SCIENTIFIC COMMITTEE
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3-11 August 2016

UPDATE ON THE IMPLEMENTATION OF ELECTRONIC MONITORING (EM) and ELECTRONIC REPORTING (ER) TECHNOLOGIES IN THE WCPO

WCPFC-SC12-2016/ST IP-04

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Update on the implementation of Electronic Monitoring (EM) and Electronic Reporting (ER) technologies in the WCPO

Since 2013 the Oceanic Fisheries Progaramme (OFP) of the Pacific Community (SPC) has been collaborating with fisheries authorities from member countries, international and regional organisations, non-governmental organisations, technology service providers and the fishing industry towards the implementation of Electronic Monitoring (EM) and Electronic Reporting (ER) technologies in the Western and Central Pacific Ocean (WCPO) Convention Area.

This paper provides an update on past, current and future EM and ER projects. It also describes how member countries are building capacity to adopt and manage these emerging technologies. Finally the paper presents the processes of how EM and ER regional operational standards are planned to be implemented.

Report on the 2014 Solomon Islands Tuna Longline Electronic Monitoring trial

This report summarises the results of a video camera based Electronic Monitoring project conducted on tuna longline fishing vessels operating in Solomon Islands waters during 2014.

- The main objective of the project was to investigate the extent which video Electronic Monitoring systems (E-Monitoring) can record the data normally collected by observers on-board tuna longline vessels based on the required minimum data fields specified under the Western and Central Pacific Fisheries Commission (WCPFC) Regional Observer Programme (ROP).
- The project partners were Tri Marine, National Fisheries Developments (NFD), Yi Man Fishing Company, Satlink (the service provider), Pacific Islands Forum Fisheries Agency (FFA), Oceanic Fisheries Programme of the Secretariat of the Pacific Community (SPC-OFP) and the Solomon Islands Ministry of Fisheries and Marine Resources (MFMR). The International Seafood Sustainability Foundation (ISSF) is also a major contributor through support of the Regional Electronic Reporting Coordinator position contracted by SPC.
- Two CT-4 freezer longline tuna vessels were equipped with a video E-Monitoring system and each undertook two trips under this project. The E-Monitoring system (Satlink Sea Tube) installed on-board consisted of high-definition video cameras, GPS and a central computer to record all events and video footage.
- The E-Monitoring records collected from these trips were analysed by experienced longline fisheries observers using the Satlink View Manager (SVM) analysis software. These office observers recorded all aspects of the fishing activity, including setting and hauling parameters, identifying fishing locations, the catch and size composition, and the fate of any bycatch taken. An independent fisheries observer was also assigned to each vessel to carry out the regular on-board task of observing and recording the catch.
- A comparative analysis between the on-board observer data and the E-Monitoring data is presented in this report and shows which of the required Regional Observer Programme (ROP) minimum standard data fields are adequately collected using E-Monitoring. Substantive recommendations for additional work are also identified in then report.
- In the scope of implementing E-Monitoring technology in all or parts of the Western and Central Pacific Ocean fisheries, logistical and legal frameworks will be required at national and regional levels. The Pacific Community's (SPC) knowledge and experience in managing observer data and the Pacific Islands Forum Fisheries Agency's (FFA) expertise in fisheries legislative mechanisms mean that an SPC/FFA partnership will be paramount if the decision is made to advance and implement E-Monitoring in the region.

The complete report from the Solomon Islands trial is available for download on the SPC's Digital Library: http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Hosken_2016_SI_EReport.pdf

Current Electronic Monitoring projects

New Caledonia

In June 2015, the fisheries authority for New Caledonia and SPC began EM trials on a tuna longline vessel based in the port of Koumac. The International Sustainability Seafood Foundation (ISSF) is providing the major financial support for this project. The EM equipment was provided and installed by Satlink. Three high definition video cameras were placed at strategic locations around the vessel to record setting and hauling operations. One Satlink View Manager (SVM) unit is installed at the fisheries authority in Noumea allowing the analysis of the EM records (raw video footage and associated data). Hard drives containing the EM records are removed from the vessel and brought back to the fisheries authority on a regular basis for an office observer to conduct the analysis of the fishing trips. During one trip only, an on-board observer was present on the vessel and was able to monitor the vessel's setting and hauling activities. The office observer has analysed the EM records for this trip. The same EM records were also analysed by a service provider (Digital Observer Services). In order to ascertain the usefulness of this EM system, a three level comparative analysis is planned for this trip. Three main challenges have been identified for this project. Firstly, the vessel is based in Koumac which is located 400km from where the fisheries authority office is in Noumea. This means that fisheries staff cannot be present each time the vessel returns to port. Had fisheries staff been available to meet the returning vessel and crew each time, it would have allowed allow monitoring the project more closely, including exchanging feedback and maintaining good relationships. Secondly, the quality of the video footage was not ideal for mainly two reasons: two of three cameras were placed in locations where they were heavily exposed to sea spray and the vessel's crew were not cleaning the cameras lenses as often as required and agreed. Finally, the office observer tasked with analysing the EM records also works as an on-board obse rver on other vessels and is unable to analyse EM records before the next ones arrive. A complete report will be available during Quarter 4 2016.

Fiji

In September 2015, the Fiji Ministry of Fisheries and Forest (MFF) began a five year EM pilot project with the support from the United Nations Food and Agriculture Organisation (UN FAO). Currently, five domestic tuna longline vessels are equipped with EM systems provided by Satlink. Six SVM units are installed at the MFF offices in Suva allowing the analysis of the EM records. Fourteen office observers have been trained in using the SVM. EM records are collected from the vessels each time they return to Suva port. Office observers also continue to embark as on board observers on a regular basis on either the vessels equipped with EM or other fishing vessels. Each longline vessel equipped with EM also embarks an on board observer. MFF, SPC and Satlink are collaborating to ensure that analysed EM data can be readily uploaded to the national Tuna Observer Database System (TUBs) database in Fiji as well as the regional TUBs database in Noumea. Comparative analyses between on board observer data and EM data analysed by office observers are also planned.

The Nature Conservancy

In June 2016, The Nature Conservancy (TNC) has launched an EM pilot project for up to 24 tuna longline vessels with Satlink as the service provider. Planning discussions with four member countries are currently taking place, including the number and types of vessels and how to set up national and/or regional EM analysis centres. SPC is collaborating in this project to ensure EM analysed data can be readily uploaded to national TUBs databases and the regional TUBs database in Noumea.

Luen Thai Fishing Venture

Since October 2015, the fishing company Luen Thai Fishing Venture (LTFV) has installed their own EM system on 33 tuna longline vessels. SPC is currently collaborating with one member country where LTFV vessels with EM systems are licenced to provide an initial assessment of this 'in house' developed EM system.

eTUNALOG: Tonga, Samoa, Fiji, New Caledonia

In 2013, SPC developed the Electronic Reporting (ER) software eTUNALOG. Originally designed for Purse Seine vessels to submit the SPC/FFA Regional Purse Seine Logsheet, a module was added allowing longline vessels to submit the SPC/FFA Regional Longline Expanded Logsheet. Trials on Purse Seine vessels were stopped in 2015 as the PNA Fisheries Information Management System (FIMS) was providing an integrated solution for submitting Purse Seine logsheet data and providing catch certification or traceability. Nevertheless, the longline module for eTUNALOG is a cost-free solution for tuna longline vessels operating in the Southern Albacore Fisheries. Trials in New Caledonia, Fiji, Tonga and Samoa are on-going. eTUNALOG logsheet data can be directly imported to the TUFMAN2 database system developed by SPC and used by member countries.

National ER and EM officers

Through support funding from the ISSF, SPC has been collaborating with the Republic of the Marshall Islands, the Federated States of Micronesia, the Cook Islands and the Solomon Islands to establish national ER and EM positions within the fisheries authorities. These staff oversee the day to day coordination of ER and EM trials and provide a link between the fisheries authorities, the fishing industry, the service providers and SPC. Two ER and EM officers are also present in Papua New Guinea. Investing in these positions is absolutely necessary to ensure member countries can build the capacity to adopt and manage ER and EM technologies efficiently.

Report of the first strategy meeting of the Tuna Fishery Data Collection Committee (DCC)

In April 2016, SPC and FFA organised the first strategy meeting of the DCC.

The future role of the DCC was this Strategy Meeting's main theme. Initially, its future role was considered diminished by the efforts of the WCPFC, as the scope and range of influence in regards to data are similar for both groups, albeit more extensive for the WCPFC. However, a significant difference between the work of the WCPFC and the DCC is that the DCC can and does provide a mechanism for its members to set data standards above and beyond those of the Commission. It was also recognised that while the DCC has no direct mandate to set data standards in certain areas (the high seas for instance), information from such areas are critical to regional stock assessment outputs and therefore of interest to the DCC. Other noted points of difference were the DCC mechanisms to remove data fields, its efforts to ensure that data standards are practical and its documented explanations on the inclusion, or otherwise, for each data field.

Electronic data collection is now a reality in the region. Often instigated by the demands of catch certification or traceability, the number of e-providers and their areas of involvement continue to grow.

The DCC came to the agreement that its area of focus should be in creating standards to facilitate the development of products capable of delivering appropriate outputs for the regional management and data repository structures.

The full report is attached at Appendix I.

EM Technical Standards Workshop

In June 2016, SPC organised a three day workshop in Noumea to begin the process of establishing EM technical standards. This workshop was attend by SPC and FFA technical staff, representatives from three member countries and representatives from six EM service providers. Funding support from the ISSF was available for this event. The workshop consisted of determining how the WCPFC Regional Observer Programme minimum data fields for longline observers could be collected using EM technology currently and in the future. The panel of experts present was also an opportunity to briefly list key issues regarding the implementation of EM in the region with an aim to develop and discuss these issues in further detail at a next workshop. Such a future workshop would need to include member countries in the objective of developing a

regional strategy for the implementation of EM. A brief report of the meeting is attached at Appendix II. A full report of the draft standard arising from this workshop will be presented at the WCPFC ERandEM WG2 which will be meeting in Bali on 1 and 2 August 2016, and is attached at Appendix III.

Future work

- Regional EM strategy (SPC/FFA)

SPC and FFA plan to convene a regional strategy meeting in 2016 to answer the following key questions.

What is the broad vision and objectives for fishery monitoring in the WCPO tuna fisheries?
What advice do SPC and FFA provide members implementing ER and EM?
What resources and support can SPC and FFA offer?

- EM Purse Seine Technical Standards

SPC plans to convene another technical standards workshop aiming at drafting the standards for EM on Purse Seine fishing vessels.

- Purse Seine EM trials

EM trials on Purse Seine vessels are envisaged in collaboration with member countries and service providers. While there is 100% observer coverage on Purse Seine vessels operating in the WCPO, EM could be used to validate claims regarding set type, thus alleviating any un-due pressure on the observers. EM could also be used to obtain more precise species and size composition data.

APPENDIX I –

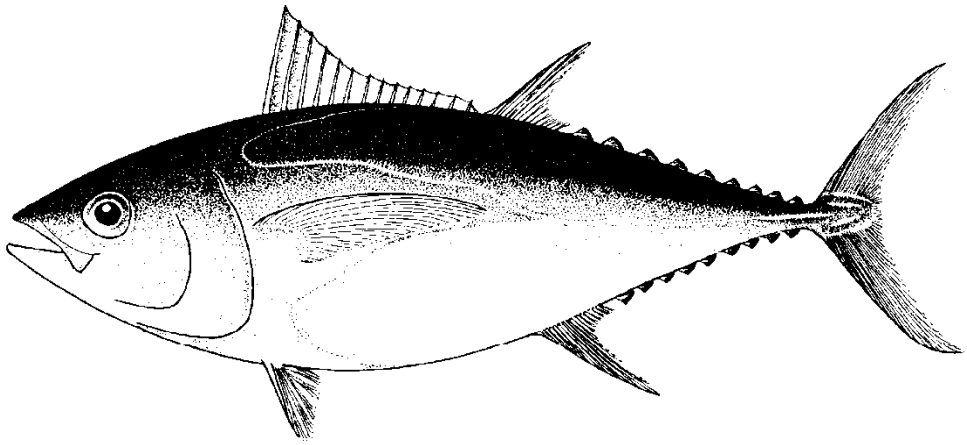
REPORT OF THE FIRST STRATEGY MEETING OF THE TUNA FISHERY DATA COLLECTION COMMITTEE

REPORT OF THE FIRST STRATEGY MEETING OF THE TUNA FISHERY DATA COLLECTION COMMITTEE

4–6 April 2016

Noumea,

New Caledonia



Oceanic Fisheries Programme
Pacific Community
Noumea, New Caledonia

Forum Fisheries Agency
Honiara
Solomon Islands

REPORT OF THE FIRST STRATEGY MEETING OF THE TUNA FISHERY DATA COLLECTION COMMITTEE

4–6 April 2016

Noumea, New Caledonia

Compiled by the Pacific Community and the Forum Fisheries Agency

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1. PRELIMINARIES

1.1. Appointment of Chairman and Rapporteurs

1. Mr Neville Smith was elected chairman of the Tuna Fishery Data Collection Committee[1] strategy meeting. Ms Deirdre Brogan was appointed rapporteur. Mr Ian Knuckey facilitated the meeting.

1.2. Adoption of Agenda

2. The agenda was adopted as presented in Appendix 3.

2. DEVELOPING A TERMS OF REFERENCE

2.1. The Historical Role of DCC

3. The Data Collection Committee has been in place since 1995. Against a background of multiple data forms the initial meeting stated its objectives as "developing standardised tuna fishery collection forms to reduce the complexity of data collection, processing and analysis" in member countries. From the start the committee has been composed of staff from SPC and FFA, along with invited guests from national programmes and with occasional attendance from industry. The outputs of the meeting were harmonised paper copy forms for logsheets, unloadings, observer, port sampling and others data types. Additionally; data fields were defined, collection instructions were provided, and the deliberations on data fields inclusion or retirement documented. The DCC report was formally adopted by Pacific Island Country and Territories (PICTs) member countries through the Forum Fisheries Committee (FFC) and the Heads of Fisheries (HOF) meetings.

2.2. Changing Environment for DCC

4. The newly convened Western and Central Fisheries Commission (WCPFC) first influenced the work of the DCC during its seventh meeting, when the DCC provided advice and comments on the draft of the 'Minimum Data Standards' for the WCPFC's Regional Observer Programme. The Conservation and Management Measures (CMMs) were also reviewed for the first time during the meeting. Henceforth all DCC meetings reviewed the various WCPFC instruments and extracted the data collection fields for inclusion into the DCC format ensuring regional standards for PICTs compliance with the WCPFC data measures.

5. Most recently, DCC9 noted the significant data collection possibilities with the advent of electronic collection through e-reporting {manual input of alpha and numeric characters} and e-monitoring {closed system collecting multiple image and sensor data}. Since that meeting, the WCPFC E-Monitoring and E-Reporting Workshop (ERandEMWG1) was convened and provided

[1] The Tuna Fishery Data Collection Forms Committee was established at the Ad Hoc Meeting on Tuna Fisheries Data Collection Forms, 11–14 December 1995, Brisbane, Australia (Anonymous, 1996), which was attended by staff of the Forum Fisheries Agency and the South Pacific Commission. The Committee is an internal SPC and FFA committee responsible to the Director of FFA and to the Director of the SPC Marine Resources Division. The second meeting of the Committee was held from 11 to 13 December 1996 in Brisbane, Australia; the third meeting was held from 9 to 10 December 1998 in Brisbane, Australia; and the fourth meeting was held from 6 to 8 December 2000 in Brisbane, Australia. During the fourth meeting, the name was changed to the Tuna Fishery Data Collection Committee. The fifth meeting was held from 2 to 6 December 2002 in Brisbane, Australia and the sixth meeting was held from 16 to 24 November 2004. The seventh meeting was held from 12-16 November 2007 in Brisbane Australia. The eight meeting was held from the 16 to 19 November, 2009 in Noumea. The ninth meeting was held from 17 – 18 March 2014 in Noumea.

one of the first forums on e-data in the region, and used its report to circulate ER data standards. With technology and policy moving forward it became obvious that DCC's original tenure was coming to a close, and a Strategy Meeting was convened to assess a way forward, if any.

