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STATUS OF OBSERVER DATA MANAGEMENT

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1. Introduction

1. Observer data management encompasses a number of activities that ensure the data collected by observers are made available for the work of the Western and Central Pacific Fisheries (WCPFC) in a form that is both representative and of acceptable quality. The underlying activity involved in Observer Data Management is the management and entry of the observer data into a standardised database system, but it also covers the many other related activities with examples described in Williams (2011).

2. The Pacific Community (SPC) OFP has been processing observer data on behalf of its member countries for more than 15 years. The Seventh Regular Session of the WCPFC (6–10 December 2010) approved the continuation of this work in respect of the Regional Observer Programme (ROP) data in the short-medium term (Anon., 2010a, Anon., 2010b). The Twelfth Regular Session of the Commission (3–8 December 2015; Anon., 2015) reconfirmed the Commission's support for ROP data processing with its inclusion in the indicative budget for the period 2016-2018.

3. The Pacific Island Forum Fisheries Agency (FFA) processes observer data for the US Multilateral Purse Seine Treaty and these data are regularly incorporated into the ROP data submitted to the WCPFC. Staff supported by the WCPFC Regional Observer Programme (ROP) data management project based at the WCPFC Secretariat mainly process data from the national observer programme of the Federated States of Micronesia (FSM). WCPFC members other than Pacific Island countries have also contributed to the ROP Database including Australia, China, Japan, New Zealand, Philippines, Chinese Taipei and the USA.

4. The majority of the observer data processed by the SPC are ROP-defined purse seine trips[1], which have been designated as the highest priority for processing since 2010. However, the WCPFC requirement for 5% observer coverage in the longline fishery (established in 2012) has resulted in increased submission of observer longline data in recent years and these data are now assigned equal priority for data processing as the purse seine observer.

5. The SPC/OFP also processes non-ROP observer data that are, *inter alia*, of importance to the scientific work of the WCPFC and so have been included in the description of observer data management and data summaries, presented in this paper.

6. This paper serves to provide an update on the status of ROP data management at SPC/OFP over the past twelve months, covering the following:

- Human resources involved in observer data management at SPC/OFP
- Activities over the past 12 months
- Status of observer data entry, data provisions, coverage and issues, and
- Future expectations.

7. The SC is encouraged to review the information in this paper and provide suggestions for enhancements for future WCPFC meetings, as required.

[1] CMM 2007-01 paragraph 5
Scope of the Commission ROP
5. The Commission ROP shall apply to the following categories of fishing vessels authorized to fish in the Convention Area in accordance with the Commission's Conservation and Management Measures 2004-01:

i) vessels fishing exclusively on the high seas in the Convention Area, and

ii) *vessels fishing on the high seas and in waters under the jurisdiction of one or more coastal States and vessels fishing in the waters under the national jurisdiction of two or more coastal States*.

2. Human Resources for managing observer data

8. Williams et al. (2016) provides a summary of the team and positions directly involved in managing and entering observer data, fully supported under the WCPFC ROP Data Management project; this document lists the other SPC/OFP staff that are also involved in this area.

9. The staffing levels were relatively stable over the past year, with only two changes in staff at SPC Noumea office: Colley Falasi resigned as Observer Data Quality Officer in late 2016 and was replaced by Aurelien Panizza in early 2017; Gabrielle Black resigned as Data Registry Officer in late 2016 and was replaced by Nabila Benhamoudi.

3. Activities over the past twelve months

10. The work related to observer data management achieved over the past twelve months includes,

- SPC technical staff continued to provide remote technical support to the observer data entry staff based at the offices of the WCPFC Secretariat. Given the growing importance of Regional Observer data in the WCPFC scientific and compliance processes, the WCPFC Secretariat and SPC technical staff met in December 2016 and in July 2017 to discuss some of the higher priority work of the Commission. In particular, this meeting focussed on the changes to the database system and procedures to support the pre-notification process for alleged infringements (related to the observer GEN3 form). Over the past year, support was also provided in upgrading versions of the database system, updating structures of the database and reference tables, new DORADO reports and resolving issues in the data that was not possible through the user interface.
- SPC technical staff continued to provide regular support to other countries and regional agencies processing observer data using the TUBS system data: Fiji, Papua New Guinea, FFA, Tonga and the Philippines. This included two visits to Fiji and one visit to Solomon Islands (FFA) over the past year.
- The most time consuming work over the past year for the observer technical staff continued to be the development and update of data loaders for the non-standard[2] observer data provided by several CCMs for their national observer programme data. Over the past year, non-standard observer data have been provided from Australia (2000–2015 resubmission), China (2015-2016), Japan (2015-2016), New Zealand (2015-2016), EU (2015-2016), US (Hawaii/American Samoa 2015-2016) and Chinese Taipei (2015-2016). Data collection systems in the countries providing the non-standard observer data need to satisfy national requirements and so do not align to regional observer database (ROP) structures that present challenges in developing the loaders and follow-up/liaison with the providers of the data. Even though loaders for non-standard data had been developed in previous years, changes to the format of data submitted from one year to the next requires an update to the loader and careful attention to the correct field mapping.
- The online web-based Observer (DORADO/TUBs) database-reporting module continues to be enhanced and used regularly by national observer providers, the WCPFC and FFA Secretariats and several other CCMs. It has a comprehensive set of reports (currently 100+ reports) covering a wide range of observer data summaries including a set of reports specifically designed to produce some of the WCFPC CMM reporting output requirements related to observer data. This system was used heavily by Pacific Island countries in preparation of the WCPFC Part 1 and Part 2 reports for submission this year (see Figure 1 for an example of the available reports). This system will continue to expand over the coming years to meet the requirements of not only national observer programmes, but also SPC, the WCPFC Secretariat and FFA.
- E-Reporting and E-Monitoring initiatives to acquire observer data continued to progress during the past year and are covered in Hosken et al. (2017). This paper also documents the progress with the draft

[2] We refer to "non-standard" as observer data that are not entered using the TUBS system and are provided in different formats by CCMs

WCPFC E-Reporting observer data field standards[3] and the recent development of E-Monitoring process standards.

- The inclusion of observer data entry/management as a component under the Tufman 2 framework is near completion and is currently undergoing trial data entry. This system will replace the current TUBS system over the coming year and will resolve many issues currently encountered by running separate instances of the TUBS database remotely (and allow more countries to proceed to enter their own observer data). Another feature of this new system will be the ease with which observer data can be linked to other types of data at the trip level (e.g. to logbook trip, unloading and port sampling data).

