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STATUS OF OBSERVER DATA MANAGEMENT

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Updates since WCPFC-SC14-2018/ST IP-02

- Corrected for "European Union" fleets throughout the document
- Figure 2 and Tables 1–4 updated to reflect the latest available data.

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- to medium-term (Anon., 2010a, Anon., 2010b). The Fourteenth Regular Session of the Commission (3–8 December 2017; Anon., 2018) reconfirmed the Commission's support for ROP data processing with its inclusion in the indicative budget for the period 2018-2020.

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 processing as the purse seine observer data.

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. With the deployment of the new Tufman 2 observer component over the past year, at least two more SPC/OFP staff are now involved in supporting observer data management throughout the region (e.g. part of the work of the Training Advisor / Analyst and Junior Professional Officer/Data management involves the provision of support to countries via the SLACK helpdesk).

9. The staffing levels were stable over the past year, although Mr. Icanus Tuiloma (Observer Data Manager) unfortunately resigned in June 2018 and will leave in late September 2018; the recruitment process to find his replacement is currently underway.

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. Some progress was made in refining the process for transferring WCPFC ROP data to the WCPFC Secretariat, but there remains several areas to improve the efficiency of the Secretariat receiving observer data in a timely manner.
- The most significant work undertaken by SPC in the past year was the redevelopment and deployment of a new observer data management system (Tufman 2 - Observer component) to replace the previous TUBS system. The framework of the new system supports observer data entry into one cloud-hosted database through a web browser, which resolves many issues currently encountered by running separate instances of the TUBS database remotely (and allows more countries to enter their own observer data directly). Another feature of this new system is that observer trip data are now automatically linked to respective trip logsheet, unloading, port sampling and cannery data (and example of a Tufman 2 feature that uses this data linking is shown in Figure 1). SPC visited the WCPFC Secretariat, Forum Fisheries Agency and Fiji to install this new system and provide training to data management and data entry staff. Staff from Tonga Fisheries also visited SPC for training in this new system.
- SPC technical staff continued to provide regular support to other countries and regional agencies processing observer data using the new Tufman 2 observer component, including visits to FSM, Fiji, French Polynesia and Solomon Islands (FFA) and Tonga 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 longline observer data have been provided for the following fleets/years: Australia (2015–2016), China (2016-2017), Indonesia (2017), New Zealand (2017), EU (2017), US (Hawaii/American Samoa 2017), Korea (2016) and Chinese Taipei (2017). Unfortunately, some of the non-standard observer data provided have yet to be loaded due to the need to resolve issues manually in the data, which has proved very time consuming.
- Non-standard observer data for 2017 have yet to be provided for the following longline fleets: Australia, Japan and Korea. 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) database-reporting module continues to be enhanced and used regularly by national observer providers, the WCPFC and FFA Secretariats and several other CCMs. This system continues to be used by Pacific Island countries in preparation of the WCPFC Part 1 and Part 2 reports for submission, and the system will continue to expand and evolve over the coming years to meet

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

the requirements of not only national observer programmes, but also SPC, the WCPFC Secretariat, FFA and PNAO.

- The data generated from trials for observer data collection using E-Monitoring (EM) systems have evolved significantly over the past two years with more than 200 EM trips for 2017 now available. In recognising the significant work involved in quality control and consolidation of the EM data at the regional level, the SPC/OFP have established a dedicated position (Regional ER Technical Coordinator) to deal with these technical aspects and provide support to member countries, through the generous assistance of The Nature Conservancy (TNC), International Seafood Sustainability Foundation (ISSF), and the Pew Foundation.

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 2018 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 2016 as nominated by the flag state and according to the metrics proposed at TCC10[3] and agreed at WCPFC11[4], and Table 4 shows the provisional coverage of observer longline activity for 2017, 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. There has been a significant amount of observer data generated from E-Monitoring over the past 2-3 years, and an attempt to quantify these data has been made in the right-hand columns of Table 3 and 4.