2.3. Preparing a new Terms of Reference for DCC

6. The future role of the DCC was this Strategy Meeting's main theme. Initially, its future role was considered diminished by the efforts of the WCPFC, as the scope and range of influence in regards to data are similar for both groups, albeit more extensive for the WCPFC. However, a significant difference between the work of the WCPFC and the DCC is that the DCC can and does provide a mechanism for its members to set data standards above and beyond those of the Commission. It was also recognised that while the DCC has no direct mandate to set data standards in certain areas (the high seas for instance), information from such areas are critical to regional stock assessment outputs and therefore of interest to the DCC. Other noted points of difference were the DCC mechanisms to remove data fields, its efforts to ensure that data standards are practical and its documented explanations on the inclusion, or otherwise, for each data field.

7. Electronic data collection is now a reality in the region. Often instigated by the demands of catch certification or traceability, the number of e-providers and their areas of involvement continues to grow. This was well documented in a recent report by Dunn and Knuckey (2013), who conducted a review of the Potential for E-Reporting (ER) and E-Monitoring (EM) in the Western and Central Pacific Tuna Fisheries. They classified the two different types of electronic data as follows:

- **E-Reporting** (ER) is generally considered to be "***open system"*** because manual inputs are required and accepted, for example from skippers and observers. Examples of E-Reporting include electronic entry and transmission of catch logsheets, observer reports, transhipment reports, and offload records. E-Reporting provides the opportunity for real time reporting of critical information through satellite transmission or mobile networks, as well as to store data for download at the end of a trip.
- **E-Monitoring** (EM) is generally considered to be "***closed system"*** because it does not accept external or manual input that impacts on its core functionality. It relies on automated operations, and sealed and tamper-evident equipment. The most common example of EM is a Vessel Monitoring System (VMS), where GPS position and time data are collected automatically, and securely transmitted at prescribed intervals to relevant agencies.

8. They found that there was an abundance of ER and EM hardware and software products already well established in both large and small fisheries around the world. Where implemented, ER was bringing improved data quality through ease-of-use tools such as drop-down boxes, data input checking, and automatic GPS capture, and was revolutionizing fisheries information in terms of timeliness, convenience, efficiency, and quality, as well as driving down total costs.

9. Not dissimilar to the situation 20 years ago with paper-based forms, however, Dunn and Knuckey (2013) found that the proliferation of electronic hardware and software was occurring in an ad-hoc manner around the WCPFC region, and there was an urgent need to develop standards, specifications, and certification procedures for both ER and EM. Two of the strategic recommendations that came out of the report of relevance to the DCC were:

- To improve quality and timeliness of the data available for science, compliance, and management, to enhance and streamline reporting obligations, and to provide an additional means of effective observer monitoring, this report recommends the Commission, its members, and its partner regional organisation within the WCPO implement both ER and EM programs without delay.

- The Commission should adopt an approach of developing standards, specifications, and certification procedures for both ER and EM, against which any provider can seek to be certified, in preference to seeking a single provider.

2.4. New Terms of Reference appear

10. Regional bodies are now, in some ways, in a catch-up situation and cognisant of the work required to provide the advice, framework, and specifications for the new electronic era. Much like its earlier work in standardising paper copy formats, **the DCC came to the agreement that its area of focus should be in creating standards to facilitate the development of products capable of delivering appropriate outputs for the regional management and data repository structures**.

11. During early discussions on possible TORs the group identified that there are no formal paths for DCC to contribute on the WCPFC data processes, although in the past it has provided significant comment to the ROP's minimum data standards and through its regular participants, important background papers for ERandEMWG1. To explore the existing links that DCC has with other groups connections were drawn up and displayed (Figure 1). Formal processes already exist between the DCC and the Regional Observer Coordinators Workshop (ROCW) and the Monitoring, Compliance and Surveillance Working Group (MCSWG), albeit noting that adding a standing agenda item would better validate these connections. The DCC is endorsed by both the SPC's Head of Fisheries (HOF) meeting, but also by the Forum Fisheries Committee (FFC) which provides a channel into WCPFC processes (Figure 1).

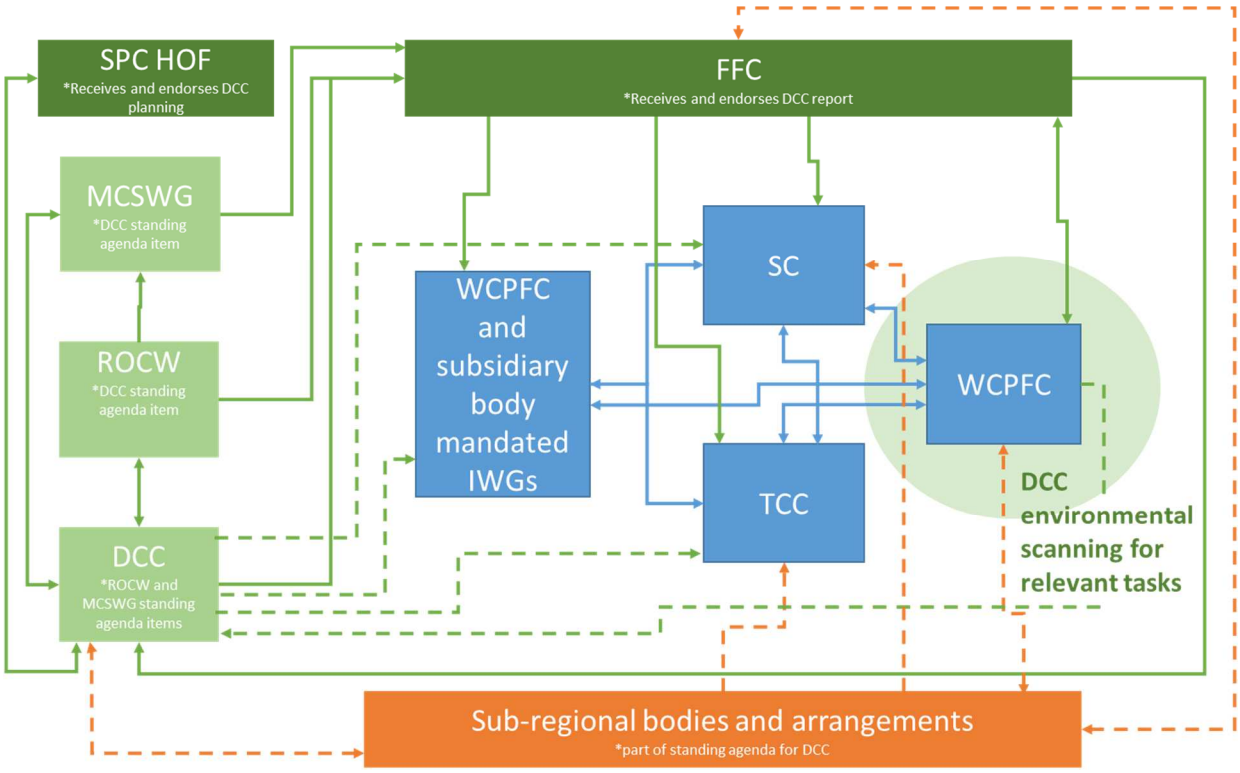


Figure 1. Schematic diagram of the relationship of DCC with the annual regional work programme with respect to fisheries. Note that this is focussed on the DCC role and does not try to reflect all connections for other identified bodies. Legend: Blue - WCPFC processes; Green - FFA/SPC processes; Orange - sub-regional processes; Dashed (- - -) lines informal links; Solid (—) lines formal links.

12. FFA highlighted the educational role DCC must take on board if national and sub-regional PICTs are to understand, support and use the DCC processes. It was noted that some member

countries have already changed or added new data standards albeit mostly in e-logs and for CDS reporting requirements.

13. A well-developed TOR was created and revised at a plenary session early on the second day. Further endorsement was sought from senior Directors of both FFA and SPC. The new Terms of Reference were combined into the Strategic Plan which are available as appendix one.

14. Note that the strategic plan was primarily prepared by Mr Ian Knuckey (Fishwell Consulting) under direction from SPC staff. That work was kindly supported by funding from Australian Aid's Fisheries for Food Security Project.

3. OTHER BUSINESS

3.1. Other matters

15. No other matters were raised.

3.2. Next meeting of the DCC

16. Normally the next meeting of the DCC – the tenth Data Collection Committee meeting will be held, as outlined in the new TORs, within three months of the close of the WCPFC meeting, which in practical terms means from mid-December 2016 to mid-March 2017.

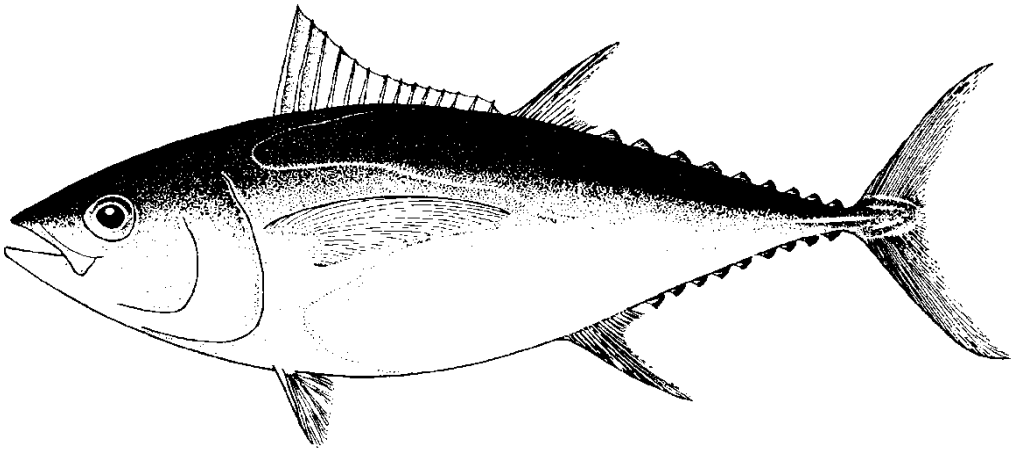
3.3. Closing

17. The meeting closed to a vigorous round of applause.

4. Appendix 1: STRATEGIC PLAN

TUNA FISHERY
DATA COLLECTION COMMITTEE (DCC)

Strategic Plan
2016 - 2020



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Solomon Islands

1.0 DCC TERMS OF REFERENCE 2016-2020

The Pacific Community (SPC)/ Pacific Islands Forum Fisheries Agency (FFA) Tuna Fishery Data Collection Committee (DCC)'s Strategic Plan was established at the first DCC Strategy Meeting in Noumea, New Caledonia in April, 2016.

1.1 Context

Management of tuna fisheries within the region of the Western and Central Pacific Ocean is critically dependent on high quality fisheries data and information such as that collected through catch and effort logsheets, observer forms, port sampling forms and Vessel Monitoring System (VMS) etc. This information is essential to the work programmes of both the SPC, the Pacific Island region's principal technical and scientific organization, and the FFA, who plays a key role in strengthening national capacity and regional solidarity to support its 17 members to manage, control and develop their tuna fisheries.

Before the DCC, tuna fishery data collection forms were developed in an ad-hoc fashion by a number of Distance Water Fishing Nations, some Pacific Island Countries and Territories (PICTs) and fishery organisations. As a consequence, there was a plethora of different forms circulating in the region which resulted in complex data management procedures and affected the quality, accuracy and timeliness of tuna fisheries information. To address this situation, SPC and FFA initiated the DCC during 1995 with the stated objectives as "developing standardised tuna fishery collection forms to reduce the complexity of data collection, processing and analysis" in member countries. Over the following two decades, the outputs of the DCC were harmonised paper copy forms for logsheets, unloadings, observer reports, port sampling and others data types. The annual DCC report was formally adopted by PICTs member countries through the Forum Fisheries Committee (FFC) and the Heads of Fisheries (HOF) meetings.

Over the last decade there has been an increasing interest in and implementation of electronic-based data collection across the range of fishery programs. With technology and policy moving forward rapidly, with little or no guidance on standards and specifications, DCC's continued focus on paper copies became untenable. A DCC Strategy Meeting was convened during 2016 to assess the situation and plan a way forward. This DCC Strategic Plan was produced as a result.

1.2 Purpose

The DCC supports the sustainable management and economic development of tuna fisheries in the Pacific Region through the improvement of the data standards, data processes and data quality that underpin the science, compliance and the provision of technical advice by the SPC and the FFA to its respective members.

1.3 Membership

The primary membership of DCC will be the SPC and the FFA.

The DCC may invite participants from a broad range of stakeholders including, but not limited to: the SPC / FFA Members, the secretariats of the WCPFC and the Secretariat of the Pacific Regional Environment Programme (SPREP), the Te Vaka Moana (TVM) Coordinator, and the Parties to the Nauru Agreement (PNA) Office, WCPFC members, fishing and seafood industry members,

Environmental Non-Government Organisations (ENGOs), ER and EM service providers[2], other Regional Fisheries Management Organisation (RFMO) secretariats, and other expertise-based groups or individuals.

1.4 Roles and Responsibilities

To achieve the purpose of the DCC, its core roles are to:

- maintain the existing paper-based framework for data collection; and,
- develop the data collection framework for emerging technologies, particularly electronic monitoring and electronic reporting.

The core responsibilities of the DCC are to enhance scientific, compliance and technical advice on tuna fisheries in the Pacific Region through:

1. ***Definition*** of standards and processes for:
    - Catch and effort logbooks
    - Observer programmes
    - Port sampling
    - Catch Landings Monitoring (including unloadings at port and at sea)
    - MCS activities (e.g. registration and boarding)
    - Current and future fisheries management schemes (e.g. vessel day schemes and catch management schemes)
    - Other areas as required

    Recognising that VMS data and a few key licencing fields (e.g. UVI, registration etc.) are critical and consistently required for each of the above.

2. ***Review / Advise / Inform on:***
    - Data standards, processes, compatibility, duplication and overall efficiency of all of the above activities.

The secondary role of the DCC is, as required, to:

3. ***Review / Advise / Inform*** the broad range of WCPO tuna fishery stakeholders on data standards, compatibility, duplication and overall efficiency with respect to:
    - Catch and effort logbooks
    - Observer programmes
    - Port sampling
    - Catch Landings Monitoring
    - MCS activities
    - CDS
    - Traceability schemes
    - Certification schemes
    - WCPFC CMMs
    - Others as required

The Annual Workplan for the DCC will be derived primarily from data issues raised by SPC / FFA Members, but will also be informed by data issues raised at WCPFC, PNA, Tokelau Arrangement, TVM, and SPREP meetings.

A schematic diagram of the relationship that the DCC will maintain with other WCPFC, FFA/SPC and other sub-regional processes and meetings is summarised in Figure 1.

[2] The term "Service Providers" is used in a broad sense to encompass software/hardware developers, analysts, fishery experts, etc. that may come from Government departments, international/subregional agencies or the private companies.