4. Status of Observer data entry, data provisions and issues

11. Table 1 shows the status of observer data received and entered by SPC as at 14th July 2017 and Table 2 provides an indication of the available purse-seine observer data processed by fleet. Table 3 shows the coverage of observer longline activity for 2015 as nominated by the flag state and according to the metrics proposed at TCC10[4] and agreed at WCPFC11[5], and Table 5 shows the provisional coverage of observer longline activity for 2016, as nominated by the flag state. Tables 3 and 4 also provide an indication of the longline observer data submitted to WCPFC/SPC by year and fleet, and the approximate coverage of the data provided; this allows a comparison to the coverage nominated by the flag state.

12. As noted in this paper in previous years, the summaries of observer data provisions presented herein continue to be constrained by a number of factors, including:

i. **Accurate information on the complete number of vessel trips by gear and flag in the WCPFC Convention Area.** This information is used as the 'base' with which to determine observer coverage. For purse seine, VMS data provides the best source of information to determine vessel trips by gear and flag, but there are several issues in using VMS data for the longline gear as a basis for determining coverage, the main issue being how to deal with transhipments at sea and accessibility of complete VMS data. Ideally, the full provision of operational data would be the best source of information to determine vessel trips for the purpose of determining coverage.

ii. **Accurate information on the actual number of observer trips by observer programme, gear and flag.** At this stage, we have accurate information on the observer data received, but do not have complete information on the actual observer trips undertaken which would provide a means of better determining coverage and where we should be focussing efforts to obtain the data. Some progress has been made in the past three years, but there remains data yet to be provided.

iii. **Assignment of an ROP trip in the unprocessed data.** The assignment of a trip as an ROP or a non-ROP trip (or part of a trip as ROP) can only be determined after the data have been processed since it depends on where the fishing activity occurred.

iv. **Lags in the uploading of observer data received in 'non-standard' format.** The SPC/FFA member countries have collected observer data on standard data collection forms and databases for more than 15 years and this facilitates the consolidation of data into the ROP database with minimal overhead. Most other national observer programmes (excluding the Philippines which also uses the SPC/FFA standard) have developed their own standards based on both regional and national requirements; the submission of observer data from these other national observer programmes has required the development of specific data loaders which need to be reviewed each year to ensure they are consistent with the data provided. The work involved in developing and checking the data loaders each year is considerable and results in lags in loading some of the observer data (received in electronic form) into the ROP database. The advent of WCFPC E-Reporting observer data field standards (see Attachment 4 in Anon, 2016) is envisaged to resolve such issues.

[3] See the draft standard WCFPC E-Reporting observer data fields at http://www.wcpfc.int/node/21569
[4] See the TCC10 paper at http://www.wcpfc.int/node/19567
[5] See the WCPFC11 report at http://www.wcpfc.int/node/20349, para 477 and Attachment L, Table 1

4.1 Purse seine

13. Provisions of purse seine observer data for years 2012–2014 have been described in previous versions of this paper.

14. Observer data for an estimated 98% (1,408 trips) of observer purse seine trips conducted (based on known placements, where this information is available and excluding those rejected by the observer programme and trips with unknown status) during 2016 have been received at SPC at the time of writing this paper. However, it is likely that the number of placements will increase by around 200-400 trips when all information is received at SPC. For 2015, Observer data received at SPC cover an estimated 94% (1,599 trips) of the 2015 purse seine trips with known placements.

15. A total of 75% (1,089 trips) of the observer data received at SPC for 2016 observer activities have now been entered (excluding the trips awaiting resolution at SPC). SPC employs a strategy of processing the most recent observer data (in this case 2016 data) as highest priority, mainly to ensure CCMs can satisfy their Part 1 and Part 2 reporting obligations (for which compliance applies to the most recent year). This is reflected in the "**% of trips received without problems**" in **CATEGORY 5** of Table 1 whereby the outstanding data entry for 2016 (for example) had a higher priority than the outstanding trips to be entered in 2012/2013, and therefore a higher proportion in this column. The outstanding trips for earlier years will be entered once the current priority for 2015/2016 data entry has been achieved (i.e. resolving the outstanding issues in trip data already received and working with observer programmes in regards to the submission of trips not yet received). For the 2016 purse seine trips received at SPC, about 4% (45 trips) have problems awaiting to be resolved (mainly issues with scanning or incomplete data submitted).

16. Tables 1 and 2 do not yet account for trips by Philippine observers on their domestic fleet permitted to fish in the high sea pocket area #1 (HSP1), or the cases where observers may be deployed in the purse seine fisheries of Indonesia and Vietnam. The observer coverage for the Philippine vessels in the HSP1 is acknowledged to be 100% and data have been provided to the WCPFC, although submissions for 2015 are currently incomplete due delays in data processing as a result of technical issues with installations of the latest versions of operating system and RDBMS software. Nonetheless, the data collected by these observers are summarised in at least one SC12 information paper (submitted but yet to be assigned an Information Paper number).

17. The breakdown of processed purse-seine observer data by fleet (Table 2) shows that the coverage of 2016 observer data submitted to SPC is generally very good, although further investigation is required in regards to the outstanding trips for observers deployed on Ecuador and El Salvador vessels. The apparent lag in data for the US purse seine fleet will be resolved once the latest backup are received and loaded.

18. Figure 2 highlights the lag in the provision of 2015 purse seine observer data compared with 2016. For the 2015 data, nearly two-thirds of the 2015 observer data were provided after 1st January 2016. However, there was a clear improvement in the provision of 2016 data, with more than 50% provided before the end of the 2016 calendar year. The lags in the provision of observer data results in an imbalance in the availability of data to process by data entry staff whereby there are certain periods (e.g. 4th quarter 2015) when there are insufficient data available to process. This was not the case in the 4th quarter 2016 and so more data were available when scientists started using the 2016 data (in early 2017). We hope to continue our support to member countries so that further improvements can be made in the provision of data in the future.

19. As reported in previous years, the 'problematic' trip data held at SPC awaiting resolution are mainly due to (i) incomplete or poor quality scanned data submissions, or (ii) issues in the data which result in the trip being set aside pending further information/review all of which prevent the trip data being entered.

