

## UPDATE ON THE IMPLEMENTATION OF THE IOTC REGIONAL OBSERVER SCHEME

PREPARED BY: IOTC SECRETARIAT, 27 AUGUST 2016

### PURPOSE

To inform the WPEB12 of the status of implementation and reporting to the IOTC Secretariat of the Regional Observer Scheme (ROS) set out by Resolution 11/04 *on a Regional Observer Scheme* at the 15<sup>th</sup> Session of the Commission (S15) in 2011.

### BACKGROUND

At the 13<sup>th</sup> Session of the Commission (S13), the Commission adopted Resolution 09/04 *on a Regional Observer Scheme*, which was superseded in 2010 by Resolution 10/04, and again in 2011 by Resolution 11/04. In 2010, the Commission addressed concerns raised by some CPCs with artisanal fleets, on which it is difficult to deploy on-board observers due to the small-size of the artisanal vessels and/or to their large numbers which would require high deployment levels and in 2011, the Commission extended the period for submitting the Observer Trip Report from 90 days to 150 days.

Resolution 11/04 *on a Regional Observer Scheme* makes provision for the development and implementation of national observer schemes among the IOTC CPCs starting in July 2010 and covering “*at least 5 % of the number of operations/sets for each gear type by the fleet of each CPC while fishing in the IOTC Area of competence of 24 meters overall length and over, and under 24 meters if they fish outside their EEZs shall be covered by this observer scheme. For vessels under 24 meters if they fish outside their EEZ, the above mentioned coverage should be achieved progressively by January 2013*”.

Moreover, the Resolution states that “*the number of the artisanal fishing vessels landings shall also be monitored at the landing place by field samplers*” and that “*the indicative level of the coverage of the artisanal fishing vessels should progressively increase towards 5% of the total levels of vessel activity (i.e. total number of vessel trips or total number of vessels active)*”.

The Resolution goes on to state “*CPCs shall provide to the Executive Secretary and the Scientific Committee annually a report of the number of vessels monitored and the coverage achieved by gear type in accordance with the provisions of this Resolution*”.

At its 13<sup>th</sup> Session the IOTC Scientific Committee (SC13) reviewed the report of the technical workshop organised in May 2010, and endorsed the documents produced by the Secretariat; an Observer Manual<sup>1</sup> and an Observer Trip Report template<sup>2</sup> containing the minimum reporting requirements. These were formally adopted at the 15<sup>th</sup> session of the Commission where it was noted<sup>3</sup> “*Minimum data requirements were adopted as well as an observer report template that will be reviewed and revised as necessary.*”

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<sup>1</sup> IOTC-2010-SC11

<sup>2</sup> IOTC-2010-SC12

<sup>3</sup> IOTC-2011-S15-R[E]

## DISCUSSION

### *Implementation of the observer scheme*

As of 9<sup>th</sup> August 2016, fifteen CPCs (Australia, China (including Taiwan,China), Comoros, EU (France<sup>4</sup>, Spain and Portugal), Indonesia, Japan, Kenya, Rep. of Korea, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, South Africa and Thailand) have submitted a list of observers and have been allocated an IOTC observer registration number. This makes a total of 348 currently registered observers.

As of 9<sup>th</sup> August 2016, 352 observer trip reports have been submitted to the IOTC Secretariat by Australia, China (including Taiwan,China), EU(France, Portugal and Spain), France OT, Indonesia, Japan, Rep. of Korea, Madagascar, Mauritius, Mozambique, Seychelles, Sri Lanka and South Africa.

Appendix A provides a summary of the status of implementation of the ROS by all IOTC CPCs. Appendix B and Appendix C provide an estimation of the level of effort covered by observers between 2010 and 2015 for industrial longline and purse seine vessels (data updated as of 9<sup>th</sup> August 2016). Reported scientific observer coverage for the artisanal fleets is currently zero.