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 [see Williams et al. (2017) for the details of each factor], including:

i. Accurate information on the complete number of vessel trips by gear and flag in the WCPFC Convention Area.
ii. Accurate information on the actual number of observer trips by observer programme, gear and flag.
iii. Assignment of an ROP trip in the unprocessed data.
iv. Lags in the uploading of observer data received in 'non-standard' format.

4.1 Purse seine

13. Provisions of purse seine observer data for years 2012–2015 have been described in previous versions of this paper.

14. Observer data for an estimated 59% (1,141 trips) of observer purse seine trips conducted during 2017 have been received at SPC at the time of writing this paper, but a significant number of these trips have only been received in recent months and so have yet to be processed (only 28% of estimated trips according to VMS data). For 2016, Observer data received at SPC cover an estimated 78% (1,598 trips) of the total estimated purse seine trips (2,042 trips according to VMS data), but with a coverage of nearly 100% for trips with known placements.

15. A total of 48% (542 trips) of the observer data received (1,141 trips) at SPC for 2017 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 2017 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 2017 (for example) had a higher priority than the outstanding trips to be entered in earlier years, and therefore a higher proportion in this column. The outstanding trips for earlier years will be entered once the current priority for 2017 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 2017 purse seine trips received at SPC, about 9% (106 trips) have problems awaiting to be resolved (mainly issues with scanning or incomplete data submitted).

[3] See the TCC10 paper at http://www.wcpfc.int/node/19567
[4] See the WCPFC11 report at http://www.wcpfc.int/node/20349, para 477 and Attachment L, Table 1

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; data collected by these observers are summarised in a SC14 Statistics theme 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 2017 observer data submitted to SPC is generally low at this stage, particularly for the major fleets of Japan, Korea and Kiribati.

18. Figure 2 highlights the lag in the provision of 2017 purse seine observer data compared with the provisions of 2016 and 2015 data. The best way to interpret these graphs is to understand that having more trips (blue bars) to the left of the red line represents the more timely provision of observer data, but having more trips (blue bars) to the right of the red line means progressive lags in the provision of data.

19. Nearly two-thirds of the 2015 observer data were provided after 1st January 2016, which was acknowledged as a problem since coverage of data available for the WCPFC processes in 2016 (SC12 and TCC12 work) was not adequate. We noted last year that there was a clear improvement in the provision of 2016 data to be used in 2017 for SC13 and TCC13, with more than 50% provided before the end of the 2016 calendar year. However, the timeliness of the provision of 2017 purse seine observer data has been poor, with most of the data only provided in the past few months only, and too late to be processed and made available for SC14 and preliminary TCC14 work. We hope to continue our support to the national observer providers so that further improvements can be made in the provision of data in the future.

20. 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.

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. In the future, we plan to work with observer providers to resolve the backlog of observer debriefing data, and incorporate debriefing data from the PNA FIMS observer-debriefing component into the regional observer database.

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 2016 and 2017 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. As mentioned, 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 longline observer data provided by several CCMs for their national observer programme data. Unfortunately, some of the non-standard observer data provided have yet to be loaded due to the need to resolve issues manually in the data, which has proved very time consuming.

26. Given the complexity and time required in loading non-standard observer data, **we strongly encourage CCMs to use the WCPFC E-Reporting observer data field standards as the basis for providing their data in the future**, even where the data are not generated from ER/EM systems.

27. A significant development in regards to the provision of longline observer data over the past year includes the recent provision of observer data from Indonesia covering 4 trips conducted in 2017 (although the data do not satisfy all ROP-required data fields). In general, there is a marginal increase in observer coverage each year, noting that we expect more data to be forthcoming for 2017.