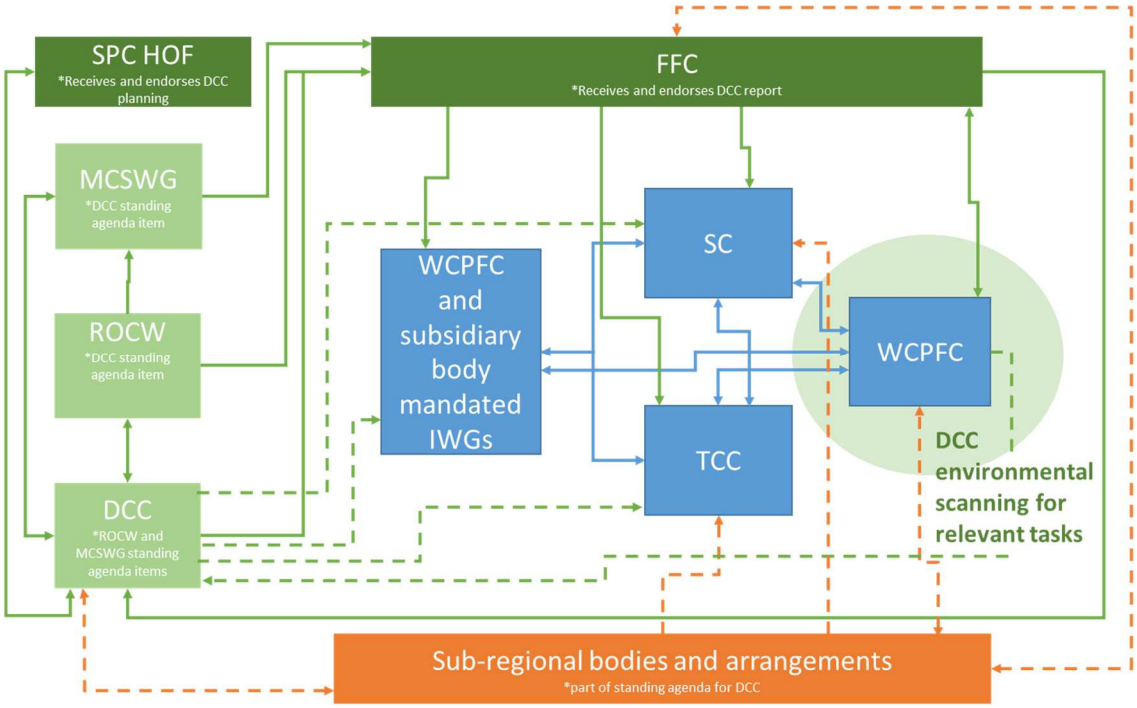

Figure 1. Schematic diagram of the relationship of DCC with the annual regional work programme with respect to fisheries. Note that this is focussed on the DCC role and does not try to reflect all connections for other identified bodies. Legend: Blue - WCPFC processes; Green - FFA/SPC processes; Orange - sub-regional processes; Dashed (- - -) lines informal links; Solid (—) lines formal links.

1.5 Meetings

DCC meetings will be conducted on an annual basis around the WCPFC cycle of meetings for the Science Committee (SC), Technical and Compliance Committee (TCC) and Regular Session of the Commission. The main annual DCC meeting will generally be held within three months following the Commission annual meeting.

Other meetings may be convened as required by the Pacific Community and FFA.

1.6 Outputs

Primary outputs from the DCC will be the Annual Report of Data Standards and Processes together with an Annual Work Plan; to be endorsed by the Forum Fisheries Committee (FFC) at their annual regular meeting, and reported to the Pacific Community Heads of Fisheries (HoF) regular biennial meeting.

In addition, the DCC will produce ongoing reports of Revised Data Standards and Processes (paper forms, fields, formats, processes etc.) as required for the various SPC / FFA sub-groups (e.g. MCSWG, ROCW). It will maintain an internal Register of Data Issues and Recommendations. It will also maintain a web-accessible list and record of the current accepted standards and processes.

1.7 Review

The terms of reference will be reviewed every 3-5 years.

2.0 FUTURE WORK PLAN

Identifying work needed

Potential areas of future work for the DCC as the collection of fishery data moves from using paper forms to using electronic collection and transmission systems are categorised and discussed below:

Setting data standards.

This is the priority area in which the DCC has been involved since its inception: determining what data is collected from catch and effort logsheets, observer reports and port landings; specific data formats; and how it is represented in a standardised manner on paper forms. This work will remain a critical component of DCC work in the medium-term if not long-term until there has been full transition to EM and ER.

It was recognised that the move to ER brings another party into an already complex equation – the software / hardware service provider (whether government or private). This requires that data standards and requirements be very clearly and accurately defined to enable service providers to build programs to the required specifications - not just for the data input screens, but for data checking, data storage, and data transmission. The format for data transmission may need to be defined differently depending on whether the data is being transferred by satellite, mobile networks or via USB. With paper forms, many of the interpretations of written data, error checking, range checking etc. are performed by trained de-briefers and experienced data entry technicians and data transmission is usually in the hardcopy paper form until it is entered into a database. Many of the standards adopted in these paper-based processes need to be reinterpreted and written as clear "business rules" for service providers. Reference datasets against which service providers can test their software and transmission against expected standards will need to be developed. Systems will need to be developed to ensure security and privacy standards are maintained through authorisation rules that remain consistent in the move from paper forms to electronic forms and transmission.

The situation for setting data standards for EM requires even further work than for ER because many of the standards required for visual or sensor capture of data do not exist under the current paper-based procedures.

Setting process standards

Many of the process standards currently used for hard-copy paper forms will need to be reviewed and clearly defined with the transition to E-Reporting. Formal electronic data backup procedures will need to be developed, as well as fall-back processes and redundancy measures required in the case of e-technology failure. For at least the medium-term, during the transition from paper-based to electronic forms, paper-based backups are likely to remain a necessity with continuing support from the DCC.

Version control is another issue which is currently dealt with the paper forms by having an issue date printed on the top left corner of the DCC-agreed form but needs to be redefined for ER and EM. Of particular issue here is the speed at which electronic versions can change compared with paper-based forms. For the latter, the effort, time and costs required in changing even a single paper-based form, get it printed and then distributed to end-users determines that version changes can only efficiently and effectively be introduced every year. In contrast, changes to ER software can be effected and distributed within a matter of weeks, although training and appropriation of new e-processes may take longer.

Version control and "backward/forward" compatibility[3] of formats and database field structure changes is a critical issue in this respect.

Change audit trails are another process standard that must be reconsidered in the move to e-technology. In paper-based forms, the use of something as simple as different coloured pens (with signatures) can be adequate to track data changes as forms move from the initial written entry, through debriefers and data entry technicians into a database. In E-Reporting, methods and standards of data change audits need to be developed for the initial data entry software and maintained through transmission and storage until it is incorporated into the final database. Along with the change audit is the need to clearly define the data "status" and provide feedback loops on data progress through entry, transmission, checking and upload with appropriate error highlighting and notification. The establishment of standards for data fields is essential for the efficient development of "data loaders"[4] to upload ER and EM data and will be a necessary part of this process.

As for data standards, because it requires new concepts in data collection tools and methods, the situation for setting process standards for EM requires further consideration and development work than for E-Reporting. It was emphasised that process standards are required for two distinct and separate aspects to collection of data from EM: 1) for the collection of physical image/sensor "information" from the vessel/port; and 2) for the examination of this information to extract "data" that can be uploaded into databases. Although work has started on corroborating Image Analysis for EM[5], there are currently no process standards of this type available, and they are required as a priority if EM is to get established and expand in an effective and controlled manner.

The final issue raised with respect to process standards is the increased ability and efficiency with which data reconciliation can be conducted using e-technology. Dunn and Knuckey (2013) pointed out that one of the drawbacks with the current paper system is the varying times at which different data sources (VMS, logsheets, observer, catch landings etc.) get entered into central databases, which means that reconciling data between datasets can be a delayed process and can hinder science and compliance activities. Some paper-based observer minimum standard fields are collected at pre– and post–trip inspections by a port inspector and used to cross-check, for example, gear components or electronics components against a master list for that vessel, but this is still a manual process. With the implementation of e-technology, data reconciliation / validation standards and procedures can be developed to ensure far more efficient and timely reconciliation across multiple datasets.

Electronic interfaces

Just as the standardised paper-based forms have been developed over the years by the DCC as the interface for easy and efficient entry of written information, the electronic interfaces for ER and EM, need to meet certain standards to ensure ease of use and efficiency. There are many technological functions available in electronic interfaces that can facilitate this including the use of drop-down boxes, pre-filled data fields, specific data format requirements, and automatic capture of GPS data for example. Service providers need to understand the sometimes harsh environment in which these interfaces are used by fishers and observers, and the practical aspects of workflow requirements and timelines — the

[3] Forward compatibility is a design characteristic that allows a system to easily accept input intended for a later version of itself. A system is backward compatible if it can function properly given input generated by an older product or technology.

[4] A data loader is a client application for the bulk import or export of data.

[5] http://iss-foundation.org/improved-monitoring-in-the-worlds-largest-tuna-fishing-ground/

User Interface (UI) of technology needed to create an efficient User Experience (EU) Recommended approaches or standards need to be considered to optimise UI and UE.

Early work should also focus on the development of UI and the impact of multiple hardware and software formats. The e-interface will require standards around the training processes and clear direction on what happens in the event of a malfunction.

A particular aspect of the development electronic UI which requires attention is the transition phase from paper-based forms to electronic forms. It is often suggested that electronic interfaces need to "mimic" paper forms to minimise change and ease the user into the electronic technology. In contrast, however, electronic interfaces can be more intuitive to the user because ER allows a far greater level of flexibility in terms of what can be displayed on a screen (which can scroll) and the relationships that can be established between screens depending on input values.

Users are required to fill in all paper-based data fields to indicate that the user has actually "thought" about a void response rather than just forgetting to fill in the field, and differentiating a non-entry from a null result (where the data were looked for but not found). Electronic interfaces and data entry can automatically pre-populate some of these fields based on specific tools such as GPS for positions or time or calculations from previous data entry responses, but consideration needs to be taken of ulterior purposes for manual entry of some fields such as to check observers are following protocols and other data verification purposes to ensure this does not undermine the quality of the information collected and its consistency with historical data.

It is likely that standards will need to be developed for each field governing whether it can be pre-populated and if not, how it is filled in (e.g. dropdown, free text, prompts, text/numeric, formatted, Yes/No, null values allowed etc.) and whether it is mandatory or optional.

The paper-based SPC/FFA observer workbooks and logsheets include extensive notes on the back of the forms to guide the users on how to complete the forms. Basically, the notes for completing workbook and paper logsheets ensure training material is available to support completion when observers are working in isolation from trainers. Notes to users of e-technologies are available but to a much lesser extent and detail. E-technologies will need to incorporate detailed notes. Being less 'space constrained' than paper forms, electronic data collection UI allows for more detailed instructions and interactive guides.

Quality processes

Data quality processes have been developed over time for paper copies and data entry and back end work. These processes need to be further developed and enhanced for e-products, noting that e-products can provide additional opportunities to cross-check data, including offering data queries to assist debriefing.

Ultimately, it is the combination of data and process standards and data acquisition mentioned in the sections above that will determine the quality of information that is made available for management of the fishery through science and compliance. In this respect the DCC needs to consider what quality of data is required for management and the best combination of data standards, process standards and electronic interfaces that can achieve this.

It was noted that the goal of continual improvement in the provision of quality data can only be achieved if e-technology solutions can incorporate mechanisms for self-review and error checking that occur at all stages of data collection and transmission. In the current paper-based system, most of this is quality improvement is achieved through human debriefing and feedback. The group suggested that the primary future work should be around the development of debriefing queries, while noting that some data are best verified through face-to-face questioning. E-technologies will not remove the need for face to face

debriefing – the level to which this can be achieved and replaced by technological solutions remains to be seen. Work on reviewing the relevance of the data and ensuring e-products provide feedback on errors would be beneficial.

Prioritising work

The work load to achieve the above was deemed to be high, with many elements being required immediately. With such a long list of potential data and process standards needed and the underlying documentation required, a priority work list for the DCC is provided below, prefaced with reference to the above four categories (Data, Process, Interface, Quality).

Table 1. Prioritisation of work areas under the four categories.

	Priority	Order	Item
Immediate	1	0	Process - Implement ToR engagement processes across stakeholders
	1	0	Process - Implement environmental scanning processes
	1	0	Current - Maintain current paper-based standards and processes
	1	0	Process - Develop web-based access point for data and process standards
Short Term	1	1	Data - Develop ER/EM Data standards (ues of gap analysis)
	1	2	Data - Conversion of paper to electronic data fields with decisions of pre-population and range checks etc.
	1	3	Data - Determine standards for how to collect EM information (event capture)
	1	3	Process - Develop EM Image analysis standards
	1	4	Interface - Development of user interface standards
	2	5	Process - Develop data transmission standards
	2	5	Data - Define transmission standards
	2	6	Process - Malfunction events (prevention and cure)
	2	7	Process - Development of Certification standards
	2	8	Quality - Feedback (error) notification / correction (esp. EM and Logsheets)
Medium Term	3		Quality - Develop validation processes throuhg cross-checking multiple databases (log, obs, landing)
	3		Interface- Training process standards
	3		Quality - Develop "E-de-briefing" queries and interfaces
	4		Process - Modify training manuals and regional vocational training
	4		Process - How to manage multiple hardware / software applications
	4		Process - Determine frequency of change and version control
	4		Process - Examine all pre-certification data
	4		Process - Determine rules around data accessibility (esp EM)
	4		Data - Determine standards for boarding interogation of EM/ER databases
	4		Interface - Translation / localisation
	4		Quality - Need to maintain face-to-face (OH&S, mesurement / operational errors, feedback)
	4		Quality - Review data relevance and accuracy and document for posterity

Process - Implement ToR engagement processes across stakeholders

To establish regional recognition of the DCC and ensure its integration in fisheries monitoring advancements, it is recognised that the role of the DCC as outlined in the terms of reference, needs to be understood and integrated within the WCPFC processes and across a range of sub regional bodies. The intent is that partnerships with the key stakeholders (see Membership page 5 paragraph 2) will be achieved through direct input by the DCC and/or its members in the stakeholders' formal decision making processes correct.

Process - Implement environmental scanning processes

To ensure timely response by the DCC to monitoring initiatives the DCC will establish protocols for reviewing the range of meetings held throughout the year Figure **1**. From this environmental scanning, potential changes, additions or deletions to data fields, standards or processes will be detected so they can be considered by the DCC. The DCC will implement a more proactive process of scanning the agendas and outcomes of these meetings to highlight these issues and they will become a formal part of the DCC agenda. In addition, it will be requested that the DCC work become a formal agenda item at each of the Regional Observers Coordinators Workshop (ROCW), the Monitoring, Compliance and Surveillance Working Group (MCSWG) and the Commission's newly formed EM and ER Working Group (EMandERWG).

The development of this strategic plan for the DCC is expected to be instrumental in achieving this goal.

Immediate work plan

Current - Maintain current paper-based standards and processes

Transition from a paper-based process to EM and/or ER will be rationalised through a planned process, because that transition will differ in adoption:

- of ER versus EM;
- among SPC/FFA Members; and,
- among the different data and information collected.

Although there is a transition already occurring from paper-based processes to both ER and E-M, there will be an ongoing need for paper-based data collection in the medium-term. Despite the potential advantages, some PICTs may not have the capacity for, or may not choose to uptake electronic technology. There may be a prioritisation of the process of transition with consideration of the importance, efficiency and cost effectiveness of transitioning the different data types. Also, paper-based forms may be needed to be retained as backup in case of ER malfunction.

Process - Develop web-based access point for data and process standards

To ensure clarity in agreed standards, processes, interfaces and Quality Assurance protocols, DCC members recognised that there is not one single access point from which stakeholders can gain information on data standards and processes. This is already an issue that needs to be resolved for paper-based forms, but it will become more critical as the fishery transitions to electronic technology, where service providers need to access standard and up-to-date information on a real-time basis.

2.1 Short Term Work Plan (1-2 years)

Data - Develop ER/EM Data standards (use of gap analysis)

Establishment of consistent clear data standards and formats recognised by the DCC stakeholders will ensure regional agencies can support monitoring processes with data interpretation and storage warehouses and hence strengthen the regional fisheries monitoring through common processes employed by SPC and FFA members / coastal states / key stakeholders. The current data and process standards that are applied to paper-based forms need to be converted and modified so that they can apply to ER technology. New data and process standards need to be developed to enable the introduction EM. The use of gap analysis will assist in both these areas.