### *IOTC observer data reporting templates*

At the 17<sup>th</sup> session of the Scientific Committee, “*the SC **NOTED** the revisions to the observer reporting templates proposed by the WPEB10 and the WPDCS10 to improve the quality of the data submissions for scientific purposes such as stock assessments and other such scientific work as requested by the IOTC Scientific Committee*”. Further “***NOTING** that improving the quality of data submissions is a process that evolves and develops over time, the SC **ADOPTED** the revised observer templates as interim reporting templates for immediate use by CPCs where ready and for preliminary use by CPCs where further time is required for review. The SC **AGREED** that the IOTC Secretariat will make these templates available in 2015 and update the guidance in the manual accordingly. Following implementation in interim format, the SC **AGREED** that these will be reviewed and modified further as appropriate in 2015*”.

The interim reporting templates, updated version of the manual and data collection forms have been made available on the IOTC website: [www.iotc.org/science/regional-observer-scheme-science](http://www.iotc.org/science/regional-observer-scheme-science)

All CPCs are reminded that the data can be submitted in any electronically readable format as long as the agreed data required for reporting are provided.

The Scientific Committee also commented on this issue (para. 134, SC18): “***NOTING** that many CPCs report Regional Observer data in .pdf format, or as data embedded within documents, and also in hard-copy format, the SC **ENCOURAGED** CPCs to report Regional Observer data in any non-proprietary electronic format (e.g. csv, xml, txt, etc.) or in an electronic format that can be easily exported and processed into standard spreadsheet, database or statistical software (e.g. xls, dbase, mdb, etc.). This may be in any electronically readable format as long as all of the agreed minimum data reporting requirements have been fulfilled*”.

Since the adoption of the interim reporting templates, Australia, China(partial), Indonesia, Japan and Mauritius (partial) have begun reporting in electronic format (Sri Lanka has also been reporting set level information in hard copy format).

### *ROS database and electronic reporting tool*

While the quantity of observer data reported to the IOTC Secretariat is increasing, the majority of observer data are still currently submitted as word, pdf, scanned or hard copy documents. This is a highly inefficient arrangement, requiring a substantial amount time to be dedicated to data entry, cleaning and processing, which the IOTC Secretariat does not have the capacity for, and is not conducive to data management or analysis. To improve the situation, a project has been developed which will allow the electronic reporting of observer data to improve the consistency, efficiency, quality, timeliness and accuracy of data reporting and management for analysis. This project is targeted particularly at developing country CPCs which have not yet developed observer data collection and management processes and will be an important capacity building tool for these fisheries, providing a template database structure for data storage as well as exporting functions for regional data reporting. The interface is intended to be very user-friendly and will be trialed in two CPCs and reviewed by experts at NOAA, IATTC, WCPFC, ICCAT, OSPESCA and SPC so that existing processes and proven successes can be built into the system.

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<sup>4</sup> Including Mayotte due to its status as a French outermost region since January 2014

The data management system will be integrated into the new IOTC database structure currently under development to streamline data management processes and facilitate the provision of data by the IOTC Secretariat. This project has been jointly funded by the European Union (EU) and the National Oceanic and Atmospheric Administration (NOAA) and began in early 2016. The development of the ROS database and e-reporting system is due to be completed by the end of the year, after which pilot trials and roll-out workshops will be held. Following the completion of the database, all the historic observer data will be uploaded to the system so that data can be processed, summarised and analysed where possible. These results can then be presented at the relevant working party meetings while the more general updates on the overall progress of the scheme, including items such as coverage rates and projects will be presented to the Scientific Committee.

### **Electronic monitoring**

At the 17<sup>th</sup> Session of the Scientific Committee in 2014, a recommendation was made for the development of electronic monitoring to support the implementation of the ROS, noting that electronic monitoring systems are meant to complement rather than replace the work conducted by onboard scientific observers:

Para. 166. ***“NOTING** that electronic monitoring (including video) has been trialled and successfully implemented in many fisheries worldwide (e.g. Australia, European Union, USA, New Zealand), with the aim of supplementing scientific observers on board vessels; and given the current difficulties cited as reasons for not deploying scientific observers under the IOTC Regional Observer Scheme (ROS) on board large-scale gillnet vessels operating in the Indian Ocean; the SC **RECOMMENDED** that the Commission considers assigning the IOTC Secretariat, in consultation with interested IOTC scientists, to develop a project on electronic monitoring in the IOTC area of competence. This would allow an evaluation of the efficacy of electronic monitoring in the collection of information on catch, discards and fishing effort as a means to supplement scientific observer coverage for large-scale gillnet vessels. The trial will include an evaluation of the main challenges of using electronic monitoring data such as the accurate identification of IOTC and bycatch species, weight and size of catches and the time taken to process the footage and extract the required data. The concept note/proposal shall also include a clear indication that the IOTC data confidentiality policy (Resolution 12/02) will need to be modified to ensure any data/information collected is for the sole purpose of scientific analysis and not for compliance purposes. The concept note should include a detailed budget and be communicated to a range of potential funding organisations”.*