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

- Since 2015, the Australian observer data have all been generated through E-Monitoring. 2016 data have been provided and 2017 data are expected, although SPC will seek advice from Australia on some aspects of the data provided;
- The ABNJ GEF-funded Fiji E-Monitoring project has generated data for over 200 trips over the past 3 years, a significant achievement;
- The Nature Conservancy (TNC) are supporting E-Monitoring trials in several countries (Palau, FSM, Marshall Islands and Solomon Islands) over recent years. To date, E-Monitoring data for 83 trips have been submitted by these countries with an expectation of significant increase in data generated from these trials in the coming years;
- An attempt has been made to include the data generated from E-Monitoring trials in the ROP Longline coverage Tables 3 and 4, noting that the 3rd Meeting of the WCPFC E-Reporting and E-Monitoring (ERandEM) Working Group (6-7 August 2018) and SC14 (8-16 August 2018) will attempt to address the following SC13 recommendation:

  "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";

29. 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.

30. In future, this paper could consider a more in-depth review of the available longline observer data provided as directed; for example, it could consider the broad spatial coverage of available observer coverage once all observer data for the year have been submitted and loaded.

5. Future expectations

31. There are several observer data entry teams[5] operating throughout the region now entering data into the new web-based Tufman 2 observer component. This system is primarily supported by the two technical positions (Observer Data Manager and Observer Data Audit Officer) based in SPC Noumea, but also by other SP/OFP staff will continue to assist member countries using this system via the SLACK Helpdesk.

32. Unfortunately, there has been a deterioration in the timeliness of purse seine observer data over the past year (see Figure 2 and Section 4.1, para. 19 above) and the Scientific Service Provider (SPC) will be working with respective observer providers in the hope of resolving any issues that caused this delay in observer data provisions.

33. Further refinement of the new web-based observer data entry system (under TUFMAN 2) will be conducted in the coming year, including the release of the observer debriefing component and support for the observer pole-and-line module. Several Pacific Island member countries have expressed interest in trialling the entry of their observer data and the Philippines will move to this system in the 4th quarter of 2018. There are also plans to review the DORADO reporting tool in the coming year to include new reports and consider the requirements for a new more user-friendly structure.

34. SPC will continue to develop and modify data loaders for ROP data provisions that are not aligned to the WCPFC E-Reporting observer data field standards which were adopted at WCPFC14 (see Anon., 2018) – that is, the loading of non-standard observer data. Given the complexity and time required in loading non-standard observer data, **we strongly encourage CCMs to use the WCPFC E-Reporting observer data field standards as the basis for providing their data in the future**, even though the data are not generated from ER/EM systems. The recent development of the draft E-Monitoring process standards[6] 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.

35. SPC will continue to be involved in 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.

36. The **observer data generated from E-Monitoring systems** in Pacific Island countries will continue to expand and where required, technical support from the regional level (e.g. through the Regional EM Technical Coordinator) will continue. The outcomes of the 3rd WCPFC ERandEM Working Group (6-7 August 2018) will be important in addressing **how EM data are to be dealt with in the WCPFC context, specifically in regards to ROP longline coverage**, and any recommendations/directives from this meeting will be taken into account in the coming year.

37. 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, 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;
- Continued support for the WCPFC/NORMA observer data entry (now using the Tufman 2 web-based system);
- Continued support (technical and training) related to the web DORADO observer reporting tool;

[5] 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.

[6] See http://oceanfish.spc.int/en/meetingsworkshops/e-reporting-a-e-monitoring/474-second-em-workshop-11-2017 2nd Regional Electronic Monitoring Process Standards Workshop, Nov. 2017, Noumea, New Caledonia

- Improving the timeliness in provisions of ROP data to the WCPFC;
- 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.