Data - Conversion of paper to electronic data fields

The DCC will improve data collection processes through investigation and assessment of state-of-the-art electronic tools. Closely related to the conversion work above, is the opportunity to realise and implement the full range of e-technology data entry methods to improve on the current paper-based systems. This includes but is not limited to: the capacity to automatically populate fields from both real time GPS input and previous data inputs; use of drop-down boxes to accurately define data inputs; capacity to use diagrams and pictures to assist in data entry; defined formatting of data fields; range checking of data entries; definition of mandatory or optional fields, the ability to enter null values; hierarchical input of data; and validation of data entered against other fields. Decisions on each of these methods need to be made on a case-by-case basis for every data field and documented.

Data - Determine standards for how to collect EM (event capture)

To ensure EM service providers meet the requirements of key stakeholders, minimum data standards, formats and processes will be developed and made publically available. There are currently no standards developed to guide how EM hardware/software is positioned/configured to meet monitoring requirements. Facilitation of this development will require better clarification on exactly what data is required from installations of EM and how it will be used in fisheries management. Currently, there is much discussion and concern about observers being wholly "replaced" by EM technology, but this is unrealistic and counter-productive. More productive outcomes will be achieved by clarifying the role of EM amongst the wide range of data collected and needed by the fishery for management. Once this is determined, the standards for collection of EM information can be determined.

Process - Develop EM Image analysis standards

To meet key stakeholder needs for data accuracy, verification processes and standardised EM reading and interpretation processes and protocols require development. Ensuring common processes also facilitates training of the interpreters and data verifiers and validators (debriefers). There are currently no standards developed to guide how image/sensor information retrieved from EM hardware/software above is analysed and data extracted. High amongst this is the need for clarification on which "events" are trying to be detected through the availability of EM information. Once clarified, standards need to be developed to ensure consistency in searching for and recognising events within this information and converting this to data that can be transferred into current databases for use in management.

Interface - Development of User Interface standards

To facilitate the field use by vessel operators and observers, state-of-the-art User Interface tools and procedures will be used. The years of experience the DCC has regarding the practical aspects and workflow requirements under which observers and skippers operate needs to be used and documented so that User Interfaces for ER and EM meet certain standards for ease-of-use and

efficiency by operators. This is particularly important given that market demands may result in multiple e-technology products, each with differing hardware and software formats.

A particularly critical aspect in the development of interface standards is the transition from paper-based forms to electronic forms because the user experience can strongly influence the uptake of e-technology in either a positive or negative manner.

Process - Develop data transmission standards

To ensure that the transmission of ER and EM data can be efficiently uploaded into the appropriate databases and meet appropriate security requirements, standards and protocols for data transmission need to be developed. Many of the paper-based standards and processes currently used need to be reinterpreted and written as clear "business rules" for service providers. Reference datasets against which service providers can test their software and transmission against expected standards will need to be developed. Systems will need to be developed to ensure security and privacy standards are maintained through authorisation rules.

Data - Define transmission standards

To enable consistency in the quality and security of data transmission regardless of specific hardware or software requirements, service providers need clear definition of transmission standards, that are published and readily accessible. The format for data transmissions need to be defined recognising the requirements of the database to which it will be uploaded and that this may be determined by whether the data is being transferred by satellite, or mobile networks or via USB and whether it is required in real-time or at the end of a trip.

Process - Malfunction events (prevention and cure)

It is necessary to develop agreed processes that take place in order to minimise the disruption that can be caused by hardware or software malfunction. In the remote and harsh environment that exists at sea, the potential for technological malfunctions in both hardware and software needs to be explicitly considered for both ER and EM technology. Process standards need to be developed so that the likelihood of a malfunction is minimised, and when a malfunction occurs, the likelihood of interruption to data collection processes is also minimised. Processes to cope in the event of total technology failure also need to be developed. Training is required so that operators have a clear understanding of how to minimise and respond to both malfunction events; the quality of interface development is likely to play a big role in this.

Process - Development of Certification standards

Once data standards have been established, there is a need for certification of the ER or EM systems to ensure that their outputs meet the agreed data standards. Based on key learnings from the development of VMS standards[6], this certification process will be based on ER and EM data outputs meeting certain standards rather than certification of the particular hardware/software type or manufacturer. Optional certification standards, will encourage business-minded service providers to target the accolade without hindering the receipt of necessary fisheries data from any party. Whilst the certification process is likely to be conducted by an independent agency or the agency in control of the database, the DCC will advise service providers in the development of these certification standards into which the data is being transferred. A typical certification process involves:

[6] https://www.wcpfc.int/vessel-monitoring-system

- Development of standards, specifications and processes against which a product can be certified;
- Make available the standards, specifications and procedures to product vendors;
- Test the product against the standards and provide feedback to the vendors;
- Certify the product (or not); and,
- Provide potential users with a list of certified products.

Quality - Feedback (error) notification / correction (esp. EM and Logsheets)

To ensure the data recorded correctly represent the data collected, data verification processes will be developed. Verification will include feedback loops that notify ER recorders and EM interpreters of actual and potential errors in data recording and allow corrections. Verification will audit the source of corrections at all stages of the data entry, transmission and upload process. The most effective combination of human-based and technology-based quality improvement processes needs to be determined and implemented.

2.2 Medium Term Work Plan (1-2 years)

Quality - Develop validation processes through cross-checking multiple databases

To ensure the data collected accurately represent the actual event or natural world status, validation processes will cross-check the fishery 'fields' among independent monitoring tools. ER and EM technology provide the opportunity for near real-time cross-checking of information across multiple sources. Both science and compliance projects benefit from timely provision of data that is validated as accurate. Validation tools vary from relatively simple queries to automatically interrogate multiple databases to complex algorithms. For example, ER and EM information on vessel landing date can be queried from logsheet, observer, VMS and port sampling databases to validate data and detect discrepancies that prompt further investigation. In current paper-based processes, such validation can take up to a year because it depends on the timeliness of data entry by various agencies, currently some validation is automated but much still relies on manual checking. The availability of near real-time electronic data from independent ER and EM integrated databases allows automated validation and hence significantly improves the utility of the data.

Interface- Training process standards

To facilitate ongoing improvement in the quality of data being received and ongoing use of ER and EM technology, a robust training process is required to educate the prime users of this technology. Facilitating change from paper-based systems to e-technology will require significant commitment to training. Such training is likely to be undertaken by a variety of agencies, so a consistent training approach with agreed standards is needed to ensure that the prime users of the technology develop equal understanding and capabilities to operate these systems.

Quality - Develop "E-debriefing" queries and interfaces

To improve and maintain the quality of data obtained by EM and ER technology, an equivalent debriefing process to that is currently used for paper-based systems needs to be developed for these e-technologies. Currently, face-to-face debriefing is a critically important aspect of data quality assurance and error checking, particularly for observers. The adoption of ER and EM allows for some of this debriefing to be efficiently and effectively conducted using electronic queries and interfaces that need to be developed.

Process - Modify training manuals and regional vocational training

To facilitate the transition into ER and EM, supporting documentation needs to be developed in the form of training manuals and vocational training guides. For ER, the significant training documentation. Manuals and instructions on the forms can readily be incorporated. In addition to simple PDF manuals, ER allows interactive and animated guides. . EM service providers may have online or paper manuals for the hardware and software they offer and these will need to be reviewed to ensure they meet appropriate standards.

Process - How to manage multiple hardware / software applications

To encourage the use of products which meet certification requirements, it will be necessary to develop and maintain a database of currently certified ER and EM technologies and service providers. It is likely that observers/skippers will have access to ER and EM technology from more than one service provider available on the market. The users need to be able to readily access information that clearly explains the technologies they are using and how they meet current data and process requirements. Work is required to develop and maintain this database of currently certified ER and EM technologies and service providers.

Process - Determine frequency of change and version control

To avoid errors and problems associated with the use of out-of-date software versions, a strict process of ER and EM version control will need to be introduced and maintained. Practical aspects of printing and distribution dictate that currency of paper-based forms are monitored but the introduction of ER and EM technology can feasibly allow new versions to be introduced within a matter of weeks, although training and other processes may take longer. Development of processes to control the introduction of new ER and EM versions and backward/forward compatibility is a critical issue in this respect.

Process - Examine all pre-certification data

To guarantee the quality of information collected from ER and EM installations prior to certification procedures being in place, it will be necessary to validate previous data to ensure it meets the agreed certification standards. Following development, this will require the agreed certification queries to be applied to historical ER and EM data. In cases where the data does not conform to current certification requirements, it should be flagged and options to correct that information should be investigated.

Process - Determine rules around data accessibility (esp. EM)

To ensure the confidentiality and privacy of data, rules regarding access authority will need to be established to meet the regional data rules and procedures and national standards. With paper-based forms, access to the form can be relatively easily controlled as there is generally only one paper copy sent for data entry and access to subsequent copies are strictly controlled. Electronic data can be easily copied and distributed unless there are strict protocols established regarding access to the data. For current paper-based forms, the access protocols and authorities are well established, but need to converted and applied to ER technology. Access rules and authorities for EM however, are yet to be established together with protocols about information / data ownership.

Data – Determine standards for boarding interrogation of EM/ER databases

To enable onboard or onsite interrogation of data for compliance purposes, officers need to be able to access some information contained in ER and EM databases. Paper-based forms such as logsheets, observer reports and landing reports are easily accessed by compliance officers when

they board a vessel or arrive on site. When the information is stored electronically, such access may be hindered. Standards and procedures need to be established that allow officers to access/download certain electronic data (there may be some data that they are not allowed to access) in a timely and efficient manner.

Interface – Translation / localisation

To improve the comprehension and understanding of e-technology users, ER and EM products can be readily translated and localised in a cost efficiently manner to suit different countries. Translation of forms is controlled as independent translation has led to misinterpretation and incorrect information being submitted that in a few cases resulted in reporting infringements. Version control in translations is critical and assurance that translations are correct and consistent is critical. Standard processes that take into account prioritisation of translation to languages other than English, and the cost-benefit of with respect to optimising data quality.

Quality – Need to maintain face-to-face (OH&S, measurement / operational errors, feedback)

Regardless of the move to e-technology, it is recognised that some level of face-to-face communication with ER and EM users will need to be maintained for OH&S reasons as well as to maintain quality assurance processes. Decisions about which data-based task/procedures would most benefit from some level of face-to-face communication and the correct balance of e-technology solutions and human intervention will need to be determined.

Quality – Review data relevance and accuracy and document for posterity

As is currently the case with paper-based systems, ongoing reviews of data relevance and accuracy will still be required with the move to e-technology. This will be the purpose, role and responsibility of the DCC.

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6. Appendix 3: Meeting Agenda

[7]TUNA FISHERY DATA COLLECTION COMMITTEE

STRATEGY MEETNIG

SPC, Noumea

Monday 4th April to Wednesday 6th April, 2016

— Indicative Agenda —

Purpose: This DCC meeting is intended to be focussed on the changing role of the DCC in the emerging era of electronic capture of data in tuna fisheries and developing a long-term work programme for the DCC

09.30 hrs: ***Monday 4th April.***

- MEETING OPENING

Appointment of Chair

Introductions

Adoption of agenda

House keeping

- ROLE OF THE DCC

Its current role

Linking up with other regional processes

Its future role in an era of electronic data capture, MSC and CDS

DCC components – strategy meeting, forms meeting, EM/ER meeting

Breadth of DCC – data in scope

- STAKEHOLDERS

Who should be involved in DCC?

[7] http://www.spc.int/oceanfish/en/meetingsworkshops/dcc

Respective roles

Future core stakeholders and issue specific participation

- SETTING DATA STANDARDS

The process for setting standards

Defining the list of standards

Further definition and explanation of data standards

Referring to and use of other standards – WCPFC, ISO

Frequency of review/change

Differences in e-reporting and e-monitoring data

08.00 hrs: ***Tuesday 5th April.***

- SETTING PROCESS STANDARDS

Defining a process standard

The process for setting process standards

Implementation of process standards

Frequency of review/change

Differences in e-reporting and e-monitoring data

- ELECTRONIC INTERFACES

Ensuring design meets data and process standards

User accessibility (vessel, observers, boarding officers)

Malfunction events

Training (PIFRO)

Translations

08.00 hrs: ***Wednesday 6th April.***

- DATA QUALITY PROCESSES

Role of Regional Bodies

Hard copy debriefing / auditing

Data curation

Better integration of data from multiple sources

Processes for reviewing data relevance

Linking analysis issue identification to fisheries monitoring improvements

Better dissemination of QA feedback

- FUTURE WORK

Long-term work-plan

Intersessional work-plan

Implications for PIRFO, including training for electronic data capture

- SUMMARY

Work-plan

Next meeting

Adoption of report

Close of meeting

7. Appendix 4: List of documents

- Summary Report for ER and EM WG1
- WCPFC ER Data Standards – logsheet (v07-06-2015 Draft)
- WCPFC ER Data Standards – Observer Data (v2-00 – 22-02-2016 Draft)
- Solomon Island e-Monitoring Trials
- Report of the 9th Data Collection Committee
- Observer Guide – By Data Field
- PIRFO E-Reporting Standards

8. Appendix 5: List of Participants

COUNTRY-ORGANISATION	NAMES	EMAIL CONTACT
Consultant www.fishwell.com.au	Ian Knuckey	ian@fishwell.com.au
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SPC - OFP SPC - OFP SPC - OFP SPC - OFP SPC - CFP www.spc.int	Neville Smith Peter Williams Timothy Park Deirdre Brogan Franck Magron	nevilles@spc.int peterw@spc.int timp@spc.int deirdreb@spc.int frankm@spc.int

9. Appendix 6: Pre-workshop Questionnaire

This DCC meeting is intended to be focussed on the changing role of the DCC in the emerging era of electronic capture of data in tuna fisheries and developing a long-term work programme for the DCC.

Based on your own individual experience and understanding, please rank the high-level and low-level issues below that you think will be the priority considerations (1 = high) with the implementation of electronic data capture and provide a paragraph or two on why you think this and what might need to be done to address the issue.

	SETTING DATA STANDARDS
	The process for setting standards
	Defining the list of standards
	Further definition and explanation of data standards
	Referring to and use of other standards – WCPFC, ISO
	Frequency of review/change
	Differences in e-reporting and e-monitoring data
	Other?

Comments

	SETTING PROCESS STANDARDS
	Defining a process standard
	The process for setting process standards
	Implementation of process standards
	Frequency of review/change
	Differences in e-reporting and e-monitoring data
	Other?

Comments

☐ **ELECTRONIC INTERFACES**

- ☐ Ensuring design meets data and process standards
- ☐ User accessibility (vessel, observers, boarding officers)
- ☐ Malfunction events
- ☐ Training (PIFRO)
- ☐ Translations
- ☐ Other?

Comments

☐ **DATA QUALITY PROCESSES**

- ☐ Role of Regional Bodies
- ☐ Hard copy debriefing / auditing
- ☐ Data curation
- ☐ Better integration of data from multiple sources
- ☐ Processes for reviewing data relevance
- ☐ Linking analysis issue identification to monitoring improvements
- ☐ Better dissemination of QA feedback
- ☐ Other?

Comments

APPENDIX II –

BRIEF REPORT OF AN ELECTRONIC MONITORING (LONGLINE) PROCESS STANDARDS WORKSHOP

ELECTRONIC MONITORING (LONGLINE) PROCESS STANDARDS WORKSHOP

Funded by the International Seafood Sustainability Foundation (ISSF) and organised by the Pacific Community (SPC), a three-day workshop on 'Electronic Monitoring Longline Process Standards' took place at the SPC headquarters in Noumea between the 27th and 29th of June 2016. The workshop brought together experts currently involved in the use of electronic monitoring systems from regional fishery management organisations, Pacific Island national fisheries offices, a non-government agency and electronic monitoring service providers (the full participant list is below).

