in the Indian Ocean, following recommendations by the IOTC Scientific Committee and the Commission to assess the quality of the catches of albacore reported by Indonesia, and other fisheries in the Indian Ocean. The main objective of the workshop was to review the catches of albacore for Indonesia, as derived from data collected in Indonesia, or provided by alternative sources, and for the workshop to produce a new catch series for albacore, where required. The funds necessary for the organization of the Workshop and the participation of experts from Indonesia were provided by the DGCF of Indonesia. Additional funding for the participation of other participants, such as IOTC and SPC, was provided by the relevant institutions.

Experts from a wide variety of disciplines and experiences were brought together to review the strategy devised by the DGCF to collect and process data from the fisheries of Indonesia, and raise estimates of catch of albacore and other species, by gear and species, using the data collected.

# 2. OPENING SESSION

The Workshop was attended by 27 participants from a variety of disciplines and backgrounds.

The participant list is given in Appendix B.

Co-conveners Ms. Erni Widjajanti and Mr. Miguel Herrera called the Workshop to order.

Ms. Erni Widjajanti, on behalf of the Director of Fisheries Resources, Mr. Ruchimat, of the DGCF, addressed the Workshop. She welcomed participants and thanked them for their willingness to assist the DGCF. Ms.

[1] Formerly *Research Center for Capture Fisheries*

Widjajanti stressed the importance that Indonesian fisheries in the Indian and Pacific oceans have in terms of their contribution to the economy of Indonesia, noting that Indonesia's fisheries are among the most important of the world. She further noted that Indonesia is currently a Member of IOTC and CCSBT, Cooperating Non-Contracting Party of WCPFC and, recently, IATTC, which proves Indonesia's commitment to participate in the work of these organizations. She, on behalf of Mr. Ruchimat, stressed the importance of the Workshop and Indonesia's commitment to revise the quality of estimates of catches of albacore in the Indian Ocean for its fisheries, as recommended by the IOTC. Ms. Widjajanti thanked the IOTC Secretariat and SPC for attending the meeting and further thanked the ISSF for sharing a summary of the information collected by processing plants with regards to albacore, for the period 2009-12.

Mr. Miguel Herrera, IOTC Data Coordinator, provided background information on the Workshop noting that the Workshop was an initial step in a process that will assist DGCF to review the catch series of albacore and improve estimates of albacore in the future. Mr. Herrera began with a summary of the *Short note on the preparation of information for the Indian Ocean tuna fisheries of Indonesia Albacore catch estimation Workshop* (Annex 1), which contains the main objectives and outcomes expected from the Workshop:

- **Objective**: Revise the catch series of albacore for the fisheries of Indonesia, in particular those operated within the IOTC Area of Competence;
  **Expected outcome**: The Workshop to propose an alternative time-series of catch for albacore, where required.
- **Objective**: Review the status of data collection with a focus on data used for the estimation of catches of albacore and recommend the type of actions that should be implemented to overcome the issues identified;
  **Expected outcome**: The DGCF to implement concrete actions in order to address the issues identified by the Workshop, in particular to improve the estimates of catch for albacore, and other species, in the future.

Mr. Herrera informed that the Workshop will be organized as two separate sessions:

- **Part I** (Bogor) will run for one day and will be devoted to review the data collection and processing systems in Indonesia, and drafting of recommendations from the Workshop, with a focus on albacore. All participants will attend this Session.
- **Part II** (Jakarta) will run for two days, in which a dedicated group will review the estimates of catch of albacore and adopt best estimates for the period under consideration, and recommend any follow-up actions required to improve estimates in the future.

Mr. Herrera noted that, while the Workshop will focus on albacore, some of the recommendations issued by the Workshop may also apply to other species.

Workshop participants selected Mr. Agus Budhiman and Ms. Erni Widjajanti as chair and co-chair for the session, respectively.

The preliminary Workshop Agenda was introduced and approved by Workshop participants. It is given in Appendix A.

## 3. REVIEW OF BACKGROUND INFORMATION

One document and four background presentations were prepared for the Workshop. In addition, the Workshop reviewed other documents and information. They are included in this report in Part II or the CD attached.

The documents and presentations were designed to cover a range of topics related to the estimation of catches of albacore by the fisheries of Indonesia: DGCF's sampling design, implementation, and official estimates of catches of albacore for the period 2002-12; status of implementation of Indonesia's Vessel Monitoring System and summary of results (2012); status of implementation of Indonesia's Logbook System and summary of results (2012-13); exports of tuna and tuna-like species recorded by the Dinas Perikanan Provincial Office in Bali (2002-12); catches of albacore by the fisheries of Indonesia in the IOTC Area (2002-12); catches of albacore by the fisheries of Indonesia in the WCPFC Area (2002-12); and imports of albacore recorded by canning factories cooperating with the International Seafood Sustainability Foundation (2009-12)..

The document and presentations are summarized briefly in the paragraphs that follow.

## 3.1 Review of IOTC scientific estimates of catch of albacore for Indonesia

Mr. Herrera presented a review of scientific catch estimates of albacore by the fisheries of Indonesia over the period 2002-2012, using catch, and export data (Annex 2). He noted that according to the data in the IOTC database, in recent years Indonesia and Taiwan Province of China have caught similar levels of albacore in the Indian Ocean, their combined catches accounting for more than 70% of the total catches of albacore estimated for the Indian Ocean, from all fisheries.

Mr. Herrera noted that, at its 2012 meeting, the IOTC Scientific Committee revised the estimates of albacore used for the assessments of albacore, as provided by the IOTC Working Party on Temperate Tunas, and, while adopting those figures as best estimates, recommended that the DGCF and the IOTC Secretariat further revise the estimates for Indonesia and report the results of this work, including a new time-series of catches of albacore, at the next meeting of the IOTC Scientific Committee.

Mr. Herrera presented Table 1, reproduced below, which shows catch series of albacore recorded from various sources, as available to the IOTC Secretariat, in the Indian and Pacific oceans, including the best estimates of catch adopted by the IOTC Scientific Committee at its last meeting (bold font).

**Table 1**: Estimates of catches of Albacore in the Indian Ocean and Pacific Ocean from different sources. More information about each data source is provided in Annex 3.

| Year | INDIAN OCEAN | | | | PACIFIC OCEAN | | | | DKP Bali |
|---|---|---|---|---|---|---|---|---|---|
| | DGCF | IOTC | FAO | ISSF | DGCF* | WCPFC | FAO | ISSF | |
| 2002 | 2,826 | **5,137** | 2,790 | | 0 | 0 | 0 | | |
| 2003 | 5,907 | **8,278** | 5,870 | | 0 | 0 | 0 | | |
| 2004 | 11,646 | **11,646** | 12,644 | | (17,489) | 0 | 0 | | 11,646 |
| 2005 | 10,902 | **10,902** | 11,595 | | (22,888) | 0 | 0 | | 10,902 |
| 2006 | 2,383 | **7,177** | 8,052 | | (17,910) | 0 | 0 | | 7,177 |
| 2007 | 12,893 | **12,893** | 13,748 | | (21,922) | 0 | 0 | | 12,893 |
| 2008 | 8,838 | **16,639** | 17,878 | | (27,513) | 0 | 0 | | 16,639 |
| 2009 | 5,924 | **16,101** | 15,274 | 12,185 | (19,564) | 0 | 0 | | |
| 2010 | 13,030 | **14,072** | 11,833 | 10,649 | (17,104) | 0 | 0 | 9 | |
| 2011 | 11,483 | **12,080** | 16,675 | 9,852 | 0 | 0 | 0 | | |
| 2012 | | ***13,725***[+] | | 10,387 | | | | | |

*Figures revised by the DGCF in 2013 with all catches of albacore in the Pacific Ocean removed

\+ Not in IOTC Database yet

Mr. Herrera noted that while the catches reported by the DGCF and those adopted by the IOTC Scientific Committee are the same for 2004, 2005, and 2007, and differ only slightly in 2010 and 2011, the catches reported by the DGCF for 2002, 2003, 2006, 2008, and 2009 differ greatly from those adopted by the IOTC Scientific Committee for those years. In particular, Mr. Herrera noted that, in 2009, the total amounts of albacore imported by canning factories under the ISSF, which initially should represent a subsample of the total catches of albacore reported by Indonesia, are more than twice the catches reported by the DGCF. On the contrary, the catches of albacore reported by Indonesia for 2010 and 2011 are higher than those recorded by the ISSF in those years, within bounds that would be considered reasonable, and therefore reports by the DGCF for this period are considered more reliable.

Mr. Herrera provided additional details concerning the data provided by processing plants under the ISSF, and noted that the IOTC Secretariat considers this dataset to be reliable. He noted that the IOTC Secretariat obtained consistent results when comparing the vessel names provided by the processing plants and those recorded in the IOTC Vessel Record database, with a match found for the large majority of the vessel entries provided by the ISSF; he also indicated that non-matches were found to originate in most cases from reports of incomplete vessel names on the side of the ISSF (*e.g.* provision of a vessel name but not a number for one or more entries in the IOTC database of vessels having the same name and a number). With regards to the origin of the catches Mr. Herrera noted that, as shown in Table 1, Indonesian vessels do not seem to catch albacore in the Pacific Ocean or, if they do, the amounts are thought to be negligible, which would confirm the ocean reported by the ISSF. Table 2 presents a summary of the information provided by canning factories cooperating with the ISSF, including the number of individual vessels from which the canning factories imported albacore, the breakdown

of vessels by GT category, the total number of transfer events recorded, and the total amounts of albacore recorded by the three canning factories that provided this information, by year, over the period 2009-11.