38. 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. Example of Tufman 2 MAP feature, overlaying observer, logsheet and VMS data for a selected purse seine trip

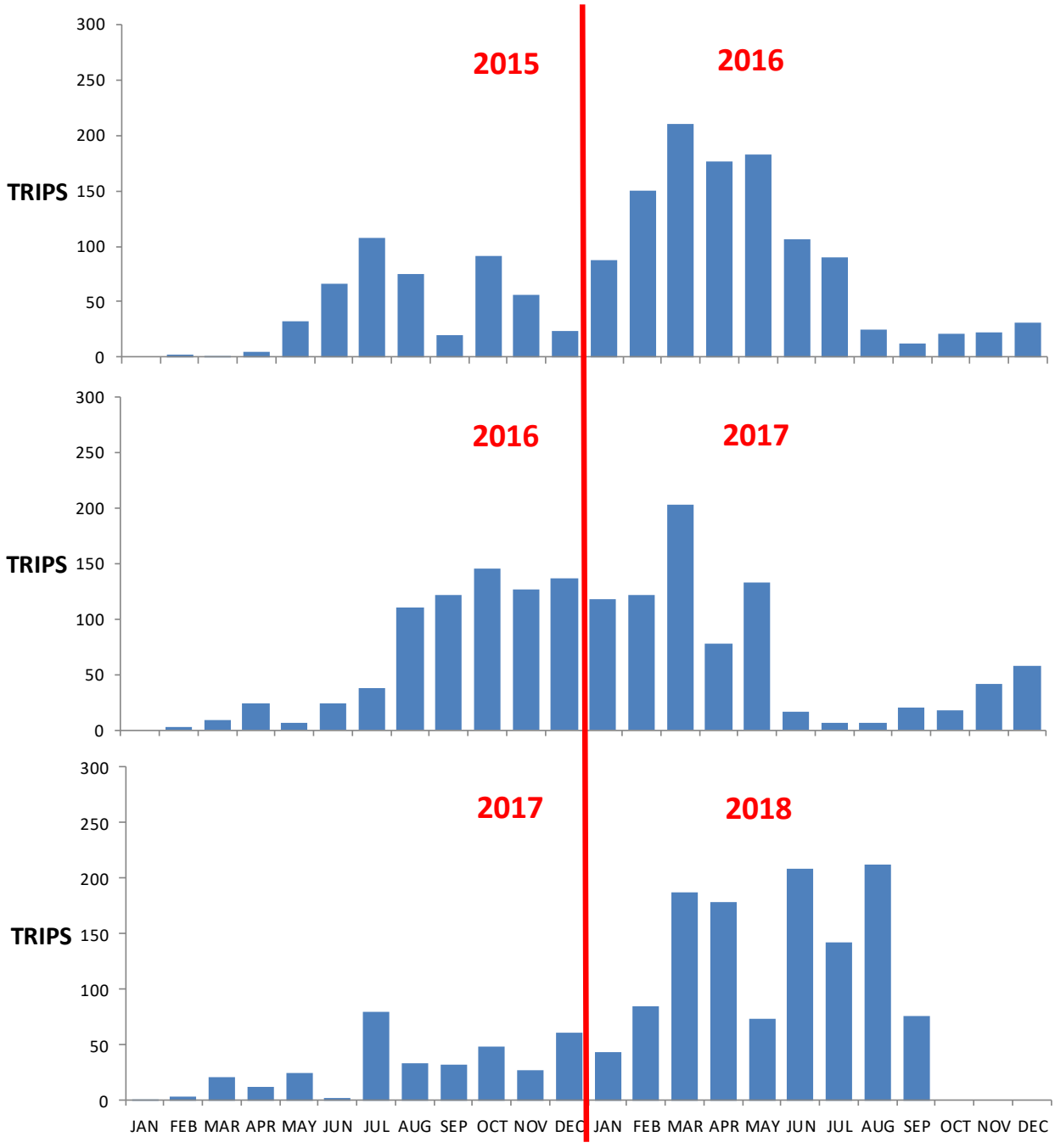

Figure 2. Monthly frequency of provision of 2015 (top), 2016 (middle) and 2017 (bottom) purse seine observer data