Electronic Monitoring (EM) has been defined as a closed monitoring system that enhances existing vessel monitoring systems (VMS) through the use of cameras, GPS capacity and gear sensors to monitor fishing activity. In the Western and Central Pacific Fisheries Commission's (WCPFC) Convention Area, EM is now, after a number of years of testing, an established method of collecting data from tuna fishing activities (e.g., VMS is approved). The capture of fisheries data through electronic tools has the powerful potential to enhance existing data collection systems and improve data deficiencies — the loss of data through mis-information or under-reporting. Such data loss from licensed vessels was identified as the major contributor to IUU fishing in the region[1]. Additionally, EM along with electronic reporting (ER) has the capacity to deliver real-time data and significantly improve the reliability of logbook data, thus enhancing the value of stock assessments and various other technical analyses. The ability to monitor the security of personnel on board is another valued feature.

The workshop's main aim was to list the detailed data standards for EM for longline fleets by defining the data fields and describing the business requirements in relation to those data fields. These are increasingly sought by EM service providers in the region. The longline fleet was identified as having the more immediate needs in terms of EM data specifications as full observer coverage is already a requirement for the WCPFC purse-seine fishery. In contrast the longline fleet has substantively more vessels, many of which remain at sea for extended periods, and offers a more challenging environment for observer placements. At-sea transhipments are routine for longline

[1] MRAG Asia Pacific (2016). Towards the Quantification of Illegal, Unreported and Unregulated (IUU) Fishing in the Pacific Islands Region. 101pp.

vessels fishing on the high seas and the physical challenges of getting observers to the vessels and providing them with appropriate accommodation can be disruptive and are the main reason why observer coverage in this sector of the longline fishery has historically been very low.

In essence the workshop was a technical meeting. As a starting point, the *e-reporting* standards drafted for the WCPFC[2] provided the framework for a step-by-step approach to crafting the new EM data standards. The positive response to the workshop invitation from a diverse and knowledgeable group provided a solid environment to investigate both the validity of each data field with respect to the capabilities of EM technologies and the current technical capacity. The other reference tool that proved helpful to the workshop was the report on the trial of electronic monitoring carried out in the Solomon Islands[3].

The workshop acknowledged the requirements for new policy and legislation around EM, at both the national and regional level, but noted that this area was beyond the mandate of the workshop. The associated over-arching issues were, however, documented as they arose and considered during a session at the end. This discussion will be included in the paper sent to the WCPFC ER and EM WG 2.

In developing the EM data standards, the working group systematically reviewed all the data fields currently collected by on-board observers (which cover both the WCPFC Regional Observer Programme (ROP) minimum data standards and additional fields required by the SPC/FFA Data Collection Committee) and assessed if the data could be collected through current versions of EM. The draft EM data standards recognise and detail the preferred source for each data field noting some data can't be collected through electronic imagery It was acknowledged that some data could be collected by a technician before or after the trip (e.g. vessel details, equipment details or species lengths) and an onboard observer or port sampler will be needed to collect some biological data (e.g. otoliths and gonad stage), for example. Additionally, the large quantity of generated imagery will normally require further interpretation by an office-based observer before it becomes 'data'. Data derived from calculations is another possible source of information. Automatically generated data, often captured by sensors, is the currently preferred source of EM data; and while not always feasible with current technology, future developments are likely to increase the amount of data that

[2] Western and Central Pacific Fisheries Commission (WCPFC) E-reporting standard data fields operational observer data. Version 2.00, 22 Feb 2016, Draft – yet to be approved.
[3] Hosken 2016 Solomon Islands E-Monitoring Project Report

can be automatically derived. The limiting factor may be cost and not technology. The workshop also documented data fields for further consideration by the appropriate data groups either for inclusion, retirement or as potential new data fields once the technological issues are resolved.

The full draft technical standard arising from the workshop will be prepared and submitted to the 2nd meeting of the WCPFC Electronic Reporting and Electronic Monitoring Intersessional Workgroup in early August, 2016. It is acknowledged that these EM data standards are a substantive start to the work that needs to be achieved, but on-going work will be required, most especially in the early years and in maintaining the standards as data needs evolve. The data standards were generated mostly from a science perspective and define how the EM data can align with existing on-board observer data and how EM can be used to verify reporting of real catch, discards and effort. Verifying real catch and effort is extremely important for stock assessments and is an important part of fisheries compliance. However, it was noted further work is needed to assess compliance needs and standards for monitoring activities like transhipment. The standards do not include advice on vessel coverage levels, the limitations around cost or the legal requirements and these will have to be explored before enhanced EM is a successful source of data in the region. They do, however, fulfil the immediate need of supplying service providers with the data standards they require to achieve the common goal of enhancing data collection from tuna longline vessels in the Western and Central Pacific Fisheries Commission's (WCPFC) Convention Area.

Workshop Participant List

Name		AFFILIATION	
Ian	Knuckey	Fishwell Consulting	FACILIATOR
Peter	Williams	Pacific Community	CHAIR
Malo	Hosken	Pacific Community	ORGANISER
Deirdre	Brogan	Pacific Community	
Siosifa	Fukofuka	Pacific Community	
Tim	Park	Pacific Community	
Emmanuel	Schneiter	Pacific Community	
Kerry	Smith	AFMA, Australia	Chair of WCPFC EREMWG
Victor	Restrepo	ISSF - International Seafood Sustainability Foundation	
David	Power	Forum Fisheries Agency	
Yvonne	Ueda	The Nature Conservatory	Palau
Netani	Tavaga	Ministry of Fisheries& Forestry, Fiji	
Jale	Qereiwasa	Ministry of Fisheries& Forestry, Fiji	
Thomas	Auger	Direction des Affaires Maritimes, New Caledonia	
Brian	Kumasi	National Fisheries Agency, PNG	
Bob	Stanley	Archipelago Asia Pacific	Service Provider
Gonzalo	Legorburu	Digital Observer Services	Service Provider
Oscar	Gonzalez	Marine Instruments	Service Provider
Jared	Fuller	Saltwater Inc	Service Provider
Jens	Heinsdorf	Satlink	Service Provider
Garland	Shen	Luen Thai Fishing Venture	Service Provider

Workshop website

http://www.spc.int/oceanfish/en/meetingsworkshops/e-reporting-a-e-monitoring

APPENDIX III –

DRAFT E-MONITORING PROCESS STANDARDS FOR DATA EXTRACTION TO LONGLINE OBSERVER DATA FIELDS

E-MONITORING PROCESS STANDARDS
FOR DATA EXTRACTION TO LONGLINE OBSERVER DATA FIELDS

July 2016

CURRENT VERSION:	*1.00*
DATE:	*08 July 2016*
STATUS:	*Draft – yet to be approved*

Version Number	*Date Approved*	*Approved by*	*Brief Description*
			–

INTRODUCTION

These tables set out Draft Process Standards for the provision of operational OBSERVER data fields collected in the WCPFC longline (LL) fisheries through E-monitoring (EM) systems. They provide the minimum requirements for data entities, data formats and data validation to be established for data submitted to the national and regional fisheries authorities from EM systems. The data fields contained herein are based on information collected under the current regional standard data collection forms[1]. This document acknowledges that national fisheries authorities require certain data fields that are not mandatory WCPFC Regional Observer Programme (ROP) data fields (for example, for anticipated Catch Documentation System – CDS – requirements), so a column in these tables identifies whether the data field is a mandatory WCFPC data field[2] or not.

These Draft Process Standards are consistent with, and should be considered in conjunction with more detailed instructions[3] on how to collect observer data provided by SPC. They are intended for, inter alia, service providers who have been contracted to provide EM systems to record OBSERVER data collected directly by EM systems and by officer observers reviewing EM data.

In accordance with Recommendation 4 of Hosken *et al.* (2014), EM technical service providers should provide a system that allows capture and entry of data that incorporates quality control processes that are equivalent to those of the TUBS system. The data — meeting the relevant standards — should then be able to be exported to authorised recipients including the WCPFC.

METHODS

INPUTS AND OUTPUT FORMAT

The format of the Draft EM Process Standard was to generally follow that identified in the Western and Central Pacific Fisheries Commission (WCPFC) E-REPORTING STANDARD DATA FIELDS for OPERATIONAL OBSERVER DATA Draft – Version 1.0 dated 10th June 2015 (as reflected in the WCPFC EREM WG1 meeting report).

The Pre-Trial Review of Data Standards for Regional Observer Programme of the Solomon Islands EM trial report (Hosken 20014) was useful in providing an initial summary of the material required for the standard to be developed.

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[1] Note: there have been some recent changes in the Standards not reflected in the current ER standard on which this document is based. These include 1) changes that were considered by the DCC in 2014 and 2) changes agreed by the last Commission meeting but yet to be considered by the DCC. These updates will need to be included during 2017 – after the next DCC meeting.

[2] The minimum standard WCPFC Regional Observer programme (ROP) data fields for purse seine data are found in the "WCPFC ROP Minimum Standard Data Fields & Instructions" http://www.wcpfc.int/doc/table-rop-data-fields-including-instructions

[3] In addition to the minimum WCPFC ROP data fields, instructions for observer data collection in the WCPFC Area are available with the regional standard observer data collection forms at http://www.spc.int/oceanfish/en/data-collection/241-data-collection-forms, general information/instruction for observers at http://www.spc.int/OceanFish/en/ofpsection/fisheries-monitoring/observers and http://www.spc.int/OceanFish/en/certification-and-training-standards.

MODIFICATION OF TABLES FOR E-MONITORING

The procedure to produce the Draft Process Standards began with the WCPFC E-Reporting Standard Data Fields. Based on previous knowledge of EM programs and the recent work on EM of Solomon Is longliners (Hosken *et al.* 2014), the capacity for EM to collect observer data was considered for each field in every table. A workshop comprising participants from SPC, FFA, WCPFC and a range of EM providers was used to assess each field in the following manner.

Each field was rated and colour-coded for EM as follows:

- EM ready – Able to be easily and immediately collected;
- EM with work – Potentially collected with further hardware/software modification;
- EM not likely – Not feasibly or practically collected in the medium term;
- EM Natural Key – Potential as an internally generated Natural Key[4];
- EM new field – A new field required specifically for E-Monitoring;
- EM redundant – A field that is potentially redundant as a result of E-Monitoring.

In addition to the codes above, the source from which each field can or could be collected (or not) both currently and in the future was identified. These were coded as follows

- SETUP — Hard-coded or recorded at the time in which the EM equipment is installed on the vessel.
- PRE — Hardcopy reporting or preferably E-Reporting from a pre-trip onsite inspection of the vessel and discussion with owner / captain / crew;
- OO — Recorded by an Office Observer (OO) based on visual reference to images / footage / sensors;
- POST — Hardcopy reporting or preferably E-Reporting from a post-trip onsite inspection of the vessel and discussion with owner / captain / crew;
- AG — Automatically generated by the EM system components;
- OO -> AG — A special case of the above where an event is detected by the Office observer and the EM system automatically generates the field value;
- CF — A calculated field arithmetically generated from one or more of the above field types.

Notes were made on any of the main issued discussed for each field.

[4] A Natural Key is formed of unique logical (real world) attributes and used as an identifier in a relational database independently of the database schema.

OVERARCHING ISSUES

As workshop participants went through the above process, a number of overarching issues (not specific to any particular field) were noted. These issues were largely outside the scope of the workshop but are briefly described below.

DATABASE MANAGEMENT

Record of data source

An "office observer" (OO) will not be able to collect all the LL Observer data fields just from reviewing image/sensor information. These will include specific vessel fields, trip fields and a variety of other fields as mentioned below:

Vessel fields

Some fields will relate specifically to the vessel (e.g. vessel identification fields, fishing gear, and safety equipment) and should not change (or rarely change) over time. When a vessel has EM equipment installed for the first time (SETUP), EM providers may be able to hardcode this information into the software following inspection of the vessel. Alternatively, staff from the licencing fisheries authority could conduct a physical inspection of the vessel to collect vessel data fields which cannot be collected by E-Monitoring.

In theory, once this first inspection has been conducted, there shouldn't be a need to re-inspect the vessel before each trip. The vessel operator would, however, be required to inform the licencing authority of any changes made to the vessel. Alternatively, the licencing authority could conduct 'spot' inspections to ensure the vessel is still compliant with the initial vessel details, this may be particularly relevant for 'high IUU risk' vessels.

Trip Fields

There are a range of fields that will relate specifically to a particular trip and have the potential to change from trip to trip or even during a trip (e.g. Departure Port, Master, Crew, Equipment etc.). As a consequence, a pre-trip (PRE) and/or post-trip (POST) port inspection of the vessel will be required. The inspection could be conducted by a team and include the office observer (although the latter may be cost-prohibitive). For example, during the first inspection all fishing gear could be compliant with fisheries regulations but after a few trips specialized gear used to target sharks (wire traces) could be introduced and these would not necessarily be so evident to see being deployed or hauled when the office observer reviews the footage.

These trip data fields will need to be collected by an authorised fisheries officer using either a paper form (e.g. the Observer LL-1 form) or preferably an equivalent electronic form. When analysis of the EM records begin, the office observer would need to transcribe or download the data collected on the form/E-form onto the specialized EM review software.

Other fields

There are numerous other data fields that may be difficult or impractical for an EM system to feasibly or effectively collect (e.g. air sightings data, pollution data). As above, alternative methods of collection may be possible, such as automatically generating the data from the EM system (AG)

or calculating the required data from information in other fields (CF). Workshop participants recognised that there are some fields that cannot be feasibly or effectively collected by EM.

Source clarification

Contrasting to the current situation in which an observer (single source) personally records all of the trip information in paper logbooks and journals, the introduction of EM opens the possibility that data will come from multiple sources. Recognising this, it is important that the end user knows the source of each data field. This might be achieved in a number of ways:

- Attach XML attribute to each field stating source as e.g. OO, AG, PRE, POST, CF, SETUP;
- Sources allocated at the Extract Transfer Loader level;
- Provide additional "source" fields where required;
- Could be implicit from the version;
- Incorporated in the metadata by service provider to accompany data.

Description of field calculation from provider

An extension of the above issue is that there are a variety of ways in which some fields can be automatically generated or calculated. Each different field/data calculation method may incorporate different assumptions and biases that need to be understood. Metadata needs to be provided by service providers clearly defining how each field is generated/calculated. This could be done in conjunction with software development process and version control.

Need to link PRE or POST data with EM TRIP

As indicated above, EM data will be supplemented from data from other databases.

- How will access to necessary auxiliary databases be managed?
- Standardised definitions will be required that enable links with other databases provide an alternative;
- Is there an application that collects the auxiliary data needed by service providers?
  - E.g. Webservice
- Is there enough data to populate the Natural Keys?

Data certainty / reliability

There may be a number of factors that influence the certainty / accuracy / precision of data collected by EM (e.g. lens clarity, field of view, light levels, resolution etc.) and interpreted by an office observer. For example, an office observer may see that a fish is caught but may be unable to identify the fish accurately despite the ability to replay images/footage. In these instances, it is necessary for different users to be able to associate the level of uncertainty with the data field. This might be achieved in a number of ways:

- Attach XML attribute to each field stating source as certainty (e.g. 1, 2, 3 Hi Med Low);
- Provide additional "certainty" fields where required.

EM compatibility with current observer database

Given the above, it is quite possible that the database for EM will be significantly different from that used for onboard observers. The pros and cons of trying to integrate the two sources of similar information into one database needs to be considered.

- Need (or otherwise) for separate databases?
- EM database will need integration of data from other sources (databases)
  - Eg Pre-departure data suggested to augment EM observer data

Cross-validation of EM data

Cross-validation of data from different databases can improve data quality by highlight areas of

- E.g. with VMS, logsheets, port inspections, port sampling
- EM is likely to facilitate improved cross-validation processes through improved timeliness of data.
  - Eg. Use of Natural Keys
- This is a current issues that applies more generally than just for EM.