20. We expect further ongoing work in this area will be required until E-Reporting is implemented on a large scale; the work involved will be required to, *inter alia*, ensure best practice procedures are implemented, and scanning software is updated. During the 17th Regional Observer Coordinators Workshop (ROCW17), the SPC Observer Manager reviewed the scanning resource requirements for each country and a draft work plan was

formulated to address the deficiencies. The resulting action included the deployment of several new scanners to the offices of Pacific Island member countries, remote support to resolve issues with scanners and visits to the offices of member countries (e.g. a trip is planned to the offices of Papua New Guinea National Fisheries Authority in August 2017).

21. It is important that the observer trip data rejected by the observer programmes still be submitted to ensure all observer trip data are available, and that the problems encountered can be reviewed and referred to in future training, debriefing and data quality control procedures.

22. Information on the trips "with unknown status" will require follow-up with flag and observer service providers, in the absence of any observer trip reporting obligations. Provision of a list of ALL observer trips conducted by each observer service provider on a regular basis would enhance the summary reports presented in this paper. The lack of provision of 'observer placement lists' from most national observer programmes remains a major issue.

23. We also highlight the importance of observer service providers submitting debriefing evaluations/scores to allow the assignment of appropriate data quality indicators to the data.

4.2 Longline

24. SC11 directed SPC to present a table of longline observer coverage which included both the coverage reported by each CCM for their longline fleet and the coverage of that fleet according to data provided to the WCPFC; Tables 3 and 4 have been prepared in response to this recommendation for longline observer coverage for 2015 and 2016 respectively. The available information on longline observer data (Tables 3 and 4) is provisional and continues to be constrained by the several issues, some of which are noted in the purse seine section above.

25. Significant developments in regards to the provision of longline observer data over the past year include the recent provision of observer data from Japan covering 95 trips conducted in 2015 and 79 trips in 2016 (to date). In general, there has been a marginal increase in observer coverage for 2016 over 2015, noting that we expect more data to be forthcoming for 2016.

26. The amount of longline observer data generated from E-Monitoring trials continues to increase.

- Since 2015, the Australian observer data are now all generated through E-Monitoring (2016 data yet to be provided);
- The ABNJ GEF-funded Fiji E-Monitoring project has generated data for over 95 trips over the past 18 months (65 trips submitted to SPC; data for an additional 30 trips have been generated and will be sent to SPC shortly);
- The Nature Conservancy (TNC) are supporting E-Monitoring trials in several countries (Palau, FSM, Marshall Islands and Solomon Islands) over the next 2-3 years. To date, E-Monitoring data for 30 trips have been submitted by these countries with an expectation of significant increase in data generated from these trials in the coming years;
- At this stage, the data generated from E-Monitoring trials is not included in the ROP Longline coverage Tables 3 and 4 (except for Australia in 2015), and this is an issue raised for consideration by SC13 through the data gaps paper/presentation (Williams, 2017):

  "There has been a recent significant increase in data generated from E-Monitoring trials and SC13 is invited to consider how these data should be dealt with in the WCPFC context, specifically in regards to ROP longline coverage";

27. Unfortunately, it is not currently possible to produce an overall coverage rate for all fleets since coverage levels by fleet can be reported in one of four different effort metrics. It is likely that the actual coverage for all fleets combined, measured in the most appropriate metric (e.g. hooks observed), will be less than what is apparent in Tables 3 and 4, since CCMs will tend to favour the metric that provides the highest coverage level.

28. In the future, this paper could consider a more in-depth review of the available longline observer data provided as directed; for example, this paper could consider the broad spatial coverage of available observer coverage.

5. Future expectations

29. There are several observer data entry teams[6] operating throughout the region entering data into a standardised observer database system (TUBs) and supported by the two technical positions (Observer Data Manager and Observer Data Audit Officer) based in SPC Noumea.

30. There have been some clear improvements in the lag in the provision of observer data (see Figure 2) and the remaining issues should be resolved over time as the national and regional resources dedicated to observer data management grow and become more experienced.

31. The development of the new web-based observer data entry system (under TUFMAN 2) is nearing completion and trial data entry began in June 2017; this system is expected to resolve many of the issues related to having distributed systems of the TUBS system. Once this new web-based system settles down, we expect that Pacific Island member countries will continue to take over some of the observer data entry work, if not through this new web-based system, then through the increased use of observer E-Reporting systems (e.g. the PNA iFIMS e-Obs system).

32. SPC will continue to develop data loaders for any new ROP data provisions that are not aligned to the standard established by SPC/FFA over the past twenty years. The final draft version of the WCPFC E-Reporting observer data field standards (see ATTACHMENT 4 in Anon, 2016) and the recent development of the draft E-Monitoring process standards[7] provide an ideal opportunity to align ROP data submissions with standards that will be adopted for E-Reporting and E-Monitoring systems and should be pursued. We expect that the WCPFC E-Reporting observer data field standards should be adopted by late 2017.

33. SPC will continue to expand the work in conducting observer E-Reporting and E-Monitoring trials in collaboration with their member countries and other regional agencies in the coming years, with an expectation of larger-scale implementation, if and when national fisheries authorities are adequately resourced and prepared to venture down this path. SPC will also continue to collaborate with other E-Reporting projects involving observer data, as required.

34. The trials for observer data collection using E-Reporting and E-Monitoring continue to progress and are changing the way technical support and training is provided to national observer programmes, with the proposal to establish dedicated positions (E-Reporting officers) at the national level now seen as fundamental to deal with the day-to-day management of observer and logbook E-Reporting.

35. SPC will continue to work closely with the WCPFC Secretariat over the coming year on the following areas:

- Provide ongoing support to enhance the WCPFC ROP database to align with the requirements of the WCPFC Compliance Case system;
- Where required, and subject to donor resourcing, continue to provide technical advice and support to address the recommendations from the WCPFC E-Reporting and E-Monitoring Intersessional Workshops;
- Provide advice and technical support on the E-Reporting and E-Monitoring standards for data fields, processes and protocols;

[6] SPC Noumea, WCPFC Secretariat (NORMA), FFA, Philippines and Fiji Fisheries are undertaking complete observer data entry. PNG/NFA and Tonga Fisheries continue to enter observer data on a trial basis.

[7] See http://www.spc.int/oceanfish/en/meetingsworkshops/e-reporting-a-e-monitoring/440-e-monitoring-technical-standards-workshop-june-2016 Electronic Monitoring (Longline) Technical Standard Workshop

- Continued support for the WCPFC/NORMA observer data entry;
- Continued support (technical and training) related to the web DORADO/TUBS observer reporting tool;
- Continued provision of ROP data to the WCPFC on a regular basis;
- Continued support in responding to requests to disseminate ROP data according to the WCPFC data dissemination rules;
- Continued work in satisfying WCPFC requirements for ROP data reports mainly aligned to their requirements for CMM monitoring.