TABLES

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

As at September 2018															
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
2013	2,129	344	1,785	84%	1,766	99%	1,712	80%	96%	100%	54	3%	3%	19	1%
2014	2,324	356	1,968	85%	1,816	92%	1,689	73%	86%	100%	127	6%	8%	152	8%
2015	2,098	445	1,653	79%	1,617	98%	1,524	73%	92%	100%	93	6%	6%	36	2%
2016	2,042	420	1,622	79%	1,595	98%	1,543	76%	95%	98%	25	2%	2%	27	2%
2017	1,924	397	1,527	79%	1,230	81%	806	42%	53%	68%	44	3%	5%	297	19%

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 values in this column 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 2016/2017 has higher priority than outstanding trips data entry in 2014/2015, 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

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 Estimated trips	% of total available trips
China	83	0	83	83	100%	82	99%	99%
Ecuador	45	18	27	27	100%	22	49%	81%
European Union	30	0	30	30	100%	28	93%	93%
FSM	45	36	9	9	100%	9	20%	100%
Japan	281	74	207	205	99%	205	73%	100%
Kiribati	64	0	64	64	100%	56	88%	88%
Korea	290	69	221	220	100%	200	69%	91%
Marshall Is.	100	0	100	98	98%	98	98%	100%
New Zealand	27	14	13	13	100%	12	44%	92%
PNG / PH / Vanuatu	518	0	518	505	97%	498	96%	99%
Solomon Islands	63	55	8	8	100%	8	13%	100%
El Salvador	22	8	14	14	100%	11	50%	79%
Tuvalu	10	2	8	8	100%	7	70%	88%
Chinese Taipei	274	68	206	205	100%	203	74%	99%
USA	277	0	277	277	100%	273	99%	99%
	2129	344	1785	1766	99%	1712	80%	97%

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 Estimated trips	% of total available trips
China	90	-6	96	94	98%	87	97%	93%
Ecuador	46	30	16	16	100%	16	35%	100%
European Union	37	12	25	25	100%	23	62%	92%
FSM	53	0	53	53	100%	49	92%	92%
Japan	273	89	184	155	84%	151	55%	97%
Kiribati	138	0	138	138	100%	120	87%	87%
Korea	309	108	201	201	100%	179	58%	89%
Marshall Is.	103	0	103	103	100%	94	91%	91%
New Zealand	24	14	10	10	100%	8	33%	80%
PNG / PH / Vanuatu	529	0	529	423	80%	394	74%	93%
Solomon Islands	65	31	34	34	100%	34	52%	100%
El Salvador	25	10	15	15	100%	15	60%	100%
Tuvalu	8	3	5	4	80%	3	38%	75%
Chinese Taipei	308	72	236	224	95%	215	70%	96%
USA	316	0	316	314	99%	301	95%	96%
	2324	363	1961	1809	92%	1689	73%	93%

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

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 Estimated trips	% of total available trips
China	50	0	50	50	100%	49	98%	98%
Ecuador	40	28	12	12	100%	9	23%	75%
European Union	19	9	10	10	100%	7	37%	70%
FSM	87	0	87	87	100%	85	98%	98%
Japan	251	121	130	119	92%	105	42%	88%
Kiribati	176	17	159	159	100%	149	85%	94%
Korea	280	49	231	231	100%	221	79%	96%
Marshall Is.	105	16	89	89	100%	87	83%	98%
New Zealand	23	20	3	3	0%	3	13%	0%
PNG / PH / Vanuatu	441	74	367	346	94%	334	76%	97%
Solomon Islands	62	23	39	39	100%	39	63%	100%
El Salvador	11	6	5	5	100%	4	36%	80%
Tuvalu	5	1	4	4	100%	4	80%	100%
Chinese Taipei	271	68	203	199	98%	188	69%	94%
USA	277	13	264	264	100%	240	87%	91%
	2098	445	1653	1617	98%	1524	73%	94%