Funding has now been obtained from the EU for the initiation of this project, and the SC18 has also committed to support this project financially (para. 142, SC18): ***“NOTING** the upcoming projects planned to support the ROS (including the development of an electronic reporting system, and a proposal for an electronic monitoring system), the SC **AGREED** that funding from the IOTC regular budget should be allocated to support these activities over the next few years. The IOTC Secretariat has been tasked by the Commission to develop a proposal and budget for its consideration”.*

A draft proposal for the development and trial of an e-monitoring system for Indian Ocean gillnet fisheries is currently being developed to begin at the end of 2016/beginning of 2017. Technical review and guidance is being sought from a variety of sources, including NOAA and the Australian Fisheries Management Authority (AFMA), WWF-Pakistan, and from Digital Observer Services. A number of CPCs with key gillnet fleets have also now expressed interest in participating in this pilot, including I.R.Iran, Pakistan and Sri Lanka.

### **Capacity building**

The sixteenth session of the Indian Ocean Tuna Commission (IOTC) Scientific Committee, held in 2013, made a number of recommendations related to training and capacity building to support data collection and bycatch mitigation for gillnet fleets:

Paragraph 39: ***“The SC RECOMMENDED** that the Commission allocate funds in its 2014 and 2015 budgets for the IOTC Secretariat to facilitate training for CPCs having gillnet fleets on bycatch mitigation methods, species identification, and data collection methods....[specifically mentioned were:] **“two training workshops: I.R. Iran/Oman and Sri Lanka”.***

The lack of progress in the implementation of the Regional Observer Scheme (ROS) by gillnet fleets was further noted at the 17<sup>th</sup> session of the Scientific Committee in 2014:

Paragraph 157. ***“The SC EXPRESSED** its strong concern regarding the low level of reporting to the IOTC Secretariat of both the observer trip reports and the list of accredited observers since the start of the ROS in July 2010. Such a low level of implementation and reporting is detrimental to the work of the SC, in particular regarding the estimation of incidental catches of non-targeted species, as requested by the Commission. Capacity building*

*activities are planned for 2015 in I.R. Iran, Pakistan and Sri Lanka in support of the Regional Observer Scheme to assist CPCs with implementation and development of their national programmes”.*

Paragraph 84. *“The SC **NOTED** that, while I.R. Iran has implemented a logbook program for its drifting gillnet fisheries, to date no catch and effort data have been reported to the IOTC. I.R. Iran is yet to implement provisions of the Regional Observer Scheme, in particular boarding of observers on its industrial purse seine and drifting gillnet fleets, and provision of observer trip reports to the IOTC. In this regard the SC **REQUESTED** that I.R. Iran make the necessary arrangements to report catch-and-effort data to the IOTC, and size frequency data by IOTC grid, and implement provisions of the Regional Observer Scheme, and to seek assistance from the IOTC Secretariat with these tasks, where required”.*

Therefore, capacity building workshops were arranged in 2015 to support these CPCs in the establishment of their observer schemes.

### **Support to the implementation of the IOTC Regional Observer Scheme in Sri Lanka**

Sri Lanka has important gillnet-longline fisheries for tropical tunas, ranking third in terms of total fleet catches from 2010–12, and has also reported important amounts of shark catches. However, Sri Lanka has not reported catch and effort data consistent with IOTC standards, including separate catch and effort data for gillnet and longline gears and for vessels operating outside the EEZ. In 2014, the Sri Lankan Department of Fisheries and Aquatic Resources made a formal request to the IOTC Secretariat for assistance to support the implementation of a national regional observer scheme.