**Table 2**: Number of fishing vessels flagged in Indonesia that exported albacore to canning factories cooperating with the ISSF, total and by GT class, number of individual unloading events from those vessels, and catches of albacore shipped to processing plants during 2009-11.

| ISSF | Number of individual vessels exporting albacore by GT category | | | | | | | | Number of transfer events and total imports of albacore (mt) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | no | 0-29 | 30-59 | 60-90 | 90-120 | 120-240 | 390-600 | UNK | no | Total (mt) |
| 2009 | 236 | 8 | 19 | 42 | 60 | 76 | 8 | 23 | 459 | 12,185 |
| 2010 | 196 | 11 | 43 | 63 | 33 | 12 | 3 | 30 | 505 | 10,649 |
| 2011 | 161 | 6 | 38 | 46 | 21 | 14 | 3 | 33 | 533 | 9,142 |

Finally, Mr. Herrera devoted some time to explain the way in which the IOTC Secretariat had estimated the alternative catch series of albacore for Indonesia, and the information that was used to derive such estimates. He noted that different datasets and approaches were used for each period and fishery and, although the final estimates were considered to be more reliable than previous catches of albacore for Indonesia, they remain uncertain and need further verification. A summary of data sources and estimation procedures is provided below, by time period:

- Years 2004-05; and 2007: no changes to catch estimates; official reports from the DGCF used.
- Years 2002-03: estimates using data from the multilateral catch monitoring programme (fresh-tuna longline), data reported by third parties (fresh-tuna longline based in ports outside Indonesia), numbers of large-scale freezing longliners reported by Indonesia and average catches of albacore reported for proxy fleets, and amounts of albacore estimated for coastal fisheries, using total catches reported by the DGCF and breakdown by species estimated using data from various sources (fisheries other than fresh-tuna and freezing longline).
- Years 2006 and 2008: exports of albacore as provided by the DKP Provincial Office in Bali.
- Year 2009: Total number of active vessels reported by Indonesia in 2009 and average catches by boat estimated using the number of active vessels reported by Indonesia for 2008 and the catches of albacore estimated for the same year.
- Years 2010-12: total imports of albacore provided by the ISSF, by year, and ratio total imports of albacore versus total catches of albacore estimated for 2008.

More details about the estimation procedures and main assumptions made in each case are provided in Annex 2.

## 3.2 DGCF data collection system and estimates of catches of albacore

Mrs. Lilik Budii Lestari and Mr. Anas presented Indonesia's fisheries data collection systems and catches of IOTC species for the period 2002-12 (Tables 1 & 3), respectively.

Ms. Riana noted that Indonesia established its data collection system in the early 1980's and has maintained the sampling design to date, based on the following scheme:

1. Data reports from Fishing Companies (L-I): Fishing companies report data on all landing activities from their vessels, including fishing grounds, type of gear used, species, and market price, by fishing trip, with data reported each month using forms provided by the DGCF (Form SL-3).
2. Total enumeration of catches at major fishing ports or landing sites (L-II): Enumerators in each port monitor all unloading from fishing vessels, recording the same information than the fishing companies, and manually processing and aggregating the data on Form SL-3, as above.
3. Monitoring of vessel activities and catches in selected villages (L-III): Enumerators conduct surveys in selected fishing villages, interviewing fishermen about their fishing activities and catches during the previous quarter.

The Provincial authorities compile the information from the Districts and summarize the data collected using a form (Form LL-3), which is sent to the DGCF in Jakarta. Form LL-3 contains a summary of vessel activities and catches, including number of fishing trips, catches by species and gear type, and market price of the catch.

**Table 3**: Catches of albacore estimated by the DGCF for the period 2010-12, by type of fishery and year

| Fishery | Year | 2010 | 2011 | 2012* |
|---|---|---|---|---|
| | Total | **13,030** | **11,483** | **11,538** |
| Coastal Longline | | 6,865 | 2,956 | 6,865 |
| Tuna Longline | | 1,910 | 2,549 | 1,910 |
| Coastal Purse seine | | 1,027 | 341 | 1,027 |
| Gillnet | | 152 | 252 | 152 |
| Handline | | 39 | 39 | 39 |
| Trolling | | 1,128 | 4,443 | 1,128 |
| Danish seine | | - | 625 | - |
| Lift net | | - | - | - |
| Pole-and-line | | - | - | - |
| Others (OTH) | | 1,825 | 362 | 522 |

* Preliminary figures

Mr. Anas presented the catches of albacore recorded by the DGCF for the period 2002-12 (Table 1), and breakdown by gear for the period 2010-12 (Table 3).

He noted that the majority of the catches in the Indian Ocean come from Indonesia's Fisheries Management Areas 572 (West Sumatra), and 573 (South Java). He indicated that 14 Provinces in Indonesia have shorelines in the Indian Ocean[2].

Mr. Anas reviewed the issues that the DGCF encounters in collecting and compiling information from the fisheries, in particular miss-identification of tuna and tuna-like species by enumerators. He noted that, in general, the turnover rate of enumerators is high and new enumerators do not generally have enough experience on species identification and are more likely to make mistakes. He pointed out that, while the DGCF conducts training sessions every year, including sampling protocols, and identification of gears and species, the speed at which enumerators change make it difficult to maintain sampling standards as required by the DGCF.

## 3.3 Review of estimates of catch of albacore for Indonesia in the WCPFC Area

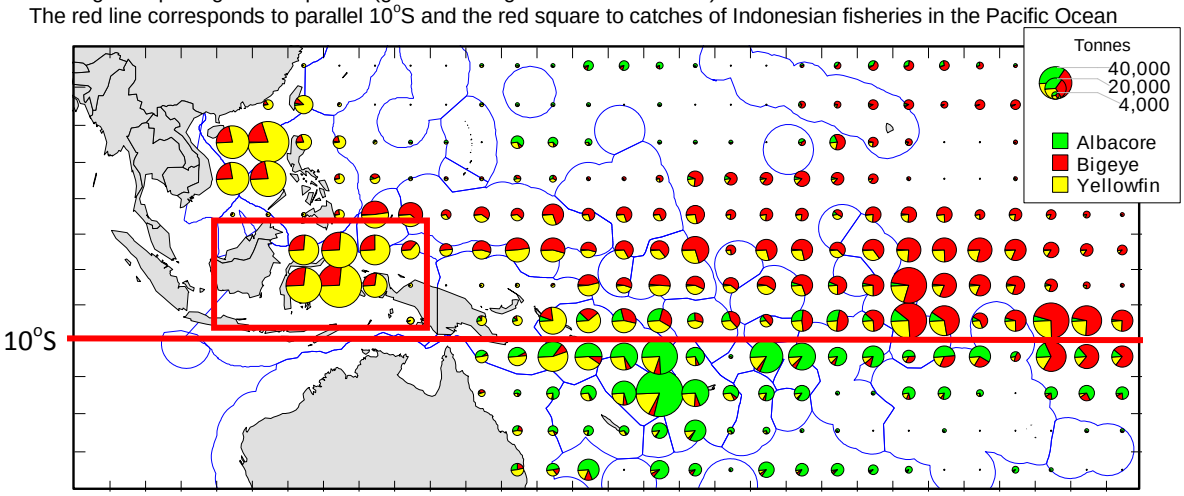
Mr. Peter Williams, from the Secretariat of the Pacific Community (SPC), presented estimates of albacore, and other species in the Pacific Ocean, as adopted by Indonesia and the WCPFC. He noted that, in 2013, the DGCF had decided to zero the catches of albacore in the Pacific Ocean, over the entire time-series. This decision was driven by results from a port sampling scheme, implemented with the assistance of the SPC in ports in Indonesia, in the Pacific Ocean side, which rendered no albacore at all, and information provided by the DGCF pointing to a massive miss-identification of yellowfin tuna in the past, with yellowfin tuna recorded as albacore (Table 1). Mr. Williams noted that if catches of albacore occur in the Pacific Ocean at all, they are likely to be very small.

The above was confirmed by representatives from the fishing industry and data from the ISSF which had recorded only 54 and 9 (Table 1) metric tons of albacore, respectively, in the Pacific Ocean in recent years.

In addition, Mr. Williams presented catches of albacore, and other species, in the Pacific Ocean, as recorded by the WCPFC noting that, in the Pacific Ocean, the majority of albacore is caught in the South, in waters beyond 10 degrees latitude South (Figure 1). He indicated that there is some consistency between reports in the Pacific Ocean and the catch levels of albacore that the DGCF presented at the meeting for the same latitudes in the Indian Ocean, which correspond to the waters between Southern Indonesia and Australia (Indonesia's Fisheries Management Area 573 (Figure 1).

[2] North Aceh Darussalam, North Sumatra, West Sumatra, Bengkulu, Lampung, Banten, West Java, DKI Jakarta, Central Java, Yogyakarta, East Java, Bali, Nusa Tengara Barat, Nusa Tengara Timur.

**Figure 1:** Total catches, all fleets combined, of main tuna species in the Western and Central Pacific Ocean during 2012, by five degree square grid and species (green shading is used for Albacore)
The red line corresponds to parallel 10°S and the red square to catches of Indonesian fisheries in the Pacific Ocean




## 3.4 Activities of vessels flagged in Indonesia equipped with a VMS

Ms. Fifi Rifiani presented a summary of the information transmitted through Vessel Monitoring System (VMS) to the DGCF for the year 2012. She noted that, at present, all fishing vessels having a Gross Tonnage over 60 shall be equipped with a VMS that allows transfer of data in real-time, as per the time frames scheduled, while data from VMS on fishing vessels between 30 and 60 GT, where VMS are also compulsory, does not need to be transmitted in real time. Ms. Rifiani noted that the Directorate General of Marine and Fisheries Resources Monitoring and Surveillance plans to introduce a new Regulation to extend VMS specifications for fishing vessels between 30-60 GT, along the lines of those existing for vessels over 60 GT, in the future.

Ms. Rifiani noted that the data presented refered only to vessels over 60GT. Notwithstanding this, the Workshop noted that the VMS data presented tends to indicate high levels of activity of longliners flagged in Indonesia in the South Indian Ocean, where catches of albacore are normally high, and this would justify the high catch levels of albacore and exports reported for Indonesian longliners, at least in recent years.

## 3.5 Status of implementation of the logbook programme

Mr. Edwin presented the status of implementation Indonesia's logbook programme and a summary of the data collected in 2012 and beginning of 2013. He noted that all fishing vessels with GT greater than 30 which have a valid fishing license shall complete logbooks and indicated that 355 vessels licensed to fish in the Indian Ocean had been handed over logbooks during the first quarter of 2013.