Different methods of collection of the same data

EM provides the potential for the same information to be collected by different methods. This enable the most cost-effective or accurate method to be explored and determined. Some examples of this are provided.

- Automatically generated fields vs office observer generated
  - E.g. smart gear[5] vs observer time
  - Explore the cost trade-offs.
- Using EM possibilities versus access other data
  - E.g. for counting crew numbers. This could potentially be done by EM (by identifying different crew members using cameras) but may be far more effective and cost-efficient to conduct a pre-trip inspection.

Change management needs to be controlled

There will be ongoing changes and improvements as EM becomes more established throughout the fishery. Appropriate standards need to be established to document and implement these changes across the system, including:

- Database
- XML
- Version control
- Protocols for correcting data post-submission

Duplicate fields.

There are duplicated fields across the different paper forms. An EM system could resolve these redundant fields.

- Eg. SSI fields could be linked to the catch table through catch ID and species (SSI only)
  - E.g. certain field from a marine turtle encounter in LL-4 could be automatically filled into the GEN2 (SSI)

[5] "Smart Gear" is loosely described as fishing gear (e.g. hook, float, line, scale) equipped with a transmitting/receiving device which is linked to the EM system. Information collected via the smart gear can be used to auto-generate EM data.

- Field codes may need to be revisited to ensure consistency.

Trip Reports

The current hardcopy Trip Report has been designed with a focus on onboard observers. The fields required in an EM Trip Report need to be reviewed.

QUALITY ASSURANCE

Quality control

There are numerous stages and processes by which quality control of onboard observer data is maintained and improved. Systems need to be developed to ensure EM systems have a similar level of quality control.

- Provide service providers with a comprehensive list of validation rules;
  - Some validation rules already available from current observer program that can be transferred to EM (e.g. Provision of XSD for XML)
- Feedback to service providers;
- Image interpretation
  - Standard required for re-reviewing by same or second analyst?
- Provide a test environment for EM providers;
- Develop mechanisms for successful data upload flag / response;
- Minimum qualifications (sea time?) for the office observer;
- Calibration of digital measuring tools;
- EM Debriefing and auditing process;
- All of the above will likely be an ongoing process.

Standard time measurement

The LL observer guide says onboard observers should record the ship's time on all forms except the GEN-1 form, and since vessels use a variety of times, observers are asked to collect a second time, or standard time, so people reviewing several observer trips can compare the time of day when activities took place. There was general agreement that UTC data and time should be the standard used in all EM data fields.

Equipment failure (hardware and/or software)

There will need to be standards and procedures put in place to deal with minor and major failures that may occur with EM hardware and software. These may need to address the following questions:

- Who will identify what has occurred and how important it is?
- How will people identify when failures have occurred?
- How to deal with missing / corrupt data that may result?
- What are the quality control mechanisms?
- Who needs to know?
- Who needs (is authorized) to respond / fix the issue?
  - E.g. MOU between coastal or flag state / service provider / vessel

- How is the flagged in the database (at all levels)?

Security

There are a range of issues regarding equipment and data security.

- The need for tamper-evident systems.
- What is the chain of custody requirements for hardware/software / images?
- Does a system need to meet minimum security requirements?
- Are standards for commercial-in-confidence for providers and staff (including office observers) required?
- Will the data rules and procedures already available for observer data need to be changed or improved to allow for EM data?

Standards for camera placement and number

There is no clear definition of the standards required for the number and placement of cameras and sensors on longline vessels — this has basically been left to service providers to determine given the expected outputs. Is there a need for more specific guidance required? Issues that may need to be considered include:

- What requirement is there to detect specific events?
  - Gear setting
  - Gear hauling
  - Catch identification / measuring
  - Fish processing areas
  - Sightings
  - Transhipment
- Is there a need to determination event priorities?
- There is a need to consider the cost / benefit of hardware installations.

Use of cameras in the workplace raises a range of issues regarding personal privacy and occupational health and safety. Guidance will be required as to which EM products are appropriate and when they should be used.

- E.g. Use of cameras in the wheelhouse to capture use of vessel electrics (LL1) is possible but may invade privacy;
- There may be other ways to determine equipment usage than cameras

Data timeframes of from EM system

EM systems potentially allow for near real-time collection of some onboard data (date/time/position/sensor).

- Is this required?
- What is the maximum timeframe for obtaining information and how will this be enforced.

SSI Interactions

Onboard observers use knowledge, expertise and a range of real-time sensory information to determine whether SSI interactions have occurred and what might be the resultant fate of an animal from such an interaction. An integral part of this is the ability to see an event and follow it (by sight)

as it develops. Onboard cameras and sensors have only a limited ability to achieve this. One example of this discussed was whether an SSI can be identified on setting through just the use of a camera – given that the camera will only be focussed on one position of the line-setting with a reasonably limited field of view. This generated more questions than answers.

- Will SSI interactions require redefinition due to limits on camera field of view?
- Are there implications on number of cameras required to meet SSI reporting requirements?
- How will EM-generated data meet CMM requirements?

In addition to the above, there are some codes/fields regardless of EM which are gear specific (e.g. turtle hooking not needed for Purse seine) that warrant reconsideration of whether different SSI fields are needed for different gears

Overall, there were quite a number of overarching SSI issues that need to be reviewed, including EM capacity for detection.

Protocols for sub-sampling sets determined

EM has the potential to monitor every longline set and haul, potentially automatically. This means that a huge amount of information is potentially available for review and data input.

- Is some level of sub-sampling of these sets required?
- How much and what information needs to be sampled?
- The decisions on this are likely to be part of the regional monitoring strategy.

Retrieving image / sensor information from vessels (especially during transhipment)

There are a variety of processes used by different service providers to retrieve image and sensor data from a vessel. These are reasonably straight forward when a vessel regularly returns to port, but may become problematic when vessels tranship and undertake multiple trips without returning to port.

- Difficult logistics on board longliners;
- Obligations under licensing agreements;
- How to ensure timeliness of EM data availability;
- Lack / limit of communication options;
- Special case of cross-country trips.

Retention of image / sensor data

Policies on ownership / storage / access / destruction / confidentiality / duplication of image and sensor data need to be developed.

EM POTENTIAL FOR MCS AND CMMS

There is significant potential for EM to play a larger role in the management of the WCP tuna fisheries than to augment observer data. One of the most important overarching issues is that guidelines are required for establishing national legal frameworks around EM – both policy and legislation.

EM within broader MCS capacity (including CDS)

There is general recognition of the benefits and potential use of EM across a broad range of management requirements. These need to be explored.

- E.g. EM generated data verifying catch in a CDS traceability process
- EM as an audit tool?
- The credibility of EM systems and capacity of office observer to be used as a compliance tool need to be established

Value-adding to the EM generated data

There is underutilised capacity available in EM systems and EM-generated data that needs to be explored.

- E.g. Use of CDS to link catch of individual (barcoded) fish to enable measurement
- Verification of processes for third-party certification schemes.
- Expanding fields that can be captured using EM, e.g. Date/time, position and image can be automatically generated for events that were not previously required. E.g.:
  - Individual fish catch;
  - Float deployment and retrieval;
  - Hook deployment and retrieval;
  - Line cuts and retrieval;
  - Retained images as evidence.

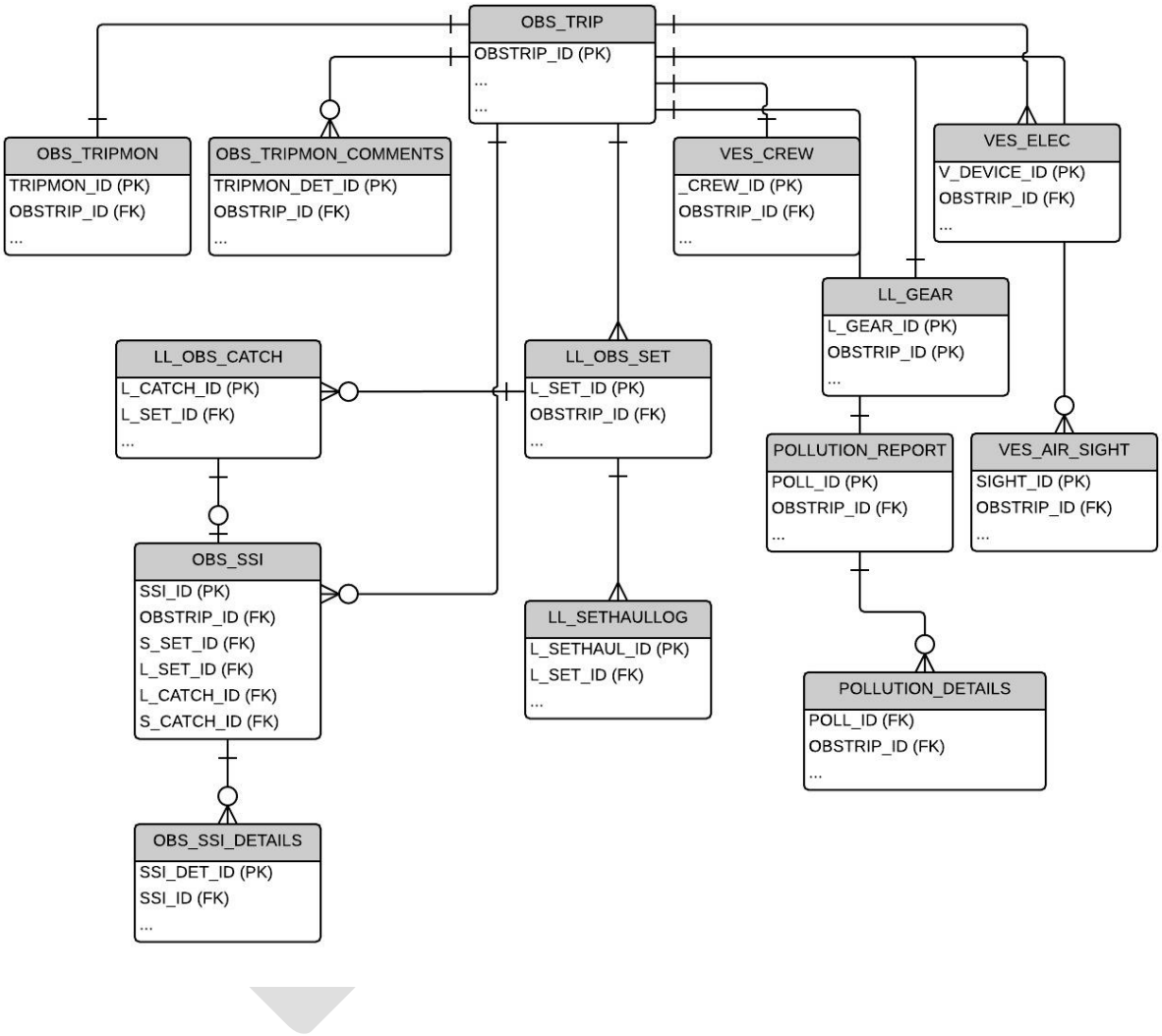
RESOURCING

The introduction and maintenance of EM systems is requiring, and will continue to require significant human and capital resources. The priorities for EM implementation and use need to be determined and sufficient funds need to be accessed to support its introduction in a planned manner.

LONGLINE OBSERVER EM PROCESS STANDARDS

DATA MODEL DIAGRAM

The following basic data model diagram outlines the structure of the entities and their relationships for longline operational OBSERVER data collected by E-Reporting systems and submitted to national and regional fisheries authorities. The tables that follow provide more information on the mechanisms of the links (relationships) between the entities.



TRIP-LEVEL DATA

- OBS_TRIP
- VES_CREW
- VES_ELEC
- LL_GEAR
- LL_TRIP_REPORT

OBS_TRIP

"The start of a trip is defined to occur when a vessel (a) leaves port after unloading part or all of the catch to transit to a fishing area or (b) recommences fishing operations or transits to a fishing area after transshipping part or all of the catch at sea (when this occurs in accordance with the terms and conditions

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
obsprg_code	OBSERVER SERVICE PROVIDERS identification– National or sub-regional observer programmes For national programmes, this is the COUNTRY_CODE + 'OB' for example, 'PGOB' – for the PNG national observer programme. For Sub-regional programmes, the following codes are used. 'TTOB' – US Multilateral Treaty Observer programme 'FAOB' – FSM Arrangement Observer Programme	OO	OO AG	Char (4)	Observer programme code must be must valid country. Refer to valid ISO two-letter Country Codes - ISO 3166	<obsprg_code>	Y	This should be Observer program code for the person responsible for reviewing the video and compiling ROP information. Will this always be a country code if a third party is providing the EM reading service? Consider use of another code instead of "OB" to be specific that data was EM collected.(e.g. "PGOO" or "PGEM") Needs to be reviewed by DCC WCPFC
staff_code	Observer field staff NAME CODE. This will be unique and link to information kept at the regional level including Observer Name, Nationality of observer, Observer provider. Currently generated by SPC currently	OO	OO	VarChar (5)	Staff code must exist in the regional Observer (FIELD_STAFF) Name Table. The unique 5-letter staff codes are generated and maintained by SPC/FFA.	<staff_code>	Y	This should be staff name code for the person responsible for reviewing the video and compiling ROP information (office observer) Does this field need to be modified to include a fifth character "V" for vessel observer and "O" for Office observer? Or should this be a completely separate field OBSTYPE?
staff_code_2	Additional staff NAME CODE. This will be unique and link to information kept at the regional level including Staff Name, Nationality of staff, Staff provider. Such additional staff may include port data collection officer that collects the PRE and POST data.	OO	OO					Identifies additional staff Needs to be reviewed / agreed by DCC WCPFC
Provider_code	Identifies the service provider	SETUP AG	SETUP AG					Identifies the service provider Needs to be reviewed / agreed by DCC WCPFC
Software_vers_A	Identifies the data analysis software version	AG	AG					Identifies the data analysis software version Needs to be reviewed / agreed by DCC WCPFC

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_TRIP

"The start of a trip is defined to occur when a vessel (a) leaves port after unloading part or all of the catch to transit to a fishing area or (b) recommences fishing operations or transits to a fishing area after transshipping part or all of the catch at sea (when this occurs in accordance with the terms and conditions

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
								Provide the link to the specific versions metadata
Software_vers_B	Identifies the EM equipment software version							Identifies the data analysis software version Needs to be reviewed / agreed by DCC WCPFC Provide the link to the specific versions metadata
tripno	Unique TRIPNO for each observer in a given year (Regional Standard) Use the last two digits of the trip year followed by a dash and increment number for each trip in a year FOR THAT OBSERVER. YY-XX, for example, '14-01' would represent the first trip for an observer in the calendar year 2014			Char (5)	Must adhere to the regional standard	<tripno>	N	Does this assume that the office observer must start and finish a Trip before the next one? If they have multiple trips, then this should be sequential based on which trip was started first. This can be uniquely identified through combination of vessel, Dep_date and Staff Incremental increase in trip numbers for an observer should include EM trips reviewed – The alternative is to have a code of EM collected data – which might be needed anyway?
tripno_internal	TRIPNO as allocated and used by the respective Observer service provider. (If this system is different from the regional standard (e.g. the US PS MLT observer programme trip number uses the format '24LP/xxx')			VarChar (15)		<tripno_INT>	N	This field might provide an opportunity for marking as an EM trip This can be uniquely identified through combination of vessel, Dep_date and Staff
DATE and TIME OF DEPARTURE	Depart DATE/TIME for the observer trip (Observer's departure) Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	OO PRE	AG OO PRE	REFER TO APPENDIX A1	Use UTC DATE for the departure date. **Should this be ships date and time?** **Must adhere to the ISO 8601 format in Appendix A1**	<dep_date>	Y	Transhipment at sea is an issue A standard is required defining a database of each port and a geofence. ***Needs tobe reviewed / agreed by DCC / WCPFC*** This may need to refer to start of trip (that can include transhipment) rather than return to port. Need to be reviewed by DCC / WCPFC.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_TRIP