36. SPC will also continue to work with the Pacific Islands Forum Fisheries Agency (FFA) and the PNA office to improve efficiencies in observer data management and dissemination (according to established data sharing rules), particularly in regards to data flow and reporting tools for the benefit of SPC/FFA/PNA member countries.

6. References

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FIGURES

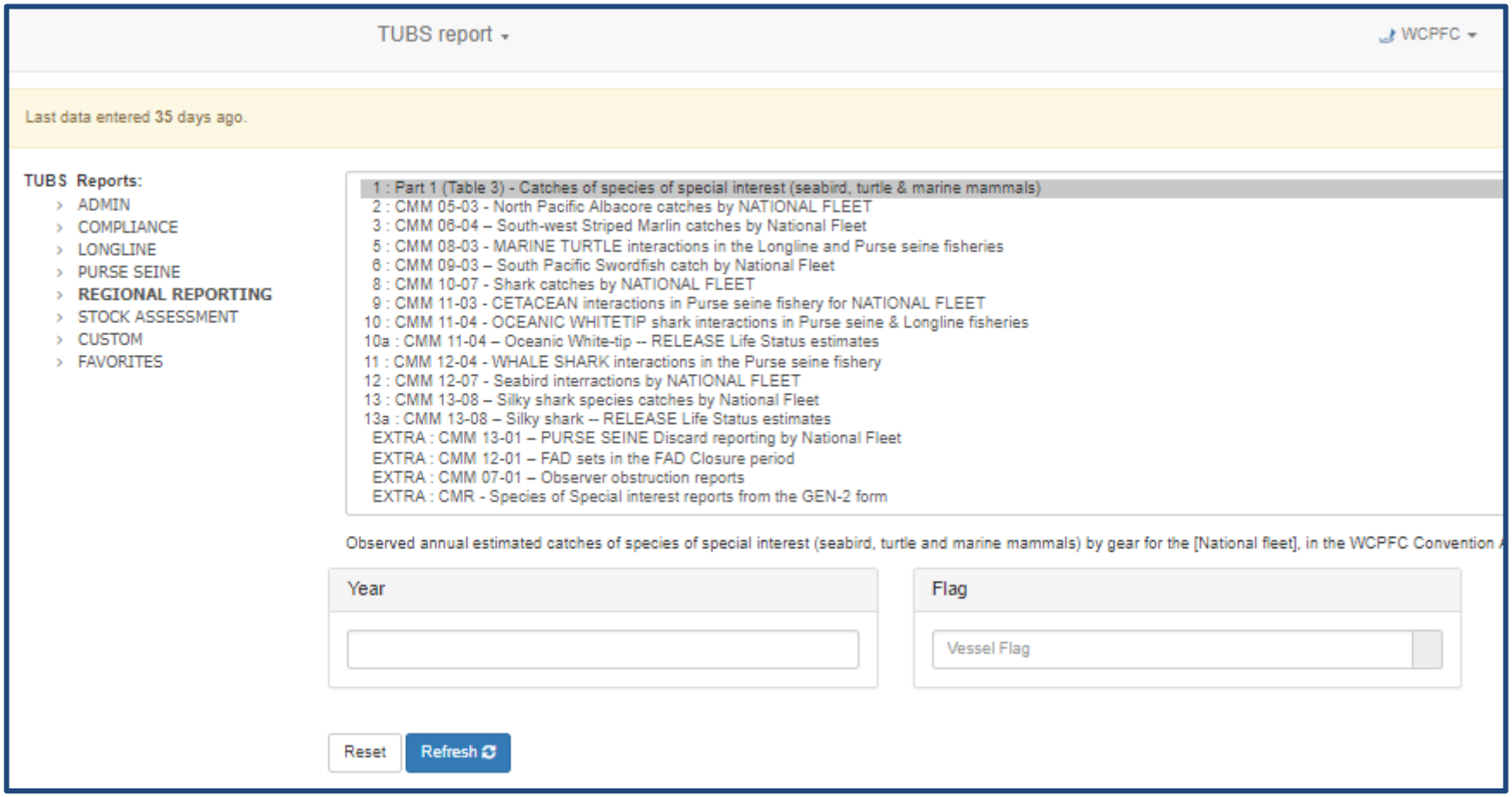

Figure 1. The WCPFC Part1 reports menu in the web DORADO/TUBS observer reporting system