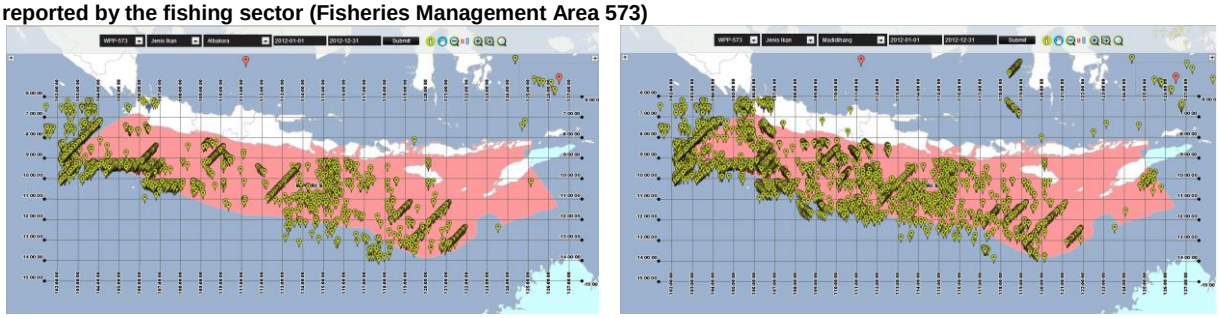
Mr. Edwin indicated that logbook coverage is still incomplete in all areas, in particular in the WCPFC Area (Table 4).

**Table 4**: Number of fishing vessels that were handed over logbooks during the first quarter of 2013, number of vessels that have returned logbooks for the period, and rate of compliance, by RFMO

| RFMO | Number of vessels with logbook | Number of vessels returning logbooks | Compliance Rate |
|---|---|---|---|
| IOTC | 355 | 217 | 61% |
| WCPFC | 39 | 10 | 26% |
| CCSBT | 264 | 184 | 70% |

Mr. Edwin noted that the quality of logbook data remains very poor, and presented information on the activities of fishing vessels, as reported in logbooks (Figure 2), and a comparison of fishing locations reported on logbooks, relating to individual trips, and data transmitted through VMS, for those same trips (Figure 3.a.-e.).

**Figure 2: Fishing locations for albacore (left) and yellowfin tuna (right) in December 2012, as derived from logbooks reported by the fishing sector (Fisheries Management Area 573)**



Mr. Edwin noted that the majority of fishing vessels do not report fishing locations and catches as they should and, while the majority of logbook activities are reported within the EEZ of Indonesia (Figure 2), the positions transmitted through the VMS tend to indicate the contrary, with the majority of the fishing effort exerted outside of the EEZ, on the high seas off western Australia and the southwest Indian Ocean.

Mr. Edwin noted that for some vessels there are large discrepancies between the fishing tracks derived from logbooks and those from VMS, for the same fishing trip, as shown in the examples presented in Figure 3.

## 3.6 Exports of albacore recorded by the DKP Provincial Office in Bali

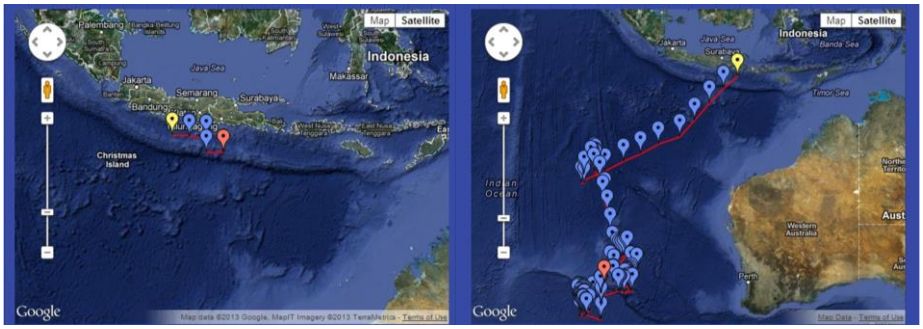
Mr. Sumantri presented exports of tunas from the DKP-Bali Provincial Office for the period 2002-12. He indicated that DKP-Bali does not collect data by species, noting that the catches used by the IOTC Secretariat and DGCF for some years as catches of albacore (Table 1) cannot refer to albacore but to the catches of all tuna and tuna-like species combined.

In light of this information, the Workshop noted the need to revise the estimates of catch of albacore for the years 2004-08, and agreed to update those values (Table 5).

**Figure 3.a.-e.: Comparison of the fishing locations reported on logbooks (left) and VMS data (right) as retrieved for the same fishing trip, on five fishing trips for the year 2012**

a

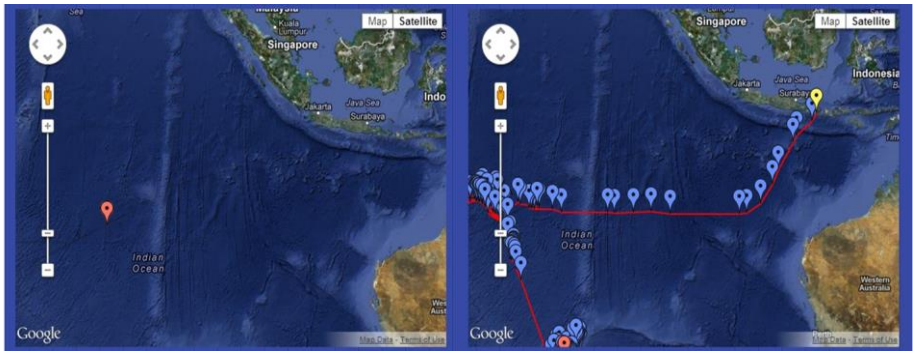

b




c


d


e



# 4. NEW CATCH SERIES OF ALBACORE ADOPTED BY THE WORKSHOP

The WS adopted a new catch series of albacore for the fisheries of Indonesia, as presented in Table 5 (bold font), agreeing that the catches estimated represent the best estimates of albacore that the Workshop was able to put together within the limited time available, for the time period and area concerned.

**Table 5**: New estimates of catches of Albacore in the Indian Ocean adopted by the Workshop and data used to derive the estimates, by year.

| | ALBACORE INDIAN OCEAN | | | | | | | TUX INDIAN OCEAN | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Adopted | Alternative 1 | Alternative 2 | Alternative 3 | Previous IOTC | Previous DGCF | ISSF | DGCF TUN[+] | DGCF TUS[++] | DKP Bali TUX[+++] |
| 2002 | **5,137** | | | | **5,137** | 2,826 | | | | 17,763 |
| 2003 | **8,278** | | | | **8,278** | 5,907 | | | | 14,472 |
| 2004 | **11,243** | 8,074 | **11,243** | 11,972 | 11,646 | 11,646 | | 270,702 | 79,305 | 12,237 |
| 2005 | **9,285** | 7,067 | **9,285** | 12,590 | 10,902 | 10,902 | | 223,556 | 83,398 | 10,712 |
| 2006 | **7,950** | 6,552 | **7,950** | 7,240 | 7,177 | 2,383 | | 191,419 | 47,961 | 9,930 |
| 2007 | **9,367** | 12,299 | **9,367** | 9,151 | 12,893 | 12,893 | | 225,540 | 60,616 | 18,642 |
| 2008 | **9,194** | 12,151 | **9,194** | 6,729 | 16,639 | 8,838 | | 221,362 | 44,574 | 18,417 |
| 2009 | **14,570** | **14,570** | *10,720* | *8,598* | 16,101 | 5,924 | 12,185 | 258,103 | 56,958 | 19,825 |
| 2010 | **13,030** | | | | 14,072 | **13,030** | 10,649 | 262,905 | 81,615 | 20,818 |
| 2011 | **11,483** | | | | 12,080 | **11,483** | 9,852 | 285,716 | 74,419 | 16,335 |
| 2012 | **11,537*** | | | | 13,725 | **11,537*** | 10,387 | 251,807 | 68,496 | 14,321 |

*Preliminary estimates

\+ TUN: albacore and southern bluefin tuna, yellowfin, bigeye and skipjack tunas, bullet, frigate and longtail tunas, and kawakawa

++ TUS: albacore, yellowfin tuna, southern bluefin tuna, and bigeye tuna

+++ TUX: includes all tuna and tuna-like species for export, including all TUN species plus swordfish and other billfish

Notwithstanding the above, the Workshop identified a number of issues that will require the attention of Indonesia in order to improve future, and review past, estimates; in addition, the Workshop provided some guidance on the actions that could be undertaken to address those issues, as presented in the next section.

The Workshop used three different approaches for the estimation of catches of albacore during 2004-08. Details about the estimation procedures used in each case and estimates adopted by the workshop are provided below, by time-period (refer also to Table 5, Alternative 1-3):

- **Years 2002-03**: The Workshop agreed to the estimates adopted by the IOTC Scientific Committee, noting that the discrepancies between previous estimates by the DGCF and IOTC may originate from underreporting of catches by longliners operating on the high seas, based in ports outside Indonesia, and insufficient coverage of catches of albacore in Indonesian ports, in particular those unloaded in frozen condition from large-scale deep-freezing longliners[3]. More details about the information used to derive estimates and procedures are presented in Annex 3.

- **Years 2004-08**: The Workshop noted that, while in the past the DGCF and the IOTC Secretariat had assumed that the figures provided by the DKF-Bali Office referred uniquely to exports of albacore, representatives of this Office clarified that the figures reported at the time referred to the total amounts of tunas exported from Bali, and therefore included exports of tropical tunas, albacore, and southern bluefin tuna, all combined. In light of this information, the Workshop agreed on the need to revise the estimates for this period, as the IOTC and the DGCF, the latter only for some years, had adopted the amounts exported from Bali as total catches of albacore for the period.

[3] It is important to note that the multilateral catch monitoring programme, in place between 2002-07 and subsequently maintained by the DGCF, while intended to cover the activities of fresh-tuna longliners based in ports in Indonesia, did not cover the activities of longliners based in foreign ports or large-scale freezing longliners, for which the DGCF relied entirely on reports from fishing operators, which were generally scant during those years.