"The start of a trip is defined to occur when a vessel (a) leaves port after unloading part or all of the catch to transit to a fishing area or (b) recommences fishing operations or transits to a fishing area after transshipping part or all of the catch at sea (when this occurs in accordance with the terms and conditions

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
DATE AND TIME OF ARRIVAL IN PORT	Return DATE/TIME for the observer trip (from the observer's point of view) Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	**OO POST**	**AG OO POST**	REFER TO APPENDIX A1	Use UTC DATE for the return date. **Should this be ships date and time?** **Must adhere to the ISO 8601 format in Appendix A1**	<ret_date>	Y	This may need to refer to end of trip (that can include transhipment) rather than return to port. Need to be reviewed by DCC / WCPFC. A standard is required defining a database of each port and a geofence. ***Needs tobe reviewed / agreed by DCC / WCPFC***
gear_code	Link to ref_gears table Selected by the office observer Could be determine by pre-trip vessel inspection or licencing information Automatically generarated from the vessel identifier and hardwired into the software	**OO PRE**	**AG SETUP**	Char (1)	Must be a valid GEAR: 'L' – Longline; 'S' – Purse seine; 'P' – Pole-and-line	<gear_code>	Y	In future it will almost certainly be derived from the vessel identfier automatically
FISHING PERMIT/LICENSE NUMBERS	PROVIDE License/Permit number that the vessel holds for the period of the TRIP.			CHAR(40)	Where possible, include validation to ensure the Permit format relevant to the agreement (national or sub-regional) complies to the required format.	<License_NO>	N	All that is needed is the vessel identifier and time preiod of the trip to link to licencing data The need for this with EM is questionable and the data is not used or accurate Review by DCC and WCPFC
VESSEL IDENIFIER	REFER TO APPENDIX A4	**SETUP**	**SETUP**					Ideally this would be UVI and programmed into the sogware during setup The service provider needs to have access to this data and vessel names
versn_id	Data standards version **This is version of the hardcopy form**			Int		<versn_id>	N	
XML_version_id		**SETUP**	**SETUP**		Refer to valid ISO two-letter Country Codes - ISO 3166			***Needs to be reviewed / agreed by DCC / WCPFC***
country_code	Two letter COUNTRY CODE for the country who organise the trip			Char (2)	Refer to valid ISO two-letter Country Codes - ISO 3166	<country_code>	Y	This is identical to the first two letter of OBSPRG

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OBS_TRIP

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FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
								Review by the DCC / WCPFC
PORT OF DEPARTURE	PROVIDE the Port of Departure Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	**OO PRE**	**AG OO PRE**	REFER TO APPENDIX A3	Must be valid United Nations - Code for Trade and Transport Locations (UN/LOCODE) – see http://www.unece.org/cefact/locode/service/location **Not mandatory?**	<DEP_PORT>	Y	A standard is required defining a database of each port and a geofence. ***Needs to be reviewed / agreed by DCC / WCPFC*** Automatically recorded from VMS / GPS
PORT OF RETURN	PROVIDE the Port of Return for Unloading Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a post-trip inspection	**OO POST**	**AG OO POST**	REFER TO APPENDIX A3	Must be valid United Nations - Code for Trade and Transport Locations (UN/LOCODE) **Not mandatory?**	<RET_PORT>	Y	A standard is required defining a database of each port and a geofence. ***Needs to be reviewed / agreed by DCC / WCPFC*** Automatically recorded from VMS / GPS
dep_lat	The actual depart LAT position for the trip (if departing AT SEA) Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	**OO PRE**	**AG OO PRE**	REFER TO APPENDIX A2	**Must adhere to the ISO 6709 – Positions** **Degrees and minutes to 3 decimal places** **Not mandatory?**	<dep_lat>	Y	A standard is required defining a database of each port and a geofence. ***Needs to be reviewed / agreed by DCC / WCPFC*** Automatically recorded from VMS / GPS
	The actual depart LON position for the trip (if departing AT SEA)				**Must adhere to the ISO 6709 – Positions**			

EM ready
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OBS_TRIP

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FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
dep_lon	Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	OO PRE	AG OO PRE	REFER TO APPENDIX A2	Degrees and minutes to 3 decimal places Not mandatory?	<dep_lon>	Y	A standard is required defining a database of each port and a geofence. *Needs to be reviewed / agreed by DCC / WCPFC* Automatically recorded from VMS / GPS
ret_lat	The actual return LAT position for the trip (if departing AT SEA) Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	OO POST	AG OO POST	REFER TO APPENDIX A2	Must adhere to the ISO 6709 – Positions Degrees and minutes to 3 decimal places Not mandatory?	<ret_lat>	Y	A standard is required defining a database of each port and a geofence. *Needs to be reviewed / agreed by DCC / WCPFC* Automatically recorded from VMS / GPS
ret_lon	The actual return LON position for the trip (if departing AT SEA) Obtained from other sources of data (e.g. VMS) Automatically generated by the vessel leaving a defined port box geofence. May be identified by office observer Recorded during a pre-trip inspection	OO POST	AG OO POST	REFER TO APPENDIX A2	Must adhere to the ISO 6709 – Positions Degrees and minutes to 3 decimal places Not mandatory?	<ret_lon>	Y	A standard is required defining a database of each port and a geofence. *Needs tobe reviewed / agreed by DCC / WCPFC* Automatically recorded from VMS / GPS
vesowner	NAME of the vessel owner	PRE	PRE	NVarChar (50)	Name and contact if possible of the owner of the vessel, if it is owned by a company, then use the company name.	<vesowner>	Y	This can be obtained
vescaptain	NAME of the captain of the vessel	PRE	PRE	NVarChar (50)		<vescaptain>	Y	
VESCAPT_NATION	NATIONALITY of the captain of the vessel	PRE	PRE	Char (2)	Refer to valid ISO two-letter Country Codes - ISO 3166 For example, refer to http://en.wikipedia.org/wiki/ISO_3166-1	<vescapt_CO_CODE>	Y	

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OBS_TRIP

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FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
	Two letter COUNTRY CODE for the country who organise the trip							
VESCAPT_ID_DOC	Captain's Document ID	PRE	PRE	NVarChar (20)		<VESCAPT_ID_DOC>	Y	
vesmaster	NAME of the fishing master	PRE	PRE	NVarChar (50)	Is there a annual list? (I doubt it)	<vesmaster>		
VESMAST_NATION	NATIONALITY of the vessel MASTER Two letter COUNTRY CODE for the country who organise the trip	PRE	PRE	Char (2)	Refer to valid ISO two-letter Country Codes - ISO 3166 For example, refer to http://en.wikipedia.org/wiki/ISO_3166-1	<vescapt_CO_CODE>	Y	
VESMAST_ID_DOC	FISHING MASTERS's Document ID	PRE	PRE	NVarChar (20)		<VESCAPT_ID_DOC>	Y	
crew_number	Total number of CREW onboard during the trip	PRE	PRE	Int		<crew_number>	Y	Recorded by the port data collection officer on FORM LL-1 and then entered into data capture screen
spill	FLAG to indicated the trip was a SPILL SAMPLE trip			Bit		<spill>	N	Don't think this is relevant to LL
cadet	FLAG to indicated whether the trip was observed by a CADET observer			Bit		<cadet>	N	This could relate to the office observer What credentials would indicate that officer observer is no longer a "cadet"
sharktarget	FLAG to indicate a trip has targeted SHARKS (LONGLINE trips only)			Bit		<sharktarget>	N	
comments	General comments about the trip	OO	OO	NText		<comments>	N	General comments
EM comments	General comments about EM the trip	OO	OO	NText		<comments>	N	Comments specifically regarding quality of EM information ***Needs tobe reviewed / agreed by DCC / WCPFC***

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

VES_CREW PROVIDE the summary details of VESSEL CREW by NATIONALITY on this TRIP.								
FIELD	Data Collection Instructions	Current Entry Source	Future Entry Source	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Issues
		SETUP PRE OO POST AG CF	SETUP PRE OO POST AG CF					
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
CREW IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + COUNTRY_CODE	CF	CF			<V_CREW_ID>	Y	
country_code	Nationality of the CREW	PRE SETUP	PRE SETUP	Char (2)	Refer to valid ISO two-letter Country Codes - ISO 3166 For example, refer to http://en.wikipedia.org/wiki/ISO_3166-1	<country_code>	Y	**Will require interview with skipper.**
crewcount	Total number of crew on board during the trip for this COUNTRY OF NATIONALITY	PRE	PRE	SmallInt		<crewcount>	Y	**Will require interview with skipper.**

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

VES_ELEC

PROVIDE information on the standard Marine Electronic devices.

FIELD	Data Collection Instructions	Current Entry Source	Future Entry Source	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
		SETUP PRE OO POST AG CF	SETUP PRE OO POST AG CF					
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
TRIP/VESSEL DEVICE IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + DEVICE_ID	CF	CF			<V_DEVICE_ID>	Y	
device_id	Marine Device CODE.	PRE SETUP	PRE SETUP	Int	Refer to APPENDIX 20 - the DEVICES should only be available according to the respective gear code (e.g. "S" for purse seine or "L" for longline is in the GEAR LIST CODES column)	<device_id>	Y	Will require pre-inspection interview with skipper and tour of wheelhouse.
ONBOARD_code	Is this DEVICE SIGHTED ONBOARD ?	PRE SETUP	PRE SETUP	Char (1)	'Y' or 'N'	<ONBOARD_code>	Y	As above
usage_code	Is this DEVICE USED ?			Char (3)	Refer to APPENDIX 21	<usage_code>	N	Use of cameras in the wheelhouse to capture use of vessel electrics is possible but may invade privacy May be able to be automatically generated from electrical monitoring of wheelhouse devices (other than cameras) e.g.sensors?
make_desc	Description of Make	PRE SETUP	PRE SETUP	NVarChar (30)	Dropdown List?	<make_desc>	N	As above
model_desc	Description of Model	PRE SETUP	PRE SETUP	NVarChar (30)	Dropdown List - Child of Make?	<model_desc>	N	As above
comments	Comments			NText	Free text	<comments>	N	As above

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_GEAR

PROVIDE information on the LONGLINE GEAR on the vessel.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
LL GEAR IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<L_GEAR_ID>	Y	
mlinehaul_ans	Mainline hauler (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<mlinehaul_ans>	Y	**Can be recorded by the OO only if in field of view of a camera.**
mlinehaul_usage_code	Link to ref_usage table	OO	OO	Char (3)	REFER TO APPENDIX 21	<mlinehaul_usage_code>	Y	**Can be recorded by the OO only if in field of view of a camera.**
mlinehaul_comments	Comments on Mainline Hauler	OO	OO	NVarChar (50)		<mlinehaul_comments>	N	**Can be recorded by the OO only if in field of view of a camera.**
blinehaul_ans	Branchline hauler (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<blinehaul_ans>	Y	**Can be recorded by the OO only if in field of view of a camera.**
blinehaul_usage_code	Link to ref_usage table	OO	OO	Char (3)	REFER TO APPENDIX 21	<blinehaul_usage_code>	Y	**Can be recorded by the OO only if in field of view of a camera.**
blinehaul_comments	Comments on Branchline Hauler	OO	OO	NVarChar (50)		<blinehaul_comments>	N	**Can be recorded by the OO only if in field of view of a camera.**
lshoot_ans	Line shooter (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<lshoot_ans>	Y	**Can be recorded by the OO only if in field of view of a camera.**
lshoot_usage_code	Link to ref_usage table	OO	OO	Char (3)	REFER TO APPENDIX 21	<lshoot_usage_code>	Y	**Can be recorded by the OO only if in field of view of a camera.**
lshoot_comments	Comments on Line shooter	OO	OO	NVarChar (50)		<lshoot_comments>	N	**Can be recorded by the OO only if in field of view of a camera.**
baitthr_ans	Automatic bait thrower (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<baitthr_ans>	Y	**Can be recorded by the OO only if in field of view of a camera.**

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

LL_GEAR PROVIDE information on the LONGLINE GEAR on the vessel.								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
baitthr_usage_code	Link to ref_usage table	OO	OO	Char (3)	REFER TO APPENDIX 21	<baitthr_usage_code>	Y	**Can be recorded by the OO only if in field of view of a camera.**
baitthr_comments	Comments on Automatic Bait thrower	OO	OO	NVarChar (50)		<baitthr_comments>	N	**Can be recorded by the OO only if in field of view of a camera.**
branchatt_ans	Automatic branchline attacher (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<branchatt_ans>	Y	**Can be recorded by the OO only if in field of view of a camera.**
branchatt_usage_code	Link to ref_usage table	OO	OO	Char (3)	REFER TO APPENDIX 21	<branchatt_usage_code>	Y	**Can be recorded by the OO only if in field of view of a camera.**
branchatt_comments	Comments on Automatic Branchline attacher	OO	OO	NVarChar (50)		<branchatt_comments>	N	**Can be recorded by the OO only if in field of view of a camera.**
wT_Sca_ans	Weighing scales (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<WT_SCA_ANS>	N	**Can be recorded by the OO only if in field of view of a camera.**
wT_Sca_usage_code	Weighing scales USAGE	OO	OO	Char (3)	REFER TO APPENDIX 21	<WT_SCA_USAGE_CODE>	N	**Can be recorded by the OO only if in field of view of a camera.**
wT_sca_comments	Comments on Automatic B Weighing scales	OO	OO	NVarChar (50)		<WT_SCA_COMMENTS>	N	**Can be recorded by the OO only if in field of view of a camera.**
mline_comp	Composition of mainline	SETUP PRE	SETUP PRE	NText		<mline_comp>	Y	
bline_comp	Composition of branchlines	SETUP PRE	SETUP PRE	NText		<bline_comp>	Y	
mline_mat	Mainline material	SETUP PRE	SETUP PRE	NVarChar (15)		<mline_mat>	Y	

EM ready
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EM with work
EM new field
EM not likely
EM redundant

LL_GEAR PROVIDE information on the LONGLINE GEAR on the vessel.								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
mline_mat_desc	Mainline material description	SETUP PRE	SETUP PRE	NVarChar (50)		<mline_mat_desc>	Y	
mline_len	Mainline length (nm) Recorded by the EM system after being flagged by the office observer.	OO -> AG	OO -> AG CF	Decimal (5,1)		<mline_len>	Y	This may be able to be calculated automatically using float markers and position
mline_diam	Mainline diameter (mm)	SETUP PRE	SETUP PRE	Decimal (4,1)		<mline_diam>	Y	
bline_mat1	Composition of branchlines (Material #1)	SETUP PRE	SETUP PRE	NVarChar (40)		<bline_mat1>	Y	
bline_mat1_desc	Branchlines (Material #1) description	SETUP PRE	SETUP PRE	NVarChar (50)		<bline_mat1_desc>	Y	
bline_mat2	Composition of branchlines (Material #2)	SETUP PRE	SETUP PRE	NVarChar (40)		<bline_mat2>	Y	
bline_mat2_desc	Branchlines (Material #2) description	SETUP PRE	SETUP PRE	NVarChar (50)		<bline_mat2_desc>	Y	
bline_mat3	Composition of branchlines (Material #3)	SETUP PRE	SETUP PRE	NVarChar (40)		<bline_mat3>	Y	
bline_mat3_desc	Branchlines (Material #3) description	SETUP PRE	SETUP PRE	NVarChar (50)		<bline_mat3_desc>	Y	
wiretrace_ans	Presence of wire trace (Y/N)	SETUP PRE OO	SETUP PRE OO	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<wiretrace_ans>	Y	Should be able to be detected by OO if sufficient clarity / definition
	Refrigeration method - Sea water ?				Must be 'Y', 'N' or 'X' (observer did	<seawater		