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 Estimated trips	% of total available trips
China	58	41	17	17	100%	15	26%	88%
Ecuador	27	24	3	3	100%	3	11%	100%
European Union	9	0	9	9	100%	8	89%	89%
FSM	110	12	98	93	95%	87	79%	94%
Japan	225	73	152	152	100%	145	64%	95%
Kiribati	210	49	161	153	95%	150	71%	98%
Korea	287	90	197	197	100%	192	67%	97%
Marshall Is.	84	9	75	71	95%	68	81%	96%
New Zealand	9	3	6	6	0%	6	67%	0%
PNG / PH / Vanuatu	428	45	383	375	98%	365	85%	97%
Solomon Islands	88	10	78	76	97%	69	78%	91%
El Salvador	13	10	3	3	100%	3	23%	100%
Tuvalu	7	0	7	7	100%	6	86%	86%
Chinese Taipei	247	30	217	217	100%	212	86%	98%
USA	240	24	216	216	100%	214	89%	99%
	2042	420	1622	1595	98%	1543	76%	97%

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

2017								
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	12	10	2	2	100%	1	8%	50%
Ecuador	32	25	7	7	100%	5	16%	71%
European Union	12	1	11	11	100%	6	50%	55%
FSM	119	-1	120	50	42%	37	31%	74%
Japan	187	85	102	102	100%	59	32%	58%
Kiribati	188	75	113	74	65%	52	28%	70%
Korea	243	66	177	154	87%	98	40%	64%
Marshall Is.	86	9	77	64	83%	44	51%	69%
New Zealand	12	7	5	5	0%	5	42%	0%
PNG / PH / Vanuatu	470	14	456	326	71%	206	44%	63%
Solomon Islands	97	2	95	80	84%	60	62%	75%
El Salvador	8	5	3	3	100%	3	38%	100%
Tuvalu	7	1	6	4	67%	2	29%	50%
Chinese Taipei	234	85	149	144	97%	114	49%	79%
USA	217	13	204	204	100%	114	53%	56%
	1924	397	1527	1230	81%	806	42%	66%

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

Observer data generated from E-Monitoring (through the EM Analyst) and made available to the WCPFC Science service provider by several CCMs are also shown for information.

			On-board OBSERVER DATA COVERAGE (minimum required for ROP is 5%)						E-Monitoring supplementary data	
CCM Fleet	Fishery	Metric selected for Coverage	Total estimated effort	As reported by flag state		Total estimated effort	As per data submission		See NOTES	(see Notes 24 and 25)	
				Observer	%		Observer	%		EM Analyst	%
AUSTRALIA	Domestic	No. of Hooks	7,829,999	680,445	8.7%	7,829,999	0	0.0%	2		
		Sets	4,927						17, 19, 22	429	8.7%
CHINA	Ice/Fresh	No. of Trips	1,952	50	2.6%	1,952	53	2.7%	3, 10, 11		
	Frozen										
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	8	3.3%	240	8	3.3%	7, 22	4	1.7%
FIJI	Pacific Islands	No. of Trips	665	153	23.0%	623	191	30.7%	8, 9, 22	32	5.1%
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	-	-	5, 10, 23		
JAPAN	Ice/Fresh, short-trip	Days fished	26,256	874	3.3%	27,284	400	1.5%	10, 18, 22	1	N/A
	Frozen, long-trip	Days fished	8,392	690	8.2%	10,933	0	0.0%	10,18		
KIRIBATI	Pacific Islands	No. of Trips	8	3	37.5%	8	3	37.5%	8, 9		
MARSHALL ISLANDS	Pacific Islands	No. of Trips	235	26	11.1%	235	26	11.1%	8, 9, 22	0	0.0%
NEW CALEDONIA	Pacific Islands	No. of Hooks	4,715,600	281,370	6.0%	4,715,600	296,592	6.3%	2		
NEW ZEALAND	Domestic	No. of Hooks	2,356,638	332,446	14.1%	2,356,638	332,446	14.1%	2		
PAPUA NEW GUINEA	Pacific Islands	No. of Trips	76	2	2.6%	76	2	2.6%	2, 9		
PALAU	Domestic	No. of Trips	7	-	-	-	-	-	22	4	57.1%
PHILIPPINES	Distant-water	No. of Trips	-	-	-	-	-	-	16, 23		
REPUBLIC OF KOREA	Distant-water	Days at Sea	21,306	1,460	6.9%	21,306	1,099	5.2%	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	-	-	-	-	-	-	2, 23		
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, 22	6	N/A
	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%	1,208	337	27.9%	6		
	AMERICAN SAMOA	No. of Trips	136	13	9.6%	136	13	9.6%	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. 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 includes information from Annual Reports - Part 1.
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 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 SC13 (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 trip-level details for 2016 observer activities including trip monitoring information. However, data at the set level have yet to be provided.
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. Several countries have submitted observer data from their E-Monitoring system in 2016 and these data are listed under the Column labelled "E-Monitoring Trips/Sets". Note that E-Monitoring trip data for Japan and Chinese Taipei were generated from the Palau EM Observer Programme.
23. No activity in 2016 by this CCMs longline fleet
24. E-Monitoring trips that also have paired on-board observer data are excluded. (for example, total E-Monitoring data for Fiji in 2016 : 37 trips)
25. These supplementary E-Monitoring data do not count towards ROP longline coverage and do not completely satisfy the ROP minimum data field standards, but have been used in some analyses conducted by the WCPFC Science service provider. Emery et al. (2018) provides an indication of which ROP-required data fields are covered by E-Monitoring. The most important and frequent scientific use of the observer data is for the fields in the "SETTING/HAULING" and "CATCH MONITORING" categories, and E-Monitoring is currently covering 88% of the ROP required fields in these categories (15 out of 17 fields, and 7 out of 8 fields, respectively).