- **Alternative 1:** Total catch of albacore (2) estimated using the ratio total combined exports of tunas reported by the DKP Provincial Office in Bali versus total catches of albacore estimated for the period 2010-11 (1), as shown below:

| | | |
|---|---|---|
| $r_e = \frac{\sum_{2010}^{2011} C_{ALB}}{\sum_{2010}^{2011} E_{TUN}}$ | $r_e = \frac{13{,}030 + 11{,}483}{20{,}818 + 16{,}335} = 0.66$ | (1) |
| $C_{ALB}{}_{2004}^{2008} = E_{TUN}{}_{2004}^{2008} * r_e$ (1) | $C_{ALB}^{2004} = 12{,}237 * 0.66 = 8{,}074$ | (2) |
| | $C_{ALB}^{2005} = 10{,}712 * 0.66 = 7{,}067$ | |
| | $C_{ALB}^{2006} = 9{,}930 * 0.66 = 6{,}552$ | |
| | $C_{ALB}^{2007} = 18{,}642 * 0.66 = 12{,}299$ | |
| | $C_{ALB}^{2008} = 18{,}417 * 0.66 = 12{,}151$ | |

The Workshop noted that the new catches of albacore estimated, while considered more accurate than previous estimates, remain uncertain, as they had been derived: assuming a constant ratio between the catches of albacore and exports for the period 2004-10; and also assuming that the proportion that tuna exports made over the total catches of tunas recorded had remained stable over the entire period.

- **Alternative 2:** Total catch of albacore (4) estimated using the proportion that the catches of albacore recorded by the DGCF made over the total catches of tunas for the years 2004-11[4] (3), as shown below:

| | | |
|---|---|---|
| $P_{TUN} = \frac{\sum_{2004}^{2011} C_{ALB}}{\sum_{2004}^{2011} C_{TUN}}$ | $P_{TUN} = \frac{72{,}595}{1{,}747{,}884} = 0.042$ | (3) |
| $C_{ALB}{}_{2004}^{2008} = C_{TUN}{}_{2004}^{2008} * P_{TUN}$ (3) | $C_{ALB}^{2004} = 270{,}702 * 0.042 =$ **11,243** | (4) |
| | $C_{ALB}^{2005} = 223{,}556 * 0.042 =$ **9,285** | |
| | $C_{ALB}^{2006} = 191{,}419 * 0.042 =$ **7,950** | |
| | $C_{ALB}^{2007} = 225{,}540 * 0.042 =$ **9,367** | |
| | $C_{ALB}^{2008} = 221{,}362 * 0.042 =$ **9,194** | |
| | $C_{ALB}^{2009} = 258{,}103 * 0.042 = 10{,}720$* | |

* Refer to Year 2009 for details

The Workshop noted that the new catches of albacore estimated, while considered more accurate than previous estimates, remain uncertain, as they had been derived assuming that: (i) the total combined catches of albacore, and total combined catches of tunas, reported by the DGCF for the period are accurate, as opposed to the catches reported for some years; (ii) the proportion that

[4] Note that the catches recorded for the year 2006, in which the catches of albacore reported by the DGCF are thought to be unreliable, were not used to estimate the proportion; the catches in 2012 were not used, as the catches estimated by the DGCF are still preliminary.

albacore made over the total combined catches of tunas had remained stable over the entire period (2004-08).

- **Alternative 3:** Total catch of albacore (6) estimated using the proportion that the catches of albacore recorded by the DGCF made over the total catches of major market tuna species for the years 2004-11[5] (5), as shown below:

| | | |
|---|---|---|
| $P_{TUS} = \frac{\sum_{2004}^{2011} C_{ALB}}{\sum_{2004}^{2011} C_{TUS}}$ | $P_{TUS} = \frac{72{,}595}{480{,}885} = 0.151$ | (5) |
| $C_{ALB}{}_{2004}^{2008} = C_{TUS}{}_{2004}^{2008} * P_{TUS}$ (5) | $C_{ALB}^{2004} = 79{,}305 * 0.151 = 11{,}972$ | (6) |
| | $C_{ALB}^{2005} = 83{,}398 * 0.151 = 12{,}590$ | |
| | $C_{ALB}^{2006} = 47{,}961 * 0.151 = 7{,}240$ | |
| | $C_{ALB}^{2007} = 60{,}616 * 0.151 = 9{,}151$ | |
| | $C_{ALB}^{2008} = 44{,}574 * 0.151 = 6{,}729$ | |
| | $C_{ALB}^{2009} = 56{,}958 * 0.151 = 8{,}598$* | |

*Refer to Year 2009 for details

The Workshop noted that the new catches of albacore estimated, while considered more accurate than previous estimates, remain uncertain, as they had been derived assuming that: (i) the total combined catches of albacore, and total combined catches for main market species of tunas (other than skipjack tuna), reported by the DGCF for the period are accurate, as opposed to the catches reported for some years; (ii) the proportion that albacore made over the total combined catches of major market species of tunas had remained stable over the entire period (2004-08).

The Workshop agreed on the need to further verify the assumptions made to derive catches of albacore under each estimation procedure. Notwithstanding this, the Workshop agreed to adopt the catches of albacore estimated using the ratio albacore versus total combined catches of tunas (Alternative 2). In particular, the Workshop expressed reservations to accept the assumptions that the ratios Export versus total catches and albacore versus total exports has remained stable over the period selected (Alternative 1), and considered that the catches of albacore derived for 2008 using the procedures detailed in Alternative 3 are unreliable, because of them being too low. The Workshop noted that the large drop in the catches of major market tuna species in 2008-09, as reported by the DGCF, is difficult to explain and needs to be confirmed.

- **Year 2009**: The Workshop noted that the catches of albacore reported by the DGCF for 2009 are half the total amounts of albacore recorded for canning factories cooperating with the ISSF during the same year, and agreed on the need to revise the catches. The Workshop agreed to reject the catches of albacore derived using alternatives 2 and 3, noting that the new catches estimated are lower than the amounts of albacore recorded by the ISSF for 2009 and therefore are thought unreliable. The Workshop further noted that the DGCF had reported catches of albacore for 2010 and 2011 that were higher than the figures recorded by the ISSF, and agreed that the difference between DGCF estimates and ISSF imports is reasonable and the ratios estimated by dividing both values, for each year, are consistent. For this reason, the Workshop agreed to use the ratio DGCF albacore catch versus ISSF imports (3) to estimate catches of albacore for 2009 (4), as shown below:

| | | |
|---|---|---|
| $r_i = \frac{\sum_{2010}^{2011} C_{ALB}}{\sum_{2010}^{2011} I_{ALB}}$ | $r_i = \frac{13{,}030 + 11{,}483}{10{,}649 + 9{,}852} = 1.20$ | (3) |

[5] *Ibid.* 3

| | |
|---|---|
| $C_{ALB}^{2009} = I_{ALB}^{2009} * r_i$ (3) | $C_{ALB}^{2009} = 12{,}185 * 1.20 = \mathbf{14{,}570}$ (4) |

While agreeing that the new catches of albacore estimated for 2009 are more reliable than previous estimates, the Workshop noted that the new estimates assume constant ratios ISSF imports *versus* total catches of albacore for 2009-11. In addition, the Workshop noted that using the catches reported by the DGCF may lead to underestimation of catches, as this approach ignores any catches of albacore unloaded in ports outside Indonesia, where unloadings of Indonesian vessels are known to occur. For this reason the Workshop agreed on the need to validate this approach in the future, using alternative approaches to estimate catches of albacore, where possible.

- **Years 2010-12**: The Workshop agreed to adopt the catches estimated by the DGCF for this period, noting that the levels of catch reported by the DGCF and imports provided by the ISSF for the period were not found conflicting. Notwithstanding this, the Workshop agreed on the need to verify the assumption that as much as 80-90% of the catches of albacore taken by the fisheries of Indonesia are exported to canning factories cooperating with the ISSF, and the fact that using the catches reported by the DGCF may ignore the activities of Indonesia's foreign-based fleet, as indicated above.

The Workshop, while adopting the new catch series of albacore and endorsing the estimation procedures presented above, reiterated the need to validate the assumptions made and procedures adopted by the Workshop. The Workshop agreed that, where required, the IOTC Secretariat maintain the procedures used to estimate catches of albacore for years before 2002 and to break the catches of albacore by gear, over the entire series, as presented in Annex 3.

## 5. MAIN ISSUES IDENTIFIED BY THE WORKSHOP

The Workshop recalled the recommendations issued by previous meetings in Indonesia, in particular the Logbook[6] (2009) and Catch Estimation[7] (2012) workshops, noting that, despite the progress achieved in some areas, some of the issues identified at the time have not been sufficiently addressed, in particular:

- To date, Indonesia has not reported a series of time-area catch and effort for its fisheries to the IOTC and WCPFC, as per the requirements agreed by each RFMO, and forms adopted at the 2009 Logbook Workshop. The Workshop noted that the lack of a reliable time-area catch and effort series for albacore, due to the poor coverage and quality of logbook reports, had compromised validation by the Workshop of the assumption that all catches of albacore come from the Indian Ocean; and prevented the use of logbook data, in combination with other information, in the estimation of catches of albacore and breakdown of those catches by gear type, area, and month.

- While acknowledging that the DGCF had achieved considerable progress in the implementation of the vessel monitoring system and the high importance of the data collected, the Workshop noted that, to date, the DGCF has not set up procedures to routinely validate, correct, and complete the information recorded on logbooks. In particular, the Workshop noted that VMS data can be used to derive levels of activity by fleet and area and, in combination with data derived from logbooks and port sampling, used in the estimation of levels of effort by area.

- The Workshop noted that DGCF's coverage of Indonesia's foreign based fleet, also called high seas fleet, remains insufficient. It was noted that significant catches of albacore and other species may have been overlooked by the DGCF due to poor logbook returns and catch reports from vessel operators, and lack of port sampling and institutional arrangements with the countries in which those vessels operate.

[6] IOTC-OFCF Project Phase II (2009). Report and documentation of the Workshop on the Implementation of a Logbook Programme for the fisheries of Indonesia: Review of issues and considerations. Jakarta, 18–20 May 2009. IOTC-OFCF Technical Report. No. 1. Jakarta, IOTC. 2009. 84 pp.