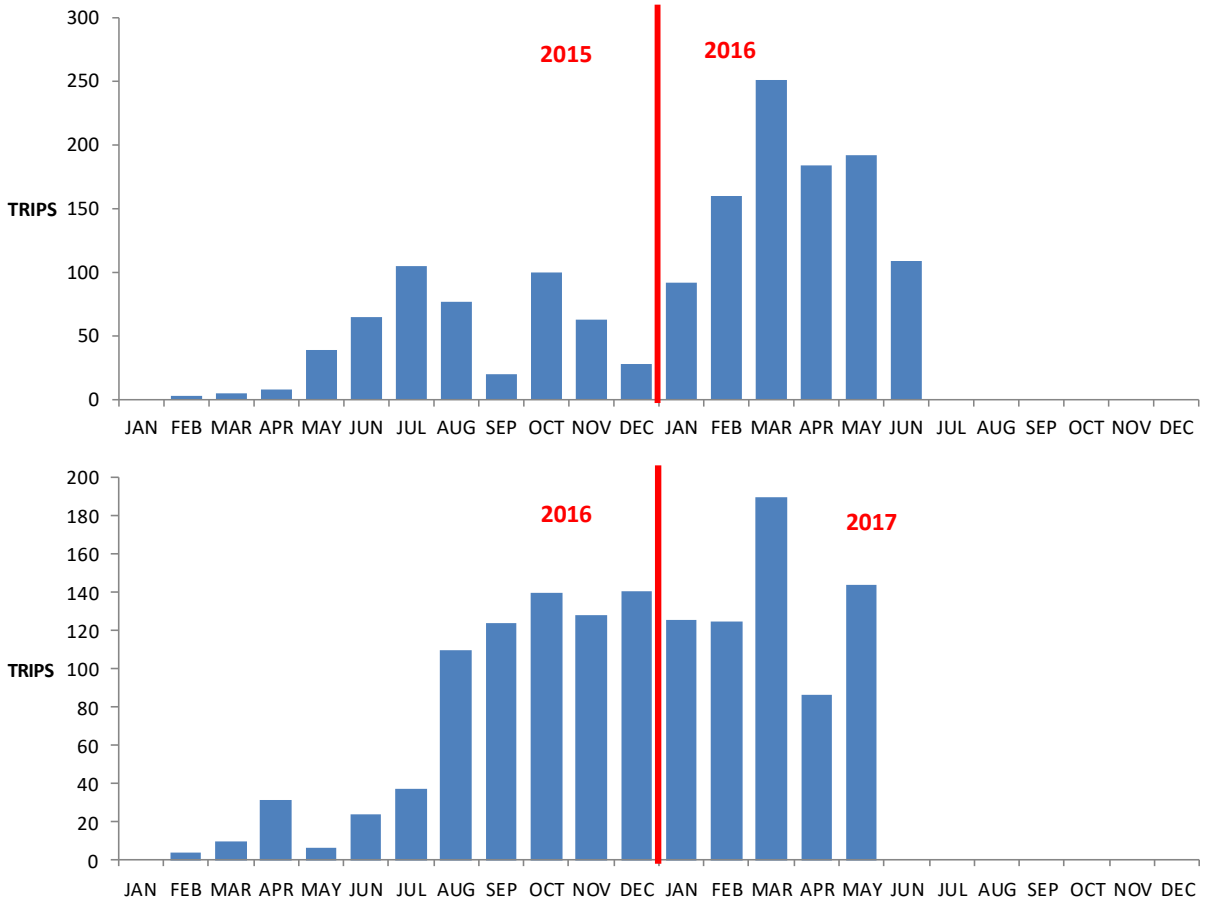

Figure 2. Monthly frequency of provision of 2015 (top) and 2016 (bottom) purse seine data

TABLES

Table 1. Summary of the provision and processing of Purse seine Observer data

YEAR	1. Estimated Purse seine TRIPS	2. TRIPS with unknown status	3. TRIPS with known placements		4. TRIP data submitted		5. TRIP data processed				6. Problems awaiting resolution			7. TRIPS not yet sent by Obsv. Progs.	
			Trips	%	Trips	%	Trips	% of Estimated trips	% of total available trips	% of trips received without problems	Trips	% of total available trips	% of received	Trips	% of total
2012	2,133	516	1,617	76%	1,613	100%	1,516	71%	94%	94%	4	0%	0%	4	0%
2013	2,198	423	1,775	81%	1,754	99%	1,702	77%	96%	97%	1	0%	0%	21	1%
2014	2,427	464	1,963	81%	1,796	91%	1,635	67%	83%	96%	94	5%	6%	167	9%
2015	2,160	464	1,696	79%	1,599	94%	1,476	68%	87%	95%	44	3%	3%	97	6%
2016	2,109	666	1,443	68%	1,408	98%	1,089	52%	75%	80%	45	3%	4%	35	2%

Notes

1. **CATGEORY 1** represents estimated trips determined from VMS data. These trips exclude the Philippines and Indonesian domestic fisheries, purse seine trips undertaken completely outside the tropical waters (20°N-20°S).). In some instances, trips identified in the VMS data where no fishing actually took place (e.g. returning to home port in Asia for annual maintenance) may have been included in the "Estimated" trips and so the estimated trips will be an over-estimate of actual fishing trips.
2. **CATEGORY 2** represents trips of unknown status and is essentially the difference between VMS trips (**CATEGORY 1**) and those trips that SPC has a record of having taken place (**CATGEORY 3**). In some instances, trips identified in the VMS data where no fishing actually took place (e.g. returning to home port in Asia for annual maintenance) may have been included in the "Estimated" trips. This category may also include fishing trips without an observer on-board.
3. **CATEGORY 3** covers (i) data received at SPC and (ii) basic trip information provided by observer programmes indicating an observer trip took place, but data have yet to be provided.
4. SPC employs a strategy of processing the most recent observer data as highest priority, mainly to ensure CCMs can satisfy their Part 1 and Part 2 reporting obligations (for which compliance applies to the most recent year). This is reflected in the **"% of trips received without problems**" in **CATEGORY 5** whereby the outstanding data entry for 2014/2015 has higher priority than outstanding trips data entry in 2012/2013, for example. Every effort has been made to resolve the backlog from previous years.
5. **CATGEORY 7** is essentially the difference between **CATEGORY 3** and **CATEGORY 4**.
6. Observer data from the Philippines fleet fishing in the High Seas Pocket #1 (HSP #1) are not included in this table at this stage.

Table 2. Summary of Purse seine Observer data received at SPC, by year and flag

2012								
FLEET	1. Estimated Purse seine TRIPS	2. TRIPS with unknown status	3. TRIPS with known placements	4. TRIP data submitted		5. TRIP data processed		
				Trips	%	Trips	% of total available trips	% of total trips recvd
China	88	36	52	52	100%	47	90%	90%
Ecuador	47	32	15	15	100%	11	73%	73%
Spain	34	18	16	16	100%	9	56%	56%
FSM	42	3	39	39	100%	38	97%	97%
Japan	279	78	201	199	99%	198	99%	99%
Kiribati	56	9	47	47	100%	45	96%	96%
Korea	315	105	210	210	100%	173	82%	82%
Marshall Is.	87	26	61	61	100%	61	100%	100%
New Zealand	24	13	11	11	100%	11	100%	100%
PNG / PH / Vanuatu	513	47	466	464	100%	444	95%	96%
Solomon Islands	80	55	25	25	100%	23	92%	92%
El Salvador	13	7	6	6	100%	1	17%	17%
Tuvalu	10	3	7	7	100%	7	100%	100%
Chinese Taipei	266	70	196	196	100%	188	96%	96%
USA	279	15	264	264	100%	260	98%	98%
	2133	517	1616	1612	100%	1516	94%	94%