Table 4. Provisional 2017 Longline observer coverage by CCM – based on reporting from CCMs and data submissions.

Observer data generated from E-Monitoring (through the EM Analyst) and made available to the WCPFC Science service provider by several CCMs are also shown for information.

			On-board OBSERVER DATA COVERAGE (minimum required for ROP is 5%)							E-Monitoring supplementary data	
CCM Fleet	Fishery	Metric selected for Coverage	Total estimated effort	As reported by flag state		Total estimated effort	As per data submission		See NOTES	(see Notes 28 and 29)	
				Observer	%		Observer	%		EM Analyst	%
AUSTRALIA	Domestic	No. of Hooks	8,668,853	889,196	10.2%	8,668,853	0	0.0%	2		
		Sets	5,234						17, 19, 22	528	10.1%
CHINA	Ice/Fresh	Days at Sea	65,825	2,693	4.1%	65,825	2,693	4.1%	3, 10, 11, 25		
	Frozen										
COOK ISLANDS	Pacific Islands	Days at Sea	3,368	256	7.6%	4,595	291	6.3%	8, 9		
EUROPEAN UNION	Distant-water	No. of Trips	3	1	33.3%	3	1	33.3%	4, 10, 19		
FSM	Pacific Islands	No. of Trips	253	1	0.4%	253	2	0.8%	7	4	1.6%
FIJI	Pacific Islands	No. of Trips	686	205	29.9%	686	165	24.1%	8, 9, 22, 28	95	13.8%
FRENCH POLYNESIA	Pacific Islands	Days at Sea	14,594	860	5.9%	14,594	860	5.9%	2, 9		
INDONESIA	Domestic	No. of Trips	2,500	4	0.2%	2,500	4	0.2%	2, 19, 23		
	Distant-water	No. of Trips	0	-	-	0	-	-	5, 10, 27		
JAPAN	Ice/Fresh, short-trip	Days fished	24,298	919	3.8%	24,298	91	0.4%	10, 18	2	N/A
	Frozen, long-trip	Days fished	8,371	669	8.0%	8,371	0	0.0%	10,18		
KIRIBATI	Pacific Islands	No. of Trips	93	2	2.2%	93	2	2.2%	8, 9		
MARSHALL ISLANDS	Pacific Islands	No. of Trips	426	36	8.5%	426	36	8.5%	2, 9, 21, 28	52	12.2%
NEW CALEDONIA	Pacific Islands	No. of Hooks	4,811,540	406,000	8.4%	4,811,540	406,000	8.4%	2		
NEW ZEALAND	Domestic	No. of Hooks	2,104,324	330,235	15.7%	2,104,324	330,235	15.7%	2		
PAPUA NEW GUINEA	Pacific Islands	No. of Trips	70	0	0.0%	70	0	0.0%	2, 9		
PHILIPPINES	Distant-water	No. of Trips	-	-	-	-	-	-	1, 16		
REPUBLIC OF KOREA	Distant-water	Days at Sea	16,777	694	4.1%	34,163	1,003	2.9%	10, 20, 26		
SAMOA	Pacific Islands	No. of Trips	135	0	0.0%	188	0	0.0%	2, 9		
SOLOMON ISLANDS	Pacific Islands	No. of Trips	-	-	-	-	-	-	2, 27	0	
TONGA	Pacific Islands	No. of Trips	186	16	8.6%	186	16	8.6%	2		
TUVALU	Pacific Islands	No. of Trips	11	1	9.1%	11	1	9.1%	8, 12		
CHINESE TAIPEI	Small longline – STLL	Days at Sea	111,240	6,344	5.7%	111,240	917	0.8%	10, 14		
	Distant-water – DWLL	Days at Sea	20,915	2,334	11.2%	20,915	3,225	15.4%	10, 24		
USA	HAWAII/California-based	No. of Trips	985	235	23.9%	985	235	23.9%	6		
	AMERICAN SAMOA	No. of Trips	7	1	14.3%	7	1	14.3%	6		
VANUATU	Pacific Island-based, short trip	Days at Sea	9,412	219	2.3%	9,412	45	0.5%	9, 10, 11		
	Distant-water										