An evaluation, training and planning workshop was held in February 2015 to review the experience and data collected by observers in 2014 and to use the findings to identify key data gaps and quality issues in order to improve the process and develop a working protocol, specific to the Sri Lankan fisheries. There were 17 participants at the workshop, comprising the observer scheme manager, future and current observers as well as the trainers. Training was provided in species identification for all species groups, sampling approaches and observer debriefing processes. Results from pilot observer trips were reviewed and discussed in detail and set of recommendations were laid out for next steps in implementation of the scheme in Sri Lanka.

### **Support to the implementation of the IOTC Regional Observer Scheme in Oman, I.R. Iran and Pakistan**

While 26 countries have gillnet fleets in the Indian Ocean, 46% of gillnet catches come solely from the fleets of I.R. Iran, Pakistan and Oman, highlighting the importance of these fleets in the Indian Ocean. To date, Oman, I.R. Iran and Pakistan have yet to establish their national onboard observer schemes in order to fulfil the requirements of Resolution 11/04 and improve the quality of data collected and reported. As limited nominal catch, catch and effort and size frequency data are submitted to the IOTC by these CPCs, observer data is particularly important.

A regional training workshop was held in Oman from 18–22 October 2015 for observer scheme managers, trainers and observers from I.R. Iran, Pakistan and Oman. The IOTC Secretariat organising this workshop in collaboration with IOSEA, CMS and WWF-Pakistan as part of the ABNJ initiative. Experts from NOAA, the Five Oceans Environmental Services, WWF-Pakistan, the Oman Marine Science and Fisheries Centre, the Gulf Elasmobranch Project and the IUCN Cetacean Specialist Group have been invited to assist facilitate the training sessions. This workshop aimed to fulfil the requests of the Scientific Committee to improve data reporting by supporting the implementation of the Regional Observer Scheme. It comprised an interactive workshop for fisheries staff working on the gillnet fleets of Oman, I.R. Iran and Pakistan. The workshop participants were senior fisheries staff who are to be involved in designing and managing observer programmes and leading training, so the workshop was tailored towards leading to the next stages of development of national observer schemes as well as the presentation of materials to be used as training resources. The workshop also provided an opportunity for observer scheme managers to learn from each other and share ideas and experiences about the implementation of an observer scheme in CPCs with gillnet fisheries. Further details can be found in the workshop summary report available on the IOTC website, reference number: *IOTC–2015–ROWS02–R[E]*: 35pp. [www.iotc.org/data/capacity-building-data](http://www.iotc.org/data/capacity-building-data). The participants agreed to provide updates on progress following the workshop at the WEPB12 and a follow-up workshop is due to take place in November 2016, hosted by the Iranian Fisheries Organisation and WWF-Pakistan. This will also include Sri Lanka, India and the Maldives.

### **Support to the implementation of the IOTC Regional Observer Scheme in Indonesia**

Indonesia has hugely important fisheries in the IOTC area of competence, accounting for over 20% of total catches in 2015. An IOTC-OFCF Project mission took place in Indonesia in November 2015 to assist Indonesia in the reporting of scientific observer data, catch and effort and size data. Indonesia has recently submitted five observer trip reports for 2014 in electronic format according to the interim reporting templates.

## *IOTC Species ID guides*

**Table 1.** Summary of priority languages and species groups for translation and printing as identified by the SC16 and SC17.

	1. Tuna & like	2. Billfish	3. Turtles	4. Sharks and rays	5. Seabirds
<b>Farsi</b>	2	1	1	1	1
<b>Arabic</b>	2	2	2	2	2
<b>Urdu</b>	4				
<b>Bahasa Indonesian</b>	1	3	5	5	5
<b>Swahili</b>		4			
<b>Spanish</b>		5	3	3	3
<b>Portuguese</b>		6	4	4	4
<b>Thai</b>		7			
<b>Sinhala</b>	3	8			
<b>Tamil</b>		8			
<b>Bahasa Malaysia</b>	1				
<b>Hindi</b>	3				

Progress to date:

- Translation of IOTC species ID guides into Farsi has already been completed for sharks and turtles. Other species are underway and all are due to be printed shortly (IOTC, IFO and WWF-Pakistan)
- Translation and printing of IOTC species ID guides into Arabic has been completed for tuna and tuna-like species and translation of the others is currently underway (IOTC and WWF-Pakistan)
- Translation and printing of tuna, billfish, turtles and shark ID guides into Urdu is complete (WWF-Pakistan)
- Translation and printing of tuna and billfish ID guides into Bahasa Indonesian is complete (OFCF)
- Translation of turtle ID guides into Bahasa Indonesian and Spanish is complete and cards are being printed, while translation of sharks and seabirds is underway (IOSEA & IOTC)
- Translation of tuna and tuna-like species ID guides into Hindi is almost complete (CMFRI and IOTC)
- Translation of tuna and tuna-like species ID guides into Malaysian is underway (IOTC)
- Translation of tuna and tuna-like species ID guides into Sinhala and Tamil is underway (NARA, DFAR and IOTC)
- Translation and printing of all IOTC species ID guides into Portuguese has been completed (WWF-Mozambique)
- Translation and printing of all IOTC species ID guides into Maldivian is underway (Ministry of Fisheries and Agriculture, Maldives)

## **RECOMMENDATIONS**

That the Scientific Committee:

- 1) **RECOMMEND** that at the next revision of Resolution 11/04, it is specified that all observer data must be submitted to the IOTC Secretariat in an electronically readable format.
- 2) **RECOMMEND** that capacity building activities continue to be supported via the Commission's annual budget, to improve the lack of compliance with the implementation of observer programmes by CPCs for their fleets and lack of reporting to the IOTC Secretariat as per the provisions contained within Resolution 11/04 *on a Regional Observer Scheme*.

## **APPENDICES**

- Appendix A:** Update on the implementation of the IOTC regional observer scheme
- Appendix B:** Estimated observer coverage for longline vessels
- Appendix C:** Estimated observer coverage for purse seine vessels

## APPENDIX A

### UPDATE ON THE IMPLEMENTATION OF THE IOTC REGIONAL OBSERVER SCHEME

CPCs	Active Vessels LOA≥24m or High Seas vessels <sup>5</sup>				Progress	List of accredited observers submitted	Number of observer reports provided <sup>6</sup>					
	LL	PS	GN	BB			2010	2011	2012	2013	2014	2015
MEMBERS												
Australia	2	6			Australia has implemented an observer programme for the longline fleet	YES: 21	2(O)	1(O)	3(O)	No	2(O) + 3(E)	No
Belize					No information received by the Secretariat.	No	No	No	No	No	No	No
China –Taiwan,China	53 233				China has implemented an observer programme	YES: 3 YES: 54	1(O) No	No No	1(O) 1(O)	1(O) 19(O)	2(O) 17(O)	1(O) 13(O)
Comoros					Comoros does not have vessels ≥ 24m. Two observers have been trained under the IOC Regional Monitoring Project, and 5 by SWIOFP.	YES: 7	N/A	N/A	N/A	N/A	N/A	N/A
Eritrea	No information received				No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
European Union	17 6 18 1	12 0 17 0			EU has an observer programme on-board its purse seine and longline fleets. To date, no information has been received from EU,UK.	Partial: EU,France: 64 EU,Portugal: 4 EU,Spain : 9 EU,UK : No	FRA 6(O) No No No	FRA 12(O) PRT 1(O) No No	FRA 17 (O) PRT 1(O) No No	FRA 15 (O) PRT 1(O) 1(O) No	FRA 32(O) PRT 1(O) 2(O) No	FRA 25(O) PRT 1(O) No No
France (OT)					N/A	N/A	No	9(O)	7(O)	7(O)	NA	NA
Guinea					Guinea has had no vessels operating in the Indian Ocean since 2006	N/A	N/A	N/A	N/A	N/A	N/A	N/A
India	22				India has not yet developed an observer programme.	No	No	No	No	No	No	No
Indonesia	550	18	1		Indonesia has 13 registered IOTC observers and a number of initiatives in place and has recently begun reporting to IOTC.	YES:9	No	No	No	No	5(E)	No
Iran, Isl. Rep. of		5	1190		IOTC observer training took place in 2015. 30 observers have now been selected and are due to be deployed in 2016.	No	No	No	No	No	No	No
Japan	53	2			Japan started its observer programme on the 1 <sup>st</sup> of July 2010.	YES: 19	8(E)	11(E)	10(E)	7(E)	8(E)	No
Kenya					Kenya has had no vessels listed in the active vessel registry since 2010, however, Kenya is developing an observer programme and 5 observers have been trained by SWIOFP.	YES: 5	No	N/A	N/A	N/A	N/A	N/A
Korea, Rep. of	14	5			Korea has had an observer programme since 2002 and has 28 observers registered in the Indian Ocean.	YES: 29	2(O)	No	2(O)	3(O)	3(O)	No