2013								
FLEET	1. Estimated Purse seine TRIPS	2. TRIPS with unknown status	3. TRIPS with known placements	4. TRIP data submitted		5. TRIP data processed		
				Trips	%	Trips	% of total available trips	% of total trips recvd
China	131	42	89	89	100%	88	99%	99%
Ecuador	45	18	27	27	100%	22	81%	81%
Spain	33	3	30	30	100%	28	93%	93%
FSM	40	35	5	5	100%	5	100%	100%
Japan	281	71	210	208	99%	208	99%	100%
Kiribati	59	3	56	54	96%	46	82%	85%
Korea	290	62	228	227	100%	209	92%	92%
Marshall Is.	93	0	93	91	98%	91	98%	100%
New Zealand	27	14	13	13	100%	12	92%	92%
PNG / PH / Vanuatu	526	13	513	500	97%	492	96%	98%
Solomon Islands	69	61	8	8	100%	8	100%	100%
El Salvador	22	8	14	14	100%	11	79%	79%
Tuvalu	10	2	8	8	100%	7	88%	88%
Chinese Taipei	274	67	207	206	100%	205	99%	100%
USA	298	24	274	274	100%	270	99%	99%
	2198	423	1775	1754	99%	1702	96%	97%

Table 2. Summary of Purse seine Observer data received at SPC, by year and flag (continued)

2014								
FLEET	1. Estimated Purse seine TRIPS	2. TRIPS with unknown status	3. TRIPS with known placements	4. TRIP data submitted		5. TRIP data processed		
				Trips	%	Trips	% of total available trips	% of total trips recvd
China	146	38	108	106	98%	97	90%	92%
Ecuador	46	30	16	16	100%	16	100%	100%
Spain	37	12	25	25	100%	23	92%	92%
FSM	65	8	57	52	91%	49	86%	94%
Japan	274	85	189	160	85%	156	83%	98%
Kiribati	114	3	111	109	98%	85	77%	78%
Korea	307	100	207	207	100%	148	71%	71%
Marshall Is.	108	18	90	87	97%	79	88%	91%
New Zealand	24	17	7	7	100%	6	86%	86%
PNG / PH / Vanuatu	553	0	553	442	80%	414	75%	94%
Solomon Islands	73	39	34	34	100%	33	97%	97%
El Salvador	25	10	15	15	100%	15	100%	100%
Tuvalu	8	4	4	3	75%	3	75%	100%
Chinese Taipei	316	86	230	216	94%	206	90%	95%
USA	331	14	317	317	100%	305	96%	96%
	2427	464	1963	1796	91%	1635	83%	91%

2015								
FLEET	1. Estimated Purse seine TRIPS	2. TRIPS with unknown status	3. TRIPS with known placements	4. TRIP data submitted		5. TRIP data processed		
				Trips	%	Trips	% of total available trips	% of total trips recvd
China	96	1	95	94	99%	91	96%	97%
Ecuador	40	28	12	12	100%	9	75%	75%
Spain	19	9	10	10	100%	7	70%	70%
FSM	83	0	83	82	99%	75	90%	91%
Japan	257	110	147	127	86%	110	75%	87%
Kiribati	165	48	117	116	99%	92	79%	79%
Korea	280	53	227	222	98%	209	92%	94%
Marshall Is.	105	29	76	75	99%	73	96%	97%
New Zealand	23	20	3	3	100%	3	100%	100%
PNG / PH / Vanuatu	428	18	410	356	87%	340	83%	96%
Solomon Islands	66	27	39	38	97%	38	97%	100%
El Salvador	11	6	5	5	100%	4	80%	80%
Tuvalu	5	1	4	4	100%	4	100%	100%
Chinese Taipei	302	98	204	191	94%	181	89%	95%
USA	280	16	264	264	100%	240	91%	91%
	2160	464	1696	1599	94%	1476	87%	92%

Table 2. Summary of Purse seine Observer data received at SPC, by year and flag (continued)

2016								
FLEET	1. Estimated Purse seine TRIPS	2. TRIPS with unknown status	3. TRIPS with known placements	4. TRIP data submitted		5. TRIP data processed		
				Trips	%	Trips	% of total available trips	% of total trips recvd
China	96	10	86	85	99%	73	85%	86%
Ecuador	27	24	3	3	100%	0	0%	0%
Spain	9	0	9	9	100%	7	78%	78%
FSM	98	11	87	79	91%	67	77%	85%
Japan	262	117	145	145	100%	130	90%	90%
Kiribati	169	70	99	89	90%	71	72%	80%
Korea	298	155	143	143	100%	98	69%	69%
Marshall Is.	84	18	66	61	92%	50	76%	82%
New Zealand	9	6	3	3	100%	3	100%	100%
PNG / PH / Vanuatu	413	53	360	352	98%	311	86%	88%
Solomon Islands	96	67	29	27	93%	21	72%	78%
El Salvador	13	11	2	2	100%	1	50%	50%
Tuvalu	7	0	7	7	100%	6	86%	86%
Chinese Taipei	287	79	208	207	100%	169	81%	82%
USA	241	46	195	195	100%	82	42%	42%
	2109	667	1442	1407	98%	1089	76%	77%

Notes

1. **CATGEORY 1** represents estimated trips determined from VMS data. These trips exclude the Philippines and Indonesian domestic fisheries, purse seine trips undertaken completely outside the tropical waters (20°N-20°S).). In some instances, trips identified in the VMS data where no fishing actually took place (e.g. returning to home port in Asia for annual maintenance) may have been included in the "Estimated" trips.
2. **CATEGORY 2** represents trips of unknown status and is essentially the difference between VMS trips (**CATEGORY 1**) and those trips that SPC has a record of having taken place (**CATGEORY 3**). In some instances, trips identified in the VMS data where no fishing actually took place (e.g. returning to home port in Asia for annual maintenance) may have been included in the "Estimated" trips. This category may also include fishing trips without an observer on-board.
3. **CATEGORY 3** covers (i) data received at SPC and (ii) basic trip information provided by observer programmes indicating an observer trip took place, but data have yet to be provided.
4. **"PNG / PH / Vanuatu"** represent a combination of vessels chartered to PNG and flagged to Philippines and Vanuatu, but also those vessels flagged to Philippines and Vanuatu that are not chartered to PNG. The reason for combining these fleets is that VMS data used to determine coverage does NOT take into account chartering arrangements while the observer data does take into account chartering arrangements.
5. Observer data from the Philippines fleet fishing in the High Seas Pocket #1 (HSP #1) are not included in this table at this stage.

Table 3. Provisional 2015 Longline observer coverage by CCM – based on reporting from CCMs and data submissions

The fleet breakdown, metric and reporting by CCMs is based on WCPFC11 Summary Report para 483-486 and Attachment L (Anon., 2010a). Flag CCM reporting is from Annual Report Part 1.