NOTES

1. 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 includes information from Annual Reports - Part 1.
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 advised in their Annual Report Part 1 that their choice of metric is "days-at-sea". Total estimated effort (of days at sea) is determined from available operational logbook data, raised to account for incomplete coverage (of operational logbook data provided).
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 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 SC14 (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 2017.
16. No longline vessels from Philippines active in 2017.
17. Australia commenced producing observer data from their E-Monitoring system from 2015.
18. Japan provided trip-level details for 2017 observer activities including trip monitoring information. However, data at the set level have yet to be provided.
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. Several countries have submitted observer data from their E-Monitoring system in 2016 and these data are listed under the Column labelled "E-Monitoring Trips/Sets". Note that E-Monitoring trip data for Japan and Chinese Taipei were generated from the Palau EM Observer Programme.
23. The number of total trips for the Indonesian domestic longline fleet is not known but has been estimated based on the annual catch estimate and approximate catch per trip.
24. Has assumed that provision of 2017 observer data from Chinese Taipei is for distant-water vessels only.
25. 2017 observer data provided for the China longline fleet included some activity in the Pacific Ocean beyond the WCPFC Area; these data have been excluded in the coverage rates presented in this table.
26. Total estimated effort (days at sea = 34,163) for Korean longline fleet in 2017 has been determined from operational logbook data provided to the WCPFC.
27. No activity in 2017 by this CCMs longline fleet
28. E-Monitoring trips that also have paired on-board observer data are excluded. (for example, total E-Monitoring data for Fiji in 2017 : 155 trips, and for Marshall Islands : 61 trips)
29. These supplementary E-Monitoring data do not count towards ROP longline coverage and do not completely satisfy the ROP minimum data field standards, but have been used in some analyses conducted by the WCPFC Science service provider. Emery et al. (2018) provides an indication of which ROP-required data fields are covered by E-Monitoring. The most important and frequent scientific use of the observer data is for the fields in the "SETTING/HAULING" and "CATCH MONITORING" categories, and E-Monitoring is currently covering 88% of the ROP required fields in these categories (15 out of 17 fields, and 7 out of 8 fields, respectively).