<sup>5</sup> The number of active vessels is given for 2015

<sup>6</sup> Year in which the observed trip has started (E: Electronic; O: Other)

CPCs	Active Vessels LOA≥24m or High Seas vessels <sup>5</sup>				Progress	List of accredited observers submitted	Number of observer reports provided <sup>6</sup>					
	LL	PS	GN	BB			2010	2011	2012	2013	2014	2015
Madagascar	7				Madagascar has developed an observer programme. Five and three observers have been trained through SWIOFP and IOC respectively. However, observer data reported are not to IOTC standards.	<b>YES: 7</b>	No	No	<b>18(O)</b> <sup>7</sup>	<b>8(O)</b>	<b>7(O)</b>	No
Malaysia	10				Malaysia is developing plans for the implementation of an observer programme.	No	No	No	No	No	No	No
Maldives	28			339	Maldivian vessel landings are monitored by field samplers at landing sites. Maldives is currently developing an at-sea observer programme.	<b>YES: 4</b>	No	No	No	No	No	No
Mauritius		7			Mauritius has developed an observer scheme and started submitting data for 2015.	<b>YES: 8</b>	No	No	No	No	No	<b>3(O)</b>
Mozambique	9				Mozambique has an observer programme and has submitted one trip report, but did not have any active vessels ≥24m in 2013.	<b>YES: 11</b>	No	No	<b>1(O)</b>	N/A	No	No
Oman	1				IOTC observer training took place in 2015, however no observer reports have been submitted as yet.	No	No	No	No	No	No	No
Pakistan					IOTC observer training took place in 2015 and Pakistan is committed to establishing an observer scheme. A crew-based observer scheme has already been initiated by WWF-Pakistan, however no data has yet been submitted to the IOTC Secretariat.	No	No	No	No	No	No	No
Philippines					No information received by the Secretariat.	No	No	No	No	No	No	No
Seychelles	37	10			Seychelles initiated an observer programme in 2014 and has started to report observer data	<b>YES: 78</b>	No	No	No	No	<b>6(O)</b>	<b>46(O)</b>
Sierra Leone	No information received				No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Somalia	No information received				No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
South Africa	15				South Africa operates an observer programme for foreign vessels operating within the EEZ as well as for national vessels (since 2014).	<b>YES: 16</b>	No	<b>12(O)</b>	<b>10(O)</b>	<b>13(O)</b>	<b>8+2(O)</b> <sup>8</sup>	<b>7+9(O)</b>
Sri Lanka	1		1564		Sri Lanka has begun an observer initiative and submitted observer data from pilot trips in 2014 and 2015.	No	No	No	No	No	<b>2(O)</b>	<b>2(O)</b>
Sudan	No information received				No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tanzania, United Rep.of	3				Tanzania does not currently have an observer programme in place.	No	No	No	No	No	No	No
Thailand	6				Thailand conducted observer training in 2015 and is due to begin deployment in 2017 as there were no active vessels in 2016	<b>YES: 8</b>	No	No	No	No	No	No

<sup>7</sup> Reports from Madagascar include observers onboard foreign vessels

<sup>8</sup> Reports submitted for foreign vessels operating in the EEZ of South Africa between 2011 and 2013, and foreign + national flagged vessels for 2014 and 2015.

CPCs	Active Vessels LOA≥24m or High Seas vessels <sup>5</sup>				Progress	List of accredited observers submitted	Number of observer reports provided <sup>6</sup>					
	LL	PS	GN	BB			2010	2011	2012	2013	2014	2015
United Kingdom (OT)					The UK(OT) does not have any active vessels in the Indian Ocean.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yemen	No information received				No information received by the Secretariat.	No	No	No	No	No	No	No
COOPERATING NON-CONTRACTING PARTIES												
Bangladesh					No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Djibouti					No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Liberia					No information received by the Secretariat.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Senegal					Senegal has not had any active vessels in the Indian Ocean since 2007.	N/A	N/A	N/A	N/A	N/A	N/A	N/A