			OBSERVER COVERAGE						
CCM Fleet	Fishery	Metric selected for Coverage	Total estimated effort	As reported by flag state		Total estimated effort	As per data submission		See NOTES
				Observer	%		Observer	%	
AUSTRALIA	Domestic	No. of Hooks	8,220,000	482,623	5.9%	8,180,749	473,178	5.8%	2, 17
CHINA	Ice/Fresh	No. of Trips	2,185	31	1.4%	2,185	31	1.4%	3, 10, 11
	Frozen	No. of Trips							
COOK ISLANDS	Pacific Islands	Days at Sea	1,915	245	12.8%	2,392	230	9.6%	8, 9
EUROPEAN UNION	Distant-water	No. of Trips	11	2	18.2%	11	1	9.1%	4, 10, 19
FSM	Pacific Islands	No. of Trips			3.0%	306	5	1.6%	7
FIJI	Pacific Islands	No. of Trips	709	147	20.7%	709	147	20.7%	8, 9
FRENCH POLYNESIA	Pacific Islands	No. of Trips	990	36	3.6%	990	36	3.6%	2, 9
INDONESIA	Domestic	No. of Trips	-	-	0.0%	-	-	0.0%	5
	Distant-water	No. of Trips	-	-	0.0%	-	-	0.0%	5, 10
JAPAN	Ice/Fresh, short-trip	Days fished	28,597	1,226	4.3%	28,597	1,226	4.3%	10, 18
	Frozen, long-trip	Days fished	8,298	627	7.6%	8,298	627	7.6%	10,18
KIRIBATI	Pacific Islands	No. of Trips	9	1	11.1%	9	1	11.1%	8, 9
MARSHALL ISLANDS	Pacific Islands	No. of Trips	0	-	-	0	-	-	1, 2, 9
NEW CALEDONIA	Pacific Islands	No. of Hooks	4,359,200	147,337	3.4%	4,415,751	204,870	4.6%	2
NEW ZEALAND	Domestic	No. of Hooks	2,321,336	714,000	30.8%	2,321,336	625,673	27.0%	2
PAPUA NEW GUINEA	Pacific Islands	No. of Trips	76	0	0.0%	76	0	0.0%	2, 9
PHILIPPINES	Distant-water	No. of Trips	-	-	-	-	-	-	1
REPUBLIC OF KOREA	Distant-water	Days at Sea	20,157	1,339	6.6%	20,157	1,057	5.2%	10, 20
SAMOA	Pacific Islands	No. of Trips	171	4	2.3%	161	2	1.2%	15, 2, 9
SOLOMON ISLANDS	Pacific Islands	No. of Trips	149	6	4.0%	149	6	4.0%	2
TONGA	Pacific Islands	No. of Trips	-	-	7.0%	137	12	8.8%	2
TUVALU	Pacific Islands	Days at Sea	500	-	0.0%	500	0	0.0%	8, 12
CHINESE TAIPEI	Small longline – STLL	Days at Sea	78,146	1,936	2.5%	61,851	1,029	1.7%	10, 14
	Distant-water – DWLL	Days at Sea	21,039	1,793	8.5%	15,080	1,882	12.5%	10
USA	HAWAII/California-based	No. of Trips	825	193	23.4%	825	193	23.4%	6
	AMERICAN SAMOA	No. of Trips	7	3	42.9%	7	3	42.9%	6
VANUATU	Pacific Island-based, short trip	Days at Sea	...	250	3.7%	17,905	394	2.2%	9, 10, 11
	Distant-water								

NOTES

1. No activity in 2015 by this CCMs longline fleet
2. Domestic fleet with no fishing on the high seas or other EEZs and therefore no ROP trips. Observer coverage of the domestic fleet is provided in some cases nonetheless.
3. China has yet to advise on which of the four metrics they choose to measure ROP longline observer coverage. At this stage, the number of trips has been used in these tables.
4. In a communication of 28 February 2015, EU advised that they will use "NUMBER OF TRIPS" for measuring and reporting observer coverage on its flagged LL vessels for years from 2014. For 2013, they had previously advised that "*We are currently exploring options for improving observer coverage on EU LLs. Recent amendments in the ES legislation should contribute also in improving these aspects. At TCC10, EU advised that legislation has been adopted*."
5. No information provided by the CCM for this fleet.
6. The information provided for the US fleets EXCLUDES activities in their respective EEZs, that is, the coverage rates provided are for their ROP trips only and estimated effort is for activities outside their EEZ.
7. The information provided for the FSM fleets EXCLUDES activities of their domestic fleet, that is, the coverage is for their ROP trips only.
8. Most (if not all) vessel trips (and therefore most days-at-sea) would be non-ROP trips since mostly restricted to waters of national jurisdiction. . Observer coverage is for all activities (ROP and non-ROP) of the domestic fleet.
9. Observer trip value represents the trip data provided to SPC in the absence of advice from this CCM on total number of observer trips conducted. This value may not represent the overall trips undertaken (i.e. it may be an under-estimate).
10. All vessel trips (and therefore days-at-sea) would be defined as ROP trips. "Distant-water" vessels have very long trips and since some fleets tranship at sea, the unit of coverage might more suitably be "days-at-sea" for these situations.
11. Covers both 'fleets' as coverage cannot be split by fleet at this stage.
12. Tuvalu advised their choice of metric for 2014 and 2015 was "days at sea".
13. Observer coverage information (as nominated from flag state) was taken from the CCMs WCPFC Annual Report Part 1 prepared for SC12 (as per WCPFC11 Summary Report paragraphs 483 – 486).
14. Includes observer trips conducted by Coastal state observer programmes on Chinese Taipei-flagged STLL vessels.
15. This CCM did not have flagged longline vessels on the Record of Fishing Vessels in 2015.
16. Philippines advised that an observer from Vanuatu was active for one trip during 2015.
17. Australia commenced producing observer data from their E-Monitoring system in 2015.
18. Japan provided 2015 observer data from their National Observer Programme in June 2017. These data have yet to be loaded.
19. Observer data provided does not completely satisfy the ROP minimum data field standards.
20. There is evidence that additional observer trips have been conducted by coastal states, but the data have yet to be provided.

Table 4. 2016 Longline observer coverage by CCM – based on reporting from CCMs and data submissions

The fleet breakdown, metric and reporting by CCMs is based on WCPFC11 Summary Report para 483-486 and Attachment L (Anon., 2010a). Flag CCM reporting is from Annual Report Part 1.