[7] IOTC-OFCF Project Phase III (2012). Report and documentation of the Indian Ocean Tuna Fisheries of Indonesia Catch Estimation Workshop: Review of Issues and Considerations. Jakarta, 13–15 March 2012. IOTC-OFCF Technical Report. No. 2. Jakarta, IOTC. 2012. 47 pp.

- The Workshop noted that Indonesia has not reported length frequency data for albacore or other IOTC species since 2010, stressing the need for the DGCF to collect and report this information routinely, as required by the IOTC. In particular, the Workshop noted that, while the majority of catches of albacore reported in recent years refer to longline fisheries, the amounts of albacore caught trolling have also been significant (Table 3), further noting that this is the only fishery trolling in the Indian Ocean known to date. For this reason, the Workshop stressed the need to collect length samples of albacore from trolling vessels, as this gear tends to catch juvenile or sub-adult albacore, unlike longlines, which catch mostly adult specimens.

- The Workshop noted that, despite all the efforts devoted by the DGCF, the management of routine statistics remains a problem in Indonesia, with data processed by hand and channeled from each District to the Province concerned, and subsequently forwarded from the Province to the DGCF Headquarters in Jakarta, in highly aggregated form. The Workshop noted that data processing and aggregation by hand compromises the quality of the statistics produced by the DGCF, as it reduces the DGCF's capacity to verify reports and track down potential errors to the collection point. Notwithstanding this, the Workshop agreed that addressing this issue may be difficult as some Provincial authorities, which hold a large degree of autonomy in Indonesia, oppose to the use a Centralized Database System (e.g. SISKA) and, to date, have hindered all attempts from the DGCF to enforce its use in Indonesia.

In addition, the Workshop identified other issues that require the DGCF's attention, including:

- The massive miss-identification of yellowfin tuna as albacore in the Pacific Ocean in recent years (Table 1) points to the fact that species identification remains a problem in some landing places, and needs to be addressed as a matter of priority. In particular, the catches of albacore reported by the coastal fisheries need to be verified.

- The large inter-annual variation in the catches of albacore reported by the DGCF for each gear type (Table 1) and reports of catches of albacore under gears that are very unlikely to catch albacore (e.g. lift nets on Table 3), tend to indicate that the data collection and verification procedures implemented by the DGCF are not sufficient, and need to be strengthened.

- The relatively large amounts of albacore caught trolling in recent years (Table 3) need to be verified, in particular whether vessels licensed as squid jiggers are also trolling for albacore or using other gears to catch albacore, as any of the two species can be targeted using the same gear. In addition, the fishing grounds of this fishery need to be assessed as trolling for juvenile albacore usually occurs in temperate waters, where the majority of the activities of vessels equipped with a VMS seem to have occurred in recent years.

- The Workshop noted that the DGCF does not keep historical VMS data due to lack of space in the VMS server or external hardware to store this information, and stressed the importance that this information has, in particular in the validation of logbooks, agreeing on the need to keep these data.

## 6. ACTIONS RECOMMENDED BY THE WORKSHOP

The main recommendations from the Workshop and actions proposed to address them are summarized below:

1. Recommendation: The DGCF should strengthen the monitoring of albacore by the coastal fisheries of Indonesia, in particular with regards to identification of species and fishing gear, and routine collection of length frequency data[8], by time-period and gear.

   Activities proposed: Implementation of a Pilot Project to assess the status of data collection systems for the coastal fisheries of Indonesia, through strengthening of sampling in selected landing places, and capacity building devoted to improve species and gear identification, and collection of length frequency data, at the landing place.

[8] To at least attain the minimum levels of coverage for size data agreed by the IOTC, which at present are 1 fish length for each metric ton of catch, per species, gear, and month.

Execution: DGCF and RCCF to implement this activity with the support of the IOTC-OFCF Project, where required. The DGCF to coordinate activities in order to avoid overlapping with activities implemented with the support of other agencies, such as CSIRO.

2. Recommendation: The DGCF should strengthen the capacity of port samplers to identify species, in particular in its juvenile stage.

   Activities proposed: Printing and dissemination of IOTC species identification cards to enumerators and training in species identification.

   Execution: The IOTC-OFCF Project to consider allocating funds under the Pilot Project to print and disseminate species identification cards in Indonesia, as required.

3. Recommendation: The DGCF should review sampling, data management and catch estimation procedures for fresh-tuna longliners based in ports in Indonesia and, where required, change the sampling design, in particular to improve the coverage of fish unloaded frozen.

   Activities proposed: Mission from a fisheries expert to ports of unloading of fresh-tuna longliners in Indonesia to evaluate data collection and management systems in each port and report on any changes required as regards to sampling design, implementation, or data management, as required.

   Execution: The DGCF to identify a fisheries expert to undertake this work and, where required, require assistance from the IOTC-OFCF Project to select and hire the Expert to undertake this work.

4. Recommendation: The DGCF should strengthen the monitoring of fishing vessels not based in Indonesia (high seas fleet), in order to increase logbook reports and monitoring of catches in port.

   Activities proposed: The DGCF to establish agreements with the authorities of coastal countries where fishing vessels flagged in Indonesia are based in order to facilitate the exchange of data, in particular data from logbooks or collected in port.

   Execution: The DGCF to establish the required agreements and the IOTC Secretariat to assist the DGCF in the identification of coastal countries where vessels flagged in Indonesia are based.

5. Recommendation: The DKP Provincial Office in Bali is encouraged to record the species for as many products exported as possible, in particular for albacore and other major market tuna species.

   Activities proposed: The DKP Provincial Office in Bali to extend data collection to include species.

   Execution: The DKP Provincial Office in Bali to implement this recommendation.

6. Recommendation: The DGCF should sustain efforts to extend the Centralized Management System so as data collected at the District and Province levels are computerized in raw form, instead of aggregated, and routines for data verification and catch estimation can be built in the system in order to ensure that data quality standards are maintained at an appropriate level.

   Activities proposed: The DGCF to establish arrangements for a phased-in implementation of the CDS, including training of staff to use the software and produce reports in District and Provincial offices and, in the event of lack of cooperation, assess the reasons of non-compliance and explore the type of measures that could be implemented to overcome those issues.

   Execution: The DGCF to implement this recommendation, where possible with the assistance of the IT Company that is building the new Centralized Database System.

7. Recommendation: The DGCF should use data from as many sources as possible to estimate catches and validate the catches reported by each Province and other data collected from the fisheries.

   Activities proposed: The DGCF to establish procedures to use catch, logbook, VMS, observer, and export statistics in the estimation of catches.

   Execution: The DGCF to implement this activity, where possible with the assistance of the IT Company that is building the new Centralized Database System, and technical assistance from the IOTC Secretariat and SPC, where necessary.

8. Recommendation: The DGCF should adopt measures to increase the amount of logbook returns and improve the quality of the data reported on logbooks.

   Activities proposed: The DGCF to establish a scheme of rewards (and sanctions) to be applied based on compliance from the fishing sector with the logbook, including return of logbooks at the end of each fishing

trip and reliability of the information reported, to be assessed using VMS data and monitoring of catches in port.

Execution: The DGCF to implement this activity, and the IOTC Secretariat and SPC to provide technical assistance, where necessary.

9. Recommendation: The DGCF should make every possible effort to keep historical VMS records in electronic form, and adopt a backup policy in order to ensure the safety of the data collected.

   Activities proposed: The DGCF to adopt a backup policy and procedures and purchase additional hardware in which to store backups from the VMS.

   Execution: The DGCF to implement this activity.

10. Recommendation: The DGCF and the IOTC Secretariat to further analyze the data provided by canning factories cooperating with the ISSF in order to assess the reliability of reports, validate estimates based on this information, and assess the value of using this information in the future.

    Activities proposed: The DGCF to request the IOTC Secretariat for a joint meeting and access to the raw data provided by the ISSF during that meeting, and the IOTC Secretariat to forward this request to the ISSF. Upon approval from the ISSF, the DGCF to prepare VMS, logbook, and landing data for those Indonesian vessels that, according to the ISSF, have exported catches of albacore to canning factories, and compare this data with records from the ISSF.

    Execution: The DGCF and the IOTC Secretariat to implement this activity.

The workshop strongly encouraged the continuation of advice and support from the IOTC, OFCF, SPC, DAFF/ACIAR/CSIRO and non-governmental organizations in the coordination and strengthening of data collection and processing activities in Indonesia. In this regard, the Workshop recognized the value that the IOTC and WCPFC implement capacity building activities in a concerted manner, noting that Indonesia has similar fisheries in the Indian and Pacific oceans and the issues identified above apply, in most cases, to both oceans.

## 7. OTHER BUSINESS

No other business were raised.

## 8. CLOSING OF THE WORKSHOP

The Workshop thanked the Chair Mr. Agus Budhiman and co-Chair Ms. Erni Widjajanti for their valuable contributions, and also thanked the authors of background papers and presentations. The Chair thanked IOTC, SPC and the representatives of the fishing industry for attending the workshop and provide valuable technical guidance. In particular, the Chair expressed its appreciation to the ISSF and stressed the value that this dataset had had to verify the catches of albacore at the Workshop, recommending that ISSF considers making this information available also in the future.

Mr. Ruchimat, Director of Fisheries Resources of DGCF, thanked participants for their contributions and closed the Workshop at approximately12:00 hours on 25 June 2013.