## APPENDIX B

### ESTIMATED OBSERVER COVERAGE FOR LONGLINE VESSELS

MEMBERS	Total effort (no.hooks)						Observed effort (no. hooks)						Coverage rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Australia	622,461	359,832	672,398	609,995	449,387	430,015	15330	6232	89490	0	41066	0	2.46%	1.73%	13.31%	0.00%	9.14%	0.00%
Belize	642,400	680,140	1,620,234	1,857,864	1,857,864	1,857,864							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
China	16,993,970	4,136,710	11,295,050	23,439,470	19,212,540	26,616,190	95205	0	185742	216640	178413	105201	0.56%	0.00%	1.64%	0.92%	0.93%	0.40%
–Taiwan, China	219,630,038	182,770,834	170,633,711	195,560,569	187,349,160	175,717,038	0	0	121675	4344678	3776042	1954689	0.00%	0.00%	0.07%	2.22%	2.02%	1.11%
Comoros																		
Eritrea																		
EU - France	3,781,554	3,769,250	3,367,941	4,042,077	3,573,448	3,533,544	75360	113269	120478	107065	141819	0	1.99%	3.01%	3.58%	2.65%	3.97%	0.00%
EU - Portugal	949,134	903,600	685,206	1,558,000	1,460,464	1,398,400		140317	73685	127580	90894	156536	0.00%	15.53%	10.75%	8.19%	6.22%	11.19%
EU - Spain	3,174,705	3,758,516	4,673,785	6,262,822	6,262,823	6,262,824							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EU - UK	61,400	92,300	71,400	55,000	84,700	388,300							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
France(OT)	75,099	93,718	120,000	120,000														
Guinea	569,943												0.00%					
India	66,990,303	85,679,113	64,201,523	67,379,998	60,995,362	16,295,414							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Indonesia	121,489,485	144,494,143	207,478,039	199,339,487	203,668,655	210,093,998	0	0	0	0	195780	0	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%
Iran, Isl. Rep. of																		
Japan*	37,032,932	28,854,054	31,460,928	29,125,098	31,780,765	24,573,763	1197302	1791161	1407715	1355396	1895419	0	3.23%	8.43%	5.41%	7.58%	7.67%	2.46%
Kenya	186,774												0.00%					
Korea, Rep. of	6,013,391	5,862,681	4,350,708	5,337,464	6,740,247	7,370,326	389042	0	282656	546927	213225	0	6.47%	0.00%	6.50%	10.25%	3.16%	0.00%
Madagascar	456,585	374,307	348,653	326,494	300,488	357,480	0	0	21582	14429	0	0	0.00%	0.00%	6.19%	4.42%	0.00%	0.00%
Malaysia	17,282,525	13,283,122	4,047,677	4,261,851	3,623,561	5,066,047							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Maldives				3,054,590	3,054,590	585,981										0.00%	0.00%	0.00%
Mauritius	267,063	252,480	182,300	150,560	105,120	195,850							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mozambique	383,323	383,323	383,323		7,177	223,937	0	0	1100	0		0	0.00%	0.00%	0.29%		0.00%	0.00%
Oman, Sultanate of	17,358,307	16,122,591	6,370,133	2,611,412	1,472,017	477,063							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Pakistan																		
Philippines	2,784,696	560,653	7,317,740	3,759,626	2,025,299	0							0.00%	0.00%	0.00%	0.00%	0.00%	
Seychelles	4,375,885	3,080,822	3,400,912	3,876,173	21,366,998	18,694,524							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sierra Leone																		
Somalia																		
Sri Lanka	118,364,092	113,229,416	141,488,655	146,513,857	172,219,506	161,060,039	0	0	0	0	550	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
South Africa*	1,751,043	1,219,015	1,176,125	959,285	565,705	390,098	0	(640045)	(293685)	(852759)	17895(543543)	70258(603777)	0.00%	0.00%	0.00%	0.00%	3.16%	18.01%
Sudan																		
Tanzania, United Rep. of	1,505,810	2,903,621	4,326,514	3,482,703	3,706,106	894,758							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Thailand	1,489,193	1,041,600	1,061,363	784,881	1,821,217	1,225,987							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
United Kingdom																		
Vanuatu	893,684		1,237,516										0.00%		0.00%			
Yemen																		
COOPERATING NON CONTRACTING PARTIES																		
Bangladesh																		
Djibouti																		
Liberia																		
Senegal																		
Other	7,368,361	7,854,251	10,832,417	5,017,737	10,634,831	8,547,171							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	652,494,155	621,760,093	682,804,251	709,487,012	744,338,029	672,256,612	1,772,239	2,050,979	2,304,123	6,712,715	7,084,661	2,767,879	0.27%	0.33%	0.34%	0.95%	0.95%	0.41%