			OBSERVER COVERAGE						
CCM Fleet	Fishery	Metric selected for Coverage	Total estimated effort	As reported by flag state		Total estimated effort	As per data submission		See NOTES
				Observer	%		Observer	%	
AUSTRALIA	Domestic	No. of Hooks	7,829,999	680,445	8.7%	7,829,999	0	0.0%	2, 17
CHINA	Ice/Fresh	No. of Trips	1,952	50	2.6%	1,952	43	2.2%	3, 10, 11
	Frozen	No. of Trips							
COOK ISLANDS	Pacific Islands	Days at Sea	2,143	165	7.7%	2,143	230	10.7%	8, 9
EUROPEAN UNION	Distant-water	No. of Trips	11	2	18.2%	11	2	18.2%	4, 10, 19
FSM	Pacific Islands	No. of Trips	240	0	0.0%	240	0	0.0%	7
FIJI	Pacific Islands	No. of Trips	665	153	23.0%	623	191	30.7%	8, 9, 22
FRENCH POLYNESIA	Pacific Islands	Fishing Days	9,500	323	3.4%	9,500	323	3.4%	2, 9
INDONESIA	Domestic	No. of Trips	-	-	0.0%	-	-	0.0%	5
	Distant-water	No. of Trips	0	-	-	0	-	-	1, 5, 10
JAPAN	Ice/Fresh, short-trip	Days fished	27,284	874	3.2%	27,284	874	3.2%	10, 18
	Frozen, long-trip	Days fished	10,933	690	6.3%	10,933	690	6.3%	10,18
KIRIBATI	Pacific Islands	No. of Trips	8	1	12.5%	8	1	12.5%	8, 9
MARSHALL ISLANDS	Pacific Islands	No. of Trips	0	-	-	0	-	-	1, 2, 9, 21
NEW CALEDONIA	Pacific Islands	No. of Hooks	4,715,600	281,370	6.0%	4,715,600	306,462	6.5%	2
NEW ZEALAND	Domestic	No. of Hooks	2,355,738	332,446	14.1%	2,355,738	332,446	14.1%	2
PAPUA NEW GUINEA	Pacific Islands	No. of Trips	76	0	0.0%	76	0	0.0%	2, 9
PHILIPPINES	Distant-water	No. of Trips	-	-	-	-	-	-	1, 16
REPUBLIC OF KOREA	Distant-water	Days at Sea	21,306	1,460	6.9%	21,306	397	1.9%	10, 20
SAMOA	Pacific Islands	No. of Trips	188	0	0.0%	188	0	0.0%	15, 2, 9
SOLOMON ISLANDS	Pacific Islands	No. of Trips	-	-	-	-	-	-	1, 2
TONGA	Pacific Islands	No. of Trips	64	6	13.5%	64	6	9.4%	2
TUVALU	Pacific Islands	No. of Trips	12	2	16.7%	12	2	16.7%	8, 12
CHINESE TAIPEI	Small longline – STLL	Days at Sea	103,269	1,912	1.9%	103,269	3,982	3.9%	10, 14
	Distant-water – DWLL	Days at Sea	21,508	1,755	8.2%	21,508	1,755	8.2%	10
USA	HAWAII/California-based	No. of Trips	1,032	233	22.6%	1,032	233	22.6%	6
	AMERICAN SAMOA	No. of Trips	5	0	0.0%	5	0	0.0%	6
VANUATU	Pacific Island-based, short trip	Days at Sea	10,442	207	2.0%	10,442	207	2.0%	9, 10, 11
	Distant-water								

NOTES

1. No activity in 2016 by this CCMs longline fleet
2. Domestic fleet with no fishing on the high seas or other EEZs and therefore no ROP trips. Observer coverage of the domestic fleet is provided in some cases nonetheless.
3. China has yet to advise on which of the four metrics they choose to measure ROP longline observer coverage. At this stage, the number of trips has been used in these tables.
4. In a communication of 28 February 2015, EU advised that they will use "NUMBER OF TRIPS" for measuring and reporting observer coverage on its flagged LL vessels for years from 2014. For 2013, they had previously advised that "*We are currently exploring options for improving observer coverage on EU LLs. Recent amendments in the ES legislation should contribute also in improving these aspects. At TCC10, EU advised that legislation has been adopted*."
5. No information provided by the CCM for this fleet.
6. The information provided for the US fleets EXCLUDES activities in their respective EEZs, that is, the coverage rates provided are for their ROP trips only and estimated effort is for activities outside their EEZ.
7. The information provided for the FSM fleets EXCLUDES activities of their domestic fleet, that is, the coverage is for their ROP trips only.
8. Most (if not all) vessel trips (and therefore most days-at-sea) would be non-ROP trips since mostly restricted to waters of national jurisdiction. . Observer coverage is for all activities (ROP and non-ROP) of the domestic fleet.
9. Observer trip value represents the trip data provided to SPC in the absence of advice from this CCM on total number of observer trips conducted. This value may not represent the overall trips undertaken (i.e. it may be an under-estimate).
10. All vessel trips (and therefore days-at-sea) would be defined as ROP trips. "Distant-water" vessels have very long trips and since some fleets tranship at sea, the unit of coverage might more suitably be "days-at-sea" for these situations.
11. Covers both 'fleets' as coverage cannot be split by fleet at this stage.
12. Tuvalu advised their choice of metric for 2016 was "Number of Trips".
13. Observer coverage information (as nominated from flag state) was taken from the CCMs WCPFC Annual Report Part 1 prepared for SC12 (as per WCPFC11 Summary Report paragraphs 483 – 486).
14. Includes observer trips conducted by Coastal state observer programmes on Chinese Taipei-flagged STLL vessels.
15. This CCM did not have flagged longline vessels on the Record of Fishing Vessels in 2016.
16. No longline vessels from Philippines active in 2016.
17. Australia commenced producing observer data from their E-Monitoring system from 2015.
18. Japan provided 2016 observer data from their National Observer Programme in June 2017. These data have yet to be loaded.
19. Observer data provided does not satisfy the ROP minimum data field standards.
20. There is evidence that additional observer trips have been conducted by coastal states, but the data have yet to be provided.
21. CCM indicated that they had charter vessels for 2016 but which are not considered under ROP trip definition.
22. Fiji commenced producing observer data from their E-Monitoring system in 2016, but these trips have yet to be included in the ROP longline coverage.