## **APPENDIX A:** Workshop agenda

1. Opening
2. Election of Workshop Moderator
3. Presentation of official figures and data sources (DGCF)
4. Presentation of scientific estimates and data sources (IOTC)
5. Presentation of scientific estimates and data sources (WCPFC)
6. Presentation of data from the ISSF (Indian + Pacific oceans) (IOTC)
7. Status of logbook programme, Vessel Monitoring System, and export data (DGCF)
8. Review of catch estimation procedures and estimates
9. Production of alternative catch estimates, and adoption of new time-series of catch of albacore (where required)
10. Recommendations and decisions from the Work Shop
11. Closing of the Workshop

## **APPENDIX B:** List of participants

| NO | Name | Institution | E-mail |
|---|---|---|---|
| 1 | Dr. Toni Ruchimat | Directorate of Fisheries Resources | truchimat@yahoo.com |
| 2 | Agus Budhiman | Directorate General of Capture Fisheries | budhiman2004@yahoo.com |
| 3 | Nugroho Aji | Directorate of Marine and Fisheries Resources Monitoring and Surveillance Infrastructure Development | - |
| 4 | Fifi Rifiani | Directorate of Marine and Fisheries Resources Monitoring and Surveillance Infrastructure Development | rifiani.fifi@gmail.com |
| 5 | Erni Widjajanti | Sub-Directorate of Fisheries Resources Management In EEZ And High Seas | erwijaya@yahoo.com |
| 6 | Sofi Chullatus Sofia | Sub-Directorate of Fisheries Resources Management In EEZ And High Seas | chullatus_sofia@yahoo.co.id |
| 7 | Yayan Hernuryadin | Sub-Directorate of Fisheries Resources Management In EEZ And High Seas | boyan_nuryadin@yahoo.co.id |
| 8 | Putuh Suadela | Sub-Directorate of Fisheries Resources Management In EEZ And High Seas | putuhsuadela@yahoo.co.uk |
| 9 | Satya Mardi | Sub-Directorate of Fisheries Resources Management In EEZ And High Seas | addye_sm18@yahoo.com |
| 10 | Neneng | Sub-Directorate of Fisheries Resources Management In EEZ And High Seas | sdi.djpt@yahoo.com |
| 11 | Diding Sudira Effendi | Sub-Directorate of Data And Statistic - DGCF | dsefendi@yahoo.com |
| 12 | Lilik Budi Lestari | Sub-Directorate of Data And Statistic - DGCF | statistiktangkap@yahoo.co.id |
| 13 | Muhammad Anas | Sub-Directorate of Data And Statistic - DGCF | statistiktangkap@yahoo.co.id |
| 14 | Anang Wahyu Susilo | Sub-Directorate of Data And Statistic - DGCF | statistiktangkap@yahoo.co.id |
| 15 | Edwison Setya Firmana | Sub-Directorate of Fisheries Resources Evaluation | edwisonsf@yahoo.com |
| 16 | Jonathan Graydam | Sub-Directorate of Fisheries Resources Evaluation | john.gdam@yahoo.com |
| 17 | Alif Priyambodo | Sub-Directorate of Fisheries Resources Evaluation | evaluasisdi@gmail.com |
| 18 | Gunawan Dwi Nugroho | Sub-Directorate of Fisheries Resources Evaluation | evaluasisdi@gmail.com |
| 19 | Sumantri | DKP Province of Bali | diskelkanbali@gmail.com |
| 20 | Anung Widodo | Research Center for Fisheries Management and Conservation | anungwd@yahoo.co.id |
| 21 | Lilis Sadiyah | Research Center for Fisheries Management and Conservation | lilis_sadiyah@yahoo.com |
| 22 | Bambang Novantoro | Indonesia Tuna Long Line Association | atli.bali@gmail.com |
| 23 | Tanto | Integrated Capture Fisheries Association | aspertadu@yahoo.com |
| 24 | R.P. Poernomo | Indonesia Tuna Association | ayu@bit.net.id |
| 25 | Muhammad Bilahmar | Indonesia Tuna Association | - |
| 26 | Miguel Herrera | Indian Ocean Tuna Commission | Miguel.Herrera@iotc.org |
| 27 | Peter Williams | Western and Central Pacific Fisheries Commission | PeterW@spc.int |

## PART 2: WORKSHOP BACKGROUND INFORMATION

See also attached CD

# Annex 1

Short note on the preparation of information for the

## INDIAN OCEAN TUNA FISHERIES OF INDONESIA ALBACORE CATCH ESTIMATION WORKSHOP

Bogor-Jakarta, 21-25 June 2013
Prepared by the IOTC Secretariat

## Purpose

The purpose of this note is to provide guidance in the preparation of information to be presented at the Workshop, as well as defining its main objectives and the expected outcomes.

## Main objectives of the Workshop and expected outcomes

1. ***Objective***: Revise the catch series of albacore for the fisheries of Indonesia, in particular those operated within the IOTC Area of Competence;
   ***Expected outcome***: The Workshop to propose an alternative time-series of catch for albacore, where required.
2. ***Objective***: Review the status of data collection with a focus on data used for the estimation of catches of albacore and recommend the type of actions that should be implemented to overcome the issues identified;
   ***Expected outcome***: The DGCF to implement concrete actions in order to address the issues identified by the Workshop, in particular to improve the estimates of catch for albacore, and other species, in the future.

Initially the WS will focus on fisheries catching albacore, although the recommendations addressed may apply also to other species.

## Organization of the Workshop

The WS will be divided into two separate Sessions:

- **Part I** will run for one day and will be devoted to review the data collection and processing systems in Indonesia, and drafting of recommendations from the Workshop, with a focus on albacore. All participants will attend this Session.
- **Part II** will run for two days, in which a dedicated group will review the estimates of catch of albacore and adopt best estimates for the period under consideration, and recommend any follow-up actions required to improve estimates in the future.

## Information required

The following information need to be prepared before the workshop, to be used by WS participants:

- Official estimates from the DGCF of Indonesia in the IOTC and WCPFC areas (DGCF)
- Catch series of albacore as adopted by the IOTC Scientific Committee (IOTC)
- Catch series of albacore as adopted by the WCPFC (SPC)

- Data sources and procedures used to estimate catches of albacore by ocean (DGCF)
    - Vessel activity: operational catch-and-effort data (logbooks), VMS data, or other.
    - Catch monitoring in port
    - Exports of albacore recorded by Dinas Perikanan Bali (or any other Export office in Indonesia), for as many years as possible (DGCF).
    - Other sources
- Data sources and procedures used to derive scientific estimates of catch of albacore in the Pacific Ocean (SPC)
    - Official reports
    - Port sampling
    - Albacore data available from canning factories cooperating with the International Seafood Sustainability Foundation
- Data sources and procedures used to derive scientific estimates of catch of albacore in the Indian Ocean (IOTC)
    - Official reports
    - Estimates of catches of albacore using data collected during the Multilateral Catch Monitoring Programme in Indonesia
- Albacore data available from canning factories cooperating with the International Seafood Sustainability FoundationWhere possible, IOTC and DGCF data to be prepared in electronic format.

## Annex 2

# Review of scientific catch estimates of albacore by the fisheries of Indonesia over the period 2002-2012 using catch and export data

Miguel Herrera & Lucia Pierre (IOTC Secretariat)

## Introduction

During its last meeting, the IOTC Scientific Committee revised scientific estimates of catches of albacore in the Indian Ocean and identified Indonesia as one of the major fisheries for albacore in recent years. Nevertheless, while acknowledging the high catches of albacore estimated for the fisheries of Indonesia, the IOTC Scientific Committee also noted the highly uncertain nature of those estimates, further

> *NOTING the ongoing review of Indonesian catches of albacore being carried out by the IOTC Secretariat in consultation with the Directorate General of Capture Fisheries (DGCF) of Indonesia, and that current catch estimates for Indonesia are derived from reports of albacore imports into canning factories cooperating with the ISSF[9], the SC REQUESTED that the IOTC Secretariat and Indonesia continue cooperation to finalise the review and report final estimates of catches of albacore to the next meeting of the WPTmT[10].*

In order to address the request from the IOTC Scientific Committee, the DGCF of Indonesia, the IOTC Secretariat, and the Secretariat of the Pacific Community (SPC) agreed to organize a meeting in Indonesia to revise the catches of albacore in the IOTC database and estimates of catches by the DGCF and the WCPFC, and agree to a new catch series of albacore in the Indian Ocean for the fisheries of Indonesia, where required.

This paper presents previous estimates of catches of albacore by the fisheries in Indonesia, as adopted by IOTC Scientific Committee, a new catch series of albacore agreed at the meeting, and the actions recommended for Indonesia to improve the quality of the estimates of catch of albacore in the future, as agreed at the meeting.

## Current status and data sources

Table 1 shows estimates of catches of albacore in the Indian Ocean and Pacific oceans as obtained from different sources. More details about each source are provided after the table.

**Table 1**: Estimates of catches of Albacore in the Indian Ocean and Pacific Ocean from different sources. More information about each data source is provided in the text

| Year | INDIAN OCEAN | | | | PACIFIC OCEAN | | | | DKP Bali |
|---|---|---|---|---|---|---|---|---|---|
| | DGCF | IOTC | FAO | ISSF | DGCF* | WCPFC | FAO | ISSF | |
| 2002 | 2,826 | 5,137 | 2,790 | | 0 | 0 | 0 | | |
| 2003 | 5,907 | 8,278 | 5,870 | | 0 | 0 | 0 | | |
| 2004 | 11,646 | 11,646 | 12,644 | | (17,489) | 0 | 0 | | 11,646 |
| 2005 | 10,902 | 10,902 | 11,595 | | (22,888) | 0 | 0 | | 10,902 |
| 2006 | 2,383 | 7,177 | 8,052 | | (17,910) | 0 | 0 | | 7,177 |
| 2007 | 12,893 | 12,893 | 13,748 | | (21,922) | 0 | 0 | | 12,893 |
| 2008 | 8,838 | 16,639 | 17,878 | | (27,513) | 0 | 0 | | 16,639 |
| 2009 | 5,924 | 16,101 | 15,274 | 12,185 | (19,564) | 0 | 0 | | |

[9] International Seafood Sustainability Foundation
[10] IOTC Working Party on Temperate Tunas

**Table 1**: Estimates of catches of Albacore in the Indian Ocean and Pacific Ocean from different sources. More information about each data source is provided in the text

| Year | INDIAN OCEAN | | | | PACIFIC OCEAN | | | | DKP Bali |
|---|---|---|---|---|---|---|---|---|---|
| | DGCF | IOTC | FAO | ISSF | DGCF* | WCPFC | FAO | ISSF | |
| 2010 | 13,030 | 14,072 | 11,833 | 10,649 | (17,104) | 0 | 0 | 9 | |
| 2011 | 11,483 | 12,080 | 16,675 | 9,852 | 0 | 0 | 0 | | |
| 2012 | | *13,725*[+] | | 10,387 | | | | | |

*Figures revised by the DGCF in 2013 with all catches of albacore in the Pacific Ocean removed

+ Not in IOTC Database yet

***Directorate General of Capture Fisheries (DGCF)***: The DGCF of Indonesia is the authority responsible to report official estimates to the Indian Ocean Tuna Commission. Indonesia has a data collection system in place that relies on reports from the fishing sector and some sampling of catches in selected fishing ports. In the mid-2000s the DGCF extended its data collection system with a view to improve estimates of catches per gear and species, and reports to national and international organizations. However, reports of catches of albacore over the years have not been within bounds that would be considered reasonable for the fisheries and species concerned and are conflicting when compared to data from other sources. In addition, DGCF has recently revised catches of albacore in the Pacific Ocean, zeroing the catches previously reported for 2004-10 (around 20,000 t of albacore per year).