NB: the ROS came into force mid-way through in July 2010 so annual coverage rates are expected to be lower for 2010.

EU,Portugal: 2012 and 2013 total effort values are estimates provided by provided by EU,Portugal which are to be updated

Madagascar: the number of observed hooks have been estimated based on the number of reported fishing days and previous hook:fishing day ratios.

Japan: this includes observer coverage reported by S.Africa for Japanese flagged vessels operating within the EEZ.

Numbers in brackets indicate hooks observed on foreign flagged vessels

Key: TOTAL EFFORT (#HOOKS): Total number of hooks set by longliners, by fishing fleet and year, including:

- Total effort available (green font)
- Total effort not available: total effort estimated using the nominal catches available and sampled effort or catch rates from other fleets or year periods (red font)

## APPENDIX C

### ESTIMATED OBSERVER COVERAGE FOR PURSE SEINE VESSELS

MEMBERS	Total effort (no. fishing days)						Observed effort (no. fishing days)						Coverage rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Australia	175	130	148	133	113	148							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Belize																		
China																		
–Taiwan,China																		
Comoros																		
Eritrea																		
EU - France	1968	1947	1795	2115	3467	3168		108	237	193	560	598	0.00%	5.55%	13.20%	9.13%	16.15%	18.88%
EU - Portugal																		
EU - Spain	3531	3555	3684	3899	4238	3838				48	86		0.00%	0.00%	0.00%	1.23%	2.03%	0.00%
France (OT)	833	1167	1257	1276				252	188	171			0.00%	21.59%	14.95%	13.40%		
EU - UK																		
Guinea																		
India																		
Indonesia																		
Iran, Isl. Rep. of	128	139	168	172	179	164							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Japan	96	95	72	36	35	86							0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Kenya																		
Korea, Rep. of			94	387	507	451				33	45				0.00%	8.52%	8.88%	0.00%
Madagascar										(14)	(118)							
Malaysia	12												0.00%					
Maldives																		
Mauritius				27	271	299						33				0.00%	0.00%	11.02%
Mozambique																		
Oman, Sultanate of																		
Pakistan																		
Philippines																		
Seychelles	2144	2166	1969	1670	1947	3012					235	1404	0.00%	0.00%	0.00%	0.00%	12.07%	46.61%
Sierra Leone																		
Somalia																		
South Africa																		
Sri Lanka				62							12					0.00%		
Sudan																		
Tanzania, United Rep. of																		
Thailand	137												0.00%					
United Kingdom																		
Vanuatu																		
Yemen																		
<b>COOPERATING NON CONTRACTING PARTIES</b>																		
Bangladesh																		
Djibouti																		
Liberia																		
Senegal																		
Other						132												0.00%
<b>Total</b>	<b>9,025</b>	<b>9,199</b>	<b>9,188</b>	<b>9,777</b>	<b>10,756</b>	<b>11,298</b>	<b>0</b>	<b>360</b>	<b>425</b>	<b>445</b>	<b>938</b>	<b>2,035</b>	<b>0.00%</b>	<b>3.91%</b>	<b>4.63%</b>	<b>4.55%</b>	<b>8.72%</b>	<b>18.01%</b>

NB: the ROS came into force mid-way through in July 2010 so annual coverage rates are expected to be relatively lower for 2010

Numbers in brackets indicate observers onboard foreign flagged vessels

Key: TOTAL EFFORT (#FDAYS): Total number of days fished by tuna purse seiners, by fishing fleet and year, including:

- Total effort available (green font)
- Total effort not available: total effort estimated using the nominal catches available and sampled effort or catch rates from other fleets or year periods (red font)