***Indian Ocean Tuna Commission (IOTC)***: The IOTC compiles information on catches, effort, and length frequency from the fisheries operated in its Area of Competence, as reported by each flag state. In addition, the IOTC collects alternative information, from as many sources as available, and compares this information with the data officially reported by each flag state. In the case of Indonesia the IOTC Secretariat used data from several sources to adjust the catches of albacore reported by the DGCF of Indonesia, as explained in the next section.

***Food and Agriculture Organization of the United Nations (FAO)***: The FAO compiles information on catches of marine species, including albacore, and other information from the fisheries, as reported by each flag state, and publishes this information annually, in database form (FAO FishStat) or through the FIGIS network. The FAO and IOTC exchange databases every year and the FAO database is usually updated to match the IOTC database, unless specific conditions apply. The reason why the catches recorded by FAO and IOTC are different is a recent update conducted by the IOTC, which led to changes in the estimates. FAO has recently updated the catches of albacore for Indonesia in the Pacific Ocean, following a review conducted by the DGCF in which all catches of albacore in the Pacific Ocean were removed.

***International Seafood Sustainability Foundation (ISSF)***: Canning factories cooperating with the ISSF provide the IOTC Secretariat with data on imports of albacore and other species each quarter, on a voluntary basis. Each canning factory provides exports of albacore by fishing vessel, carrier vessel (where applicable), date of catch transfer, and ocean of origin. The IOTC Secretariat has been compiling information from canning factories under the ISSF since 2009. However, it is important to note that the total exports of albacore recorded for Indonesia are likely to be lower than the total catches of albacore taken by vessels flagged in Indonesia, as some albacore exports may not go through canning factories that cooperate with the ISSF, and some catches of albacore are likely to be sold locally. A summary of the data available is presented in Table 2 below.

A comparison between the vessel details provided by canning factories cooperating with the ISSF and information in the IOTC Vessel Record Database showed that the majority of the catches of albacore exported to canning factories come from fresh-tuna longline vessels flagged in Indonesia. The large number of small-scale vessels (LOA<24m) that exported albacore to canning factories and the relatively high average catches per boat exported during this period (50 metric tons per boat per year in average) tend to indicate that albacore is a frequent catch of this fishery with fishing grounds likely to be in the proximity of Indonesia, probably in the Indian Ocean, between Indonesia and Australia.

**Table 2**: Number of fishing vessels flagged in Indonesia that exported albacore to canning factories cooperating with the ISSF, number of individual unloading events from those vessels, number of transhipment events, and catches of albacore shipped to processing plants during 2009-11. Numbers by vessel length class and catches per processing plant are also shown.

| ISSF | Number of individual vessels exporting albacore | | | | Number of fishing vessel unloading events | | | | Number of transhipment events* and catch of albacore shipped | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | no | <24 | 24+ | UNK | no | <24 | 24+ | UNK | no | Total (mt) | Plant 1 | Plant 2 | Plant 3 |
| 2009 | 236 | 85 | 129 | 22 | 459 | 199 | 228 | 32 | 315 | 12,185 | 11,776 | 102 | 308 |
| 2010 | 189 | 131 | 28 | 30 | 505 | 374 | 78 | 53 | 505 | 10,649 | 9,589 | 0 | 1,061 |
| 2011 | 212 | 100 | 31 | 81 | 533 | 321 | 94 | 118 | 533 | 9,142 | 7,646 | 0 | 1,496 |

*Note that more than one fishing vessel transhipped catch to the same carrier vessel in 2009

***Western and Central Pacific Fisheries Commission (WCPFC)***: The WCPFC compiles similar information to that collected by the IOTC, in the Pacific Ocean.

***Export Office/Dinas Kelautan Perikanan Bali (DKP):*** DKP Bali records exports of albacore and other species to foreign markets including species, type of product, and amount exported. Information by species is only available since 2004 and, while the origin of the catches is not specified, the large majority of the exports of albacore are presumed to come from the Indian Ocean. As with ISSF, it is likely that the amounts of albacore recorded by DKP Bali are lower than the total catches of albacore taken by vessels flagged in Indonesia, as some of the catches may be sold locally or exported from other locations in Indonesia or beyond (e.g. Mauritius).

## Estimation procedures and results

In recent years, the IOTC Secretariat has used a combination of methods to estimate catches of albacore and other species in the Indian Ocean, including: official reports from the DGCF; data from the Dinas Perikanan Office in Bali; catch and effort data collected in Port from fresh-tuna longline vessels (Multilateral Catch Monitoring Programme); and data from the ISSF.

While in the past Indonesia used data from the multilateral catch monitoring programme to derive catches of albacore, the amounts of albacore estimated for the period proved to be too low when compared with data collected from alternative sources, in particular exports of albacore recorded by the Dinas Perikanan Office in Bali. The following may explain the discrepancies in the amounts of albacore estimated from port sampling *versus* those recorded by the Export office:

- **Insufficient monitoring of unloadings of frozen albacore from fresh-tuna longliners**: the majority of albacore, swordfish and sharks are usually considered bycatch and stored frozen onboard longliners, as opposed to target species, which are kept on ice or refrigerated seawater. In general unloading of frozen fish in port are more difficult to monitor because fish is not unloaded or weighed individually, often not weighed at all, rapidly loaded in tracks and transferred to cold storage facilities in land.
- **Allocation of catches of albacore to the wrong ocean:** Between 2004 and 2010 the DGCF of Indonesia reported very high catches of albacore in the Pacific Ocean, with annual catches ranging between 17 and 27 thousand tons during that period (Table 1). On the contrary, catches in the Indian Ocean for the same period were moderate to low. In 2012, following reports of systematic miss-labelling of yellowfin tuna as albacore and results from port sampling in the Pacific Ocean (DGCF-SPC monitoring), the DGCF removed all catches of albacore in the Pacific Ocean, acknowledging that no or very low amounts of albacore were taken by Indonesia in the Pacific Ocean during that period. Even though the removal of catches of albacore from the Pacific Ocean did not lead to re-allocation of part or the totality of those catches to the Indian Ocean, data available from alternative sources, as the ISSF and the DKP Export Office in Bali (Table 1), tend to indicate that the catches of

albacore reported by the DGCF for the Indian Ocean are too low and catches originally reported in the Pacific Ocean may in fact belong to the Indian Ocean.

- **Insufficient monitoring of freezing tuna longliners flagged in Indonesia:** At present around 30 large-scale freezing longliners flagged in Indonesia are authorized to operate in the IOTC Area of competence (Table 4). Although freezing longliners have been operating in Indonesia in recent years, their unloadings were not covered through the multilateral catch monitoring programme, which was directed at fresh-tuna longliners. The IOTC Secretariat believes that monitoring of catches from these vessels is poor due to the lack of logbooks and difficulties to monitor catches in port, as explained above for the frozen component. Some freezing longliners may be targeting albacore, as these vessels have the capacity to sail to distant fishing grounds, as those for albacore in Southern waters.
- **Insufficient of monitoring of activities of vessels flagged in Indonesia based in ports outside Indonesia:** The IOTC Secretariat has received information from several IOTC CPCs and other parties relating to unloadings of vessels flagged in Indonesia in ports within their territories, including Mauritius, Sri Lanka, Thailand, Malaysia, and Singapore. To date, Indonesia has not monitored activities of these vessels or reported their catches to the IOTC.

The procedures used to estimate catches of albacore are briefly explained below:

- **Total catches from vessels flagged in Indonesia**:
    - Catch estimates 2002-03: The total catches of albacore for 2002 and 2003 were estimated independently for fresh-tuna longliners, freezing longliners, and coastal fisheries. The estimation of catches for freezing longliners and coastal fisheries is covered in the next section (Breakdown of catches by gear). The catches of fresh-tuna longliners were estimated using data from the multilateral catch monitoring programme, as follows:
        - 2002: Catches of albacore were derived using the total number vessel unloadings and samples of catch collected on those unloading, in Benoa, which was the only port covered at the time. Catches for other ports were estimated using procedures similar to those explained for 2003 below.
        - 2003: Catches of albacore were derived using the total number vessel unloadings and samples of catch collected on those unloadings, in Benoa, Cilacap, and Jakarta. The catches in other ports in Indonesia that were not monitored, such as Pelabuhan-ratu, Bungus, and Aceh, were estimated using levels of activity from those ports and average catches per boat from ports monitored, as required. Finally, the catches of albacore unloaded in ports outside Indonesia were estimated using data reported by the coastal countries in which those vessels were based. More details about the estimation procedures and results can be found on reports presented to IOTC Working Parties (DGCF et al. 2005[11]; Herrera 2002[12]; Herrera 2002[13]).
    - Catch estimates 2004-08: The IOTC Secretariat used the amounts exported recorded by DKP Bali (Table 1) as total catches of albacore for the period, on the assumption that: (i) the amounts of albacore recorded as exports for the period were all accurate (e.g. no miss-labelling occurred); (ii) all exports of albacore originated from vessels flagged in Indonesia fishing in the Indian Ocean; (iii) all catches of albacore from vessels flagged in Indonesia were exported through DKP Bali. In general, it is likely that the

[11] DGCF *et al.* 2005. Preliminary Results of the Multilateral Catch Monitoring Programme on fresh-tuna longliners operating from ports in Indonesia. Document presented at the 7th Session of the IOTC Working Party on Tropical Tunas, Phuket, Thailand, 18-22 July 2005 (IOTC-2005-WPTT-06)
[12] Herrera, M., 2002. Catches Of Industrial Fleets Operating Under Flags of Non-Reporting Countries in the IOTC Area of Competence: An Update. Document presented at the 4th Session of the IOTC Working Party on Tropical Tunas, Shanghai, People's Republic of China, 3-11 June, 2002 (IOTC Proceedings no. 5 (2002) page 125-157)
[13] Herrera, M., 2002. Catches of Artisanal and Industrial Fleets in Indonesia: An Update. Document presented at the 4th Session of the IOTC Working Party on Tropical Tunas, Shanghai, People's Republic of China, 3-11 June, 2002 (IOTC Proceedings no. 5 (2002) page 105-124)

catches used for this period are lower than the actual catches of albacore taken by Indonesian vessels, as these figures would ignore any catches of albacore sold locally in Indonesia or other countries or all those albacore exports not channelled through DKP Bali.

- Catch estimates 2009: The catches of albacore in 2009 were estimated using:
  - The average catches of albacore per boat in 2008, estimated using the total number of longliners flagged in Indonesia that were fishing in the Indian Ocean ($\sum LL_{IDN}^{2008}$) and the total Exports of albacore ($\sum E_{IDN}^{2008}$) recorded by DKP Bali for that year.

| | |
|---|---|
| $\widehat{C_{IDN}^{2008}} = \frac{\sum E_{IDN}^{2008}}{\sum FLL_{IDN}^{2008}}$ | $\widehat{C_{IDN}^{2008}} = \frac{16{,}639}{1{,}052} = 15.8$ |

(1)

  - Number of fresh-tuna longliners from Indonesia fishing in the Indian Ocean in 2009 ($\sum LL_{IDN}^{2009}$).

With total catches of albacore for 2009 ($C_{IDN}^{2009}$) estimated as:

| | |
|---|---|
| $C_{IDN}^{2009} = \sum FLL_{IDN}^{2009} * \widehat{C_{IDN}^{2008}}$ | $C_{IDN}^{2009} = 1{,}018 * 15.8 = 16{,}101$ |

(2)

The above assumes that the catches estimated for 2008 are correct (see above), as well as equal catch rates of albacore in 2008 and 2009 for Indonesian fresh tuna longliners. Inspection of logbook or VMS data could provide some light about the whereabouts of Indonesian longliners in 2008 and 2009 and likelihood that the above assumptions are correct.

- Catch estimates 2010-12: The ratio between the catches estimated in 2009 ($C_{IDN}^{2009}$) and the amounts of albacore from vessels flagged in Indonesia processed by canning factories under the ISSF ($I_{ISSF}^{2009}$) was used to estimate catches for the period 2010-12 ($C_{IDN}^{Yi}$), by year ($I_{ISSF}^{Y_i}$), as follows:

| | |
|---|---|
| $C_{IDN}^{Yi} = \frac{C_{IDN}^{2009}}{I_{ISSF}^{2009}} * I_{ISSF}^{Y_i}$ | $C_{IDN}^{2010} = \frac{16{,}101}{12{,}185} * 10{,}649 = 14{,}072$ |
| | $C_{IDN}^{2011} = \frac{16{,}101}{12{,}185} * 9{,}852 = 12{,}080$ |
| | $C_{IDN}^{2012} = \frac{16{,}101}{12{,}185} * 10{,}387 = 13{,}725$ |

(3)

The above assumes constant ratios between the amounts of albacore provided by canning factories under the ISSF for Indonesia and total catches of albacore estimated for Indonesia, for the period 2009-12, as derived from the values available in 2009. This means that around 75% of the catches of albacore from Indonesian vessels are exported to canning factories cooperating with the ISSF.

- **Breakdown of catches by gear**: The catches of coastal fisheries of Indonesia, other than fresh-tuna longline and freezing longline fisheries were reviewed in 2012 by an independent consultant (Moreno 2012) who estimated that, in recent years, catches of albacore by coastal fisheries have accounted for 1.92% of the total catches of tunas (TUN), as reported by Indonesia for the period (Table 3).

| |
|---|
| $C_{COASTAL_{IDN}}^{Y_i} = C_{TUN_{IDN}}^{Yi} * 1.92\%$ |

(4)

**Table 3**: Estimates of catches of Albacore for the coastal fisheries of Indonesia, by gear and year (Moreno 2010)

| Year | Total Catch TUN* Coastal | Albacore (coastal fisheries) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Total | Gillnet | Purse seine | Coastal longlines | Handline | Trolling | Other+ |
| | | 1.92% | 0.03% | 0.04% | 1.21% | 0.01% | 0.27% | 0.37% |
| 2002 | 122,098 | **2,348** | 33 | 49 | 1,473 | 10 | 329 | 453 |
| 2003 | 125,288 | **2,409** | 34 | 50 | 1,512 | 11 | 338 | 465 |
| 2004 | 147,622 | **2,838** | 40 | 59 | 1,781 | 13 | 398 | 548 |
| 2005 | 129,419 | **2,488** | 35 | 52 | 1,561 | 11 | 349 | 480 |
| 2006 | 156,330 | **3,006** | 42 | 63 | 1,886 | 13 | 422 | 580 |
| 2007 | 182,927 | **3,517** | 49 | 74 | 2,207 | 16 | 493 | 679 |
| 2008 | 237,131 | **4,559** | 64 | 95 | 2,861 | 20 | 639 | 880 |
| 2009 | 242,900 | **4,670** | 65 | 98 | 2,931 | 21 | 655 | 901 |
| 2010 | 253,386 | **4,872** | 68 | 102 | 3,057 | 22 | 683 | 940 |
| 2011 | 268,746 | **5,167** | 72 | 108 | 3,242 | 23 | 725 | 997 |

* TUN: tropical tunas, temperate tunas and neritic tunas, including dogtooth tuna and bonito, as reported by the DGCF
\+ Other: includes pelagic danish seines, liftnets, and hook and line gears

In addition of the above, the IOTC Secretariat estimates catches of albacore for freezing-longliners flagged in Indonesia, as the catches of these vessels are not monitored in port, and in some cases are transhipped on the high seas (IOTC Transshipment Programme). The catches of albacore for this component ($C_{LL_{IDN}}^{Y_i}$) are estimated using the total number of freezing-longliners flagged in Indonesia fishing in the Indian Ocean ($\sum LL_{IDN}^{Y_i}$), and average catches from vessels of the same type flagged in Taiwan ($* \widehat{C_{LL_{TWN}}^{Y_i}}$), as follows:

$$C_{LL_{IDN}}^{Y_i} = \sum LL_{IDN}^{Y_i} * \widehat{C_{LL_{TWN}}^{Y_i}} \quad (5)$$

The catches of albacore estimated for freezing longliners are presented in Table 4.

**Table 4**: Estimates of catches of Albacore for freezing longliners flagged in Indonesia fishing in the Indian Ocean during 2002-11, by year (IOTC Secretariat)

| Albacore LL | Taiwan | | | Indonesia | |
|---|---|---|---|---|---|
| | Catch | nLL | avC | nLL | Catch |
| 2002 | 20,300 | 308 | 66 | 6 | 395 |
| 2003 | 11,056 | 341 | 32 | 13 | 421 |
| 2004 | 9,116 | 341 | 27 | 15 | 401 |
| 2005 | 6,262 | 341 | 18 | 15 | 275 |
| 2006 | 3,229 | 224 | 14 | 17 | 245 |
| 2007 | 2,014 | 222 | 9 | 23 | 209 |
| 2008 | 2,908 | 272 | 11 | 21 | 225 |
| 2009 | 4,303 | 282 | 15 | 27 | 412 |
| 2010 | 5,450 | 154 | 35 | 30 | 1,062 |
| 2011 | 3,208 | 132 | 24 | 32 | 778 |

The IOTC Secretariat derived final catches of albacore for fresh-tuna longliners by taking away the total catch of albacore estimated ($C_{IDN}^{Yi}$; Table 1) from the combined catches estimated for coastal fisheries ($C_{COASTAL_{IDN}}^{Y_i}$; Table 3) and the freezing-longline component ($C_{LL_{IDN}}^{Y_i}$; Table 4). This was done on the assumption that the total catches of albacore estimated (as presented in Table 1) represent the totality of catches of albacore, from all fisheries in Indonesia.

$$C_{FLL_{IDN}}^{Y_i} = C_{IDN}^{Yi} - C_{COASTAL_{IDN}}^{Y_i} - C_{LL_{IDN}}^{Y_i} \quad (6)$$

Final estimates of catches of albacore, by type of fishery and year, are presented in Table 5.

**Table 5**: Estimates of catches of Albacore for vessels flagged in Indonesia fishing in the Indian Ocean during 2002-11, by main fishery and year (IOTC Secretariat)

| Albacore | Total | COASTAL | LL | FLL |
|---|---|---|---|---|
| 2002 | **5,137** | 2,348 | 395 | 2,394 |
| 2003 | **8,278** | 2,409 | 421 | 5,448 |
| 2004 | **11,646** | 2,838 | 401 | 8,407 |
| 2005 | **10,902** | 2,488 | 275 | 8,138 |
| 2006 | **7,177** | 3,006 | 245 | 3,926 |
| 2007 | **12,893** | 3,517 | 209 | 9,167 |
| 2008 | **16,639** | 4,559 | 225 | 11,855 |
| 2009 | **16,101** | 4,670 | 412 | 11,019 |
| 2010 | **14,072** | 4,872 | 1062 | 8,138 |
| 2011 | **12,080** | 5,167 | 778 | 6,135 |

## Further actions

The Workshop is invited to revise the catch series of albacore adopted by the IOTC Scientific Committee for Indonesia and estimation procedures presented above.