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_GEAR PROVIDE information on the LONGLINE GEAR on the vessel.								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
seawater_ans		SETUP PRE	SETUP PRE	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<seawater_ans>	Y	
blastfreezer_ans	Refrigeration method - blast freezer ?	SETUP PRE	SETUP PRE	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<blastfreezer_ans>	Y	
ice_ans	Refrigeration method - Ice ?	SETUP PRE	SETUP PRE	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<ice_ans>	Y	
chilledseawater_ans	Refrigeration method - Chilled Sea water ?	SETUP PRE	SETUP PRE	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<chilledseawater_ans>	Y	
otherstorage_ans	Refrigeration method - other ?	SETUP PRE	SETUP PRE	Char (1)	Must be 'Y', 'N' or 'X' (observer did not respond to this question)	<otherstorage_ans>	Y	
otherstorage_desc	Refrigeration method – other description	SETUP PRE	SETUP PRE	NVarChar (50)		<otherstorage_desc>	Y	
hksjapan_size	Japanese hook size	SETUP PRE	SETUP PRE	NVarChar (50)		<hksjapan_size>	Y	
hksjapan_perc	% of Japanese hook	SETUP PRE	SETUP PRE	TinyInt		<hksjapan_perc>	N	
hksjapan_ors	Japanese hook original size	SETUP PRE	SETUP PRE	NVarChar (5)		<hksjapan_ors>	Y	
hkscircle_size	Circle hook size	SETUP PRE	SETUP PRE	NVarChar (50)		<hkscircle_size>	Y	
hkscircle_perc	% of Circle hook	SETUP PRE	SETUP PRE	TinyInt		<hkscircle_perc>	N	
hkscircle_ors	Circle hook original size	SETUP PRE	SETUP PRE	NVarChar (5)		<hkscircle_ors>	Y	
	J hook size							

EM ready
EM Natural Key
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EM not likely
EM redundant

LL_GEAR PROVIDE information on the LONGLINE GEAR on the vessel.								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
hksj_size		SETUP PRE	SETUP PRE	NVarChar (50)		<hksj_size>	Y	
hksj_perc	% of J hook size	SETUP PRE	SETUP PRE	TinyInt		<hksj_perc>	N	
hksj_ors	J hook original size	SETUP PRE	SETUP PRE	NVarChar (5)		<hksj_ors>	Y	
hksoth_type	Other hook types description	SETUP PRE	SETUP PRE	NVarChar (50)		<hksoth_type>	Y	
hksoth_size	Other hook type size	SETUP PRE	SETUP PRE	NVarChar (50)		<hksoth_size>	Y	
hksoth_perc	% of Other hook types	SETUP PRE	SETUP PRE	TinyInt		<hksoth_perc>	N	
hksoth_ors	Others types of hook original size	SETUP PRE	SETUP PRE	NVarChar (5)		<hksoth_ors>	Y	
bline_mat1_diam	Branchlines (Material #1) diameter	SETUP PRE	SETUP PRE	Decimal (4,1)		<bline_mat1_diam>	Y	
bline_mat2_diam	Branchlines (Material #2) diameter	SETUP PRE	SETUP PRE	Decimal (4,1)		<bline_mat2_diam>	Y	

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_TRIP_REPORT PROVIDE descriptive information on the trip. Refer to the relevant sections in http://www.spc.int/OceanFish/en/publications/doc_download/1318-2014-ll-trip-report								
FIELD	**Data Collection Instructions**	**Future Entry Source** **SETUP PRE OO POST AG CF**	**Future Entry Source** **SETUP PRE OO POST AG CF**	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	N	The current hardcopy Trip Report has been designed with a focus on onboard observers. ***The fields required in an EM trip report needs to be reviewed by DCC / WCPFC.***
1_BACKGROUND	(Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<1_BACKGROUND>	N	The following can be populated from data already recorded: - Observer service provider - PDCO name - Office observer name
2_0_CRUISE_SUMMARY	(Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<2_0_CRUISE_SUMMARY>	N	Recorded by the office observer and Pre- and Post-inspections. The following can be populated / calculated from data already recorded: - Port of departure - Date and time of departure - Time between departure and start of first set - the number of fishing operations fully monitored by the office observer · The summary table in Appendix 1
2_1_Area_FISHED	(Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<2_1_Area_FISHED>	N	Recorded by the office observer. The following can be populated from data already recorded: - Range of latitudes and longitudes Or region / 5 degree blocks - Date and time of departure and return
2_2_END_OF_TRIP	(Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<2_2_END_OF_TRIP>	N	Recorded by the office observer and Pre- and Post-inspections. The following can be populated from data already recorded: - Port of return - Date and time of return The following can be calculated from data already recorded: - Time between end of last set and date and time of return

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_TRIP_REPORT

PROVIDE descriptive information on the trip.

Refer to the relevant sections in http://www.spc.int/OceanFish/en/publications/doc_download/1318-2014-ll-trip-report

FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
								- total number of fishing operations made by the vessel - the number of fishing operations fully monitored by the office observer - average number of hooks set per fishing operation
3_0_DATA_COLLECTED	(Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<3_0_DATA_COLLECTED>	N	Recorded by the office observer and Pre- and Post-inspections. A lot of this could be automatically completed by the EM database.
3_1_OTHER_DATA_COLL	(Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<3_1_OTHER_DATA_COLL>	N	Recorded by the office observer and Pre- and Post-inspections.
4_0_COC	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<4_0_COC>	N	Recorded by the office observer and Pre- and Post-inspections.
5_1_VESS_INFO	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_1_VESS_INFO>	N	Recorded by the office observer and Pre- and Post-inspections. Vessel details could be automatically populated from the vessel register (https://www.wcpfc.int/record-fishing-vessel-database) including: - Owner - Tonnage - Length - Freezer capacity
5_2_CREW_NATION	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<5_2_CREW_NATION>	N	Recorded Pre- and Post-inspections.
5_2_1_PIC	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<5_2_1_PIC>	N	Recorded Pre- and Post-inspections.
5_3_ELEC	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<5_3_ELEC>	N	Recorded Pre- and Post-inspections.
5_3_1_RADIO_BUOYS	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<5_3_1_RADIO_BUOYS>	N	Recorded Pre- and Post-inspections.
5_4_FISHING_GEAR	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<5_4_FISHING_GEAR>	N	Recorded Pre- and Post-inspections.
5_4_1_MAINLINE	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_4_1_MAINLINE>	N	Recorded by the office observer and Pre- and Post-inspections.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_TRIP_REPORT

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
5_4_2_BRANCHLINES	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_4_2_BRANCHLINES>	N	Recorded by the office observer and Pre- and Post-inspections. The following can be calculated from data already recorded: - Average branchline length for trip - Average branchline length per set - Average number of branchlines used - Average number of sharklines per set from sum(FLOAT_HOOK_N) / number of sets
5_4_3_FLOATLINES	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_4_3_FLOATLINES>	N	Recorded by the office observer and Pre- and Post-inspections. The following can be calculated from data already recorded: - Average float line (FLOAT_LENGTH) - Average float line per set (FLOAT_LENGTH)
5_4_4_bline_wts	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_4_4_bline_wts>	N	Recorded by the office observer and Pre- and Post-inspections.
5_4_5_FISH_HOOKS	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_4_5_FISH_HOOKS>	N	Recorded by the office observer and Pre- and Post-inspections. The following can be calculated from data already recorded: - Total number and percentage of hooks per set by hook type - Total number and percentage of hooks per trip by hook type
5_5_safety_eq	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<5_5_safety_eq>	N	Not really relevant, but could be reported by PDCO.
5_6_REGRIG	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_6_REGRIG>	N	Recorded by the office observer and Pre- and Post-inspections.
5_7_OTHER_GEAR	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<5_7_OTHER_GEAR>	N	Recorded by the office observer and Pre- and Post-inspections.
6_0_fISH_STRATEGY	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_0_fISH_STRATEGY>	N	Recorded by the office observer and Pre- and Post-inspections.
6_1_FISHERY_INFO	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_1_FISHERY_INFO>	N	Recorded by the office observer and Pre- and Post-inspections.

EM ready
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EM redundant

LL_TRIP_REPORT

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
6_2_OCEAN_fEATURES	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_2_OCEAN_fEATURES>	N	Recorded by the office observer and Pre- and Post-inspections.
6_3_set_hAUL	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_3_set_hAUL>	N	Recorded by the office observer and Pre- and Post-inspections. A summary table could be automatically generated from the data already recorded for each set: - Start set time - Set duration - Start haul time - Haul duration - Average number of hooks per basket
6_4_TARGET_DEPTH	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_4_TARGET_DEPTH>	N	Recorded by the office observer and Pre- and Post-inspections.
6_5_BAITING	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_5_BAITING>	N	Recorded by the office observer and Pre- and Post-inspections. Bait sequence could be automatically summarised from data provided in LL-2/3 for each set.
6_6_MITIGATION	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_6_MITIGATION>	N	Recorded by the office observer and Pre- and Post-inspections. A list of mitigation methods automatically summarised from data provided in LL-2/3 for each set.
6_6_1_FISH_OFFAL	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_6_1_FISH_OFFAL>	N	Recorded by the office observer and Pre- and Post-inspections. The Sol Is report stated that “This information can only be collected onboard the fishing vessel during the trip. It would require the video to adequately identify the vessel’s practice with respect to disposal of offal.” But it could be obtained from interview with the skipper.
6_7_hAUL_PROCESS	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<6_7_hAUL_PROCESS>	N	Recorded by the office observer and Pre- and Post-inspections.
6_8_UNUSUAL_SET	Refer to relevant section in link above) **Recorded by the OO.**	OO	OO	NText		<6_8_UNUSUAL_SET>	N	Recorded by the OO.

EM ready
EM with work
EM not likely
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EM redundant

LL_TRIP_REPORT

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
6_9_CHANGES_SETS	Refer to relevant section in link above)	OO	OO	NText		<6_9_CHANGES_SETS>	N	Recorded by the OO. Summary tables of select set characteristics could be automatically generated.
7_1_WEATHER	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<7_1_WEATHER>	N	Recorded by the office observer and Pre- and Post-inspections.
7_2_sEA_cond	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<7_2_sEA_cond>	N	Recorded by the office observer and Pre- and Post-inspections.
7_3_MOOn_phase	Refer to relevant section in link above)	OO	OO	NText		<7_3_MOOn_phase>	N	Recorded by the PDCO from interviews and moon phase table / calculation. Summary graph of catch by species against moon phase could be automatically produced.
8_1_tARGET_cATCH	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_1_tARGET_cATCH>	N	Recorded by the office observer and Pre- and Post-inspections. Summary table could be automatically produced for each shot showing - Target species (common name followed by the scientific name and FAO code) - Appendix 2 - Catch statistics and catch fate
8_1_1_tARGET_pROC	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_1_1_tARGET_pROC>	N	Recorded by the office observer and Pre- and Post-inspections. The quality of this information could depend on wheter there is a camera over the area of processing.
8_1_2_Target_disc	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_1_2_Target _disc>	N	Recorded by the office observer (discards) and Pre- and Post-inspections. Summary table could be automatically produced for the trip showing - Target species (common name followed by the scientific name and FAO code) discarded for each fate category
	Refer to relevant section in link above)							Recorded by the OO.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_TRIP_REPORT

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
8_1_3_Target_damage		PRE OO POST	PRE OO POST	NText		<8_1_3_Target_damage>	N	Summary table could be automatically produced for the trip showing - Target species (common name followed by the scientific name and FAO code) retained or discarded for each “damage” fate category
8_2_1_Other_tun_bill	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_2_1_Other_tun_bill>	N	Recorded by the office observer and Pre- and Post-inspections. (for processing is not visible to EM). Summary table of all non-target tuna and billfish could be automatically produced for the trip showing - Species (common name followed by the scientific name and FAO code) - Summary details listed Appendix 2
8_2_2_Sharks_rays	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_2_2_Sharks_rays>	N	Recorded by the office observer and Pre- and Post-inspections. (for processing is not visible to EM). Summary table of all sharks and rays could be automatically produced for the trip showing - Species (common name followed by the scientific name and FAO code) - Summary details listed Appendix 2
8_2_3_Other_by-catch	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_2_3_Other_by-catch>	N	Recorded by the office observer and Pre- and Post-inspections. (for processing is not visible to EM). Summary table of all other bycatch species could be automatically produced for the trip showing - Species (common name followed by the scientific name and FAO code) - Summary details listed Appendix 2
8_3_Unspec_sp_codes	Refer to relevant section in link above)			NText		<8_3_Unspec_sp_codes	N	Recorded by the OO.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_TRIP_REPORT

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
oues						>		
8_4_1_Ssi_land	Refer to relevant section in link above)	OO	OO	NText		<8_4_1_Ssi_land>	N	Recorded by the OO. Table of all landed SSI individuals automatically produced for the trip showing - Species (common name followed by the scientific name and FAO code) - Gender - Size - Description of interaction (including prior sighting, treatment, problems with ID) - Condition when landed - Condition when released
8_4_2_Ssi_interact	Refer to relevant section in link above)	OO	OO	NText		<8_4_2_Ssi_interact>	N	Recorded by the OO. Table of all SSIs that interacted with vessel or gear only automatically produced for the trip showing - Species (common name followed by the scientific name and FAO code) - Condition at start of interaction - Condition at end of interaction Check to see if this is just for Purse seine
8_4_3_Ssi_mam	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_4_3_Ssi_mam>	N	Recorded by the office observer and Pre- and Post-inspections.
8_4_4_Ssi_sight	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<8_4_4_Ssi_sight>	N	Recorded by the office observer and Pre- and Post-inspections. Table of all SSIs that interacted with vessel or gear only automatically produced for the trip showing - Species (common name followed by the scientific name and FAO code) - Number of adults/juvs - Condition at end of interaction - Sight distance - Sight behaviour

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_TRIP_REPORT

PROVIDE descriptive information on the trip.

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
								From the Sol Is report "E-Monitoring is useful for collecting information on the landings of Species of Special Interest (SSIs), but the equipment may not be appropriately placed to collect information on the sightings of SSIs."
9_0_TRANS	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<9_0_TRANS>	N	Recorded by the office observer and Pre- and Post-inspections. Some mention of EM being hooked up to cranes to collect transhipment data.
10_1_Tags	Refer to relevant section in link above)			NText		<10_1_Tags>	N	Not applicable unless industry tag animals.
10_2_Stomach	Refer to relevant section in link above)			NText		<10_2_Stomach>	N	Not applicable unless industry take stomach samples.
10_3_Other	Refer to relevant section in link above)			NText		<10_3_Other>	N	Not applicable unless industry take data for other projects.
11_0_ TRIP_MON	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<11_0_ TRIP_MON>	N	Recorded by the office observer and Pre- and Post-inspections.
11_1_Clarify	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<11_1_Clarify>	N	Recorded by the office observer and Pre- and Post-inspections. This should be under 13 - General
11_2_Recommend	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<11_2_Recommend>	N	Recorded by the office observer and Pre- and Post-inspections. This should be under 13 - General
11_3_Crew_info	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<11_3_Crew_info>	N	Recorded from Pre- and Post-inspections. This should be under 13 - General
11_4_Medical	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<11_4_Medical>	N	Recorded from Pre- and Post-inspections. This should be under 13 - General
11_5_Photos	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<11_5_Photos>	N	Recorded by the office observer and Pre- and Post-inspections. This should be under 13 - General
11_6_other_info	Refer to relevant section in link above)	PRE OO	PRE OO	NText		<11_6_othe	N	Recorded by the office observer and Pre- and Post-inspections.

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

LL_TRIP_REPORT

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FIELD	Data Collection Instructions	Future Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
11_0_Other_Info		OO POST	OO POST	NText		r info>	N	This should be under 13 - General
12_0_VESS _DATA	Refer to relevant section in link above)	PRE POST	PRE POST	NText		<12_0_VESS _DATA>	N	Recorded from Pre- and Post-inspections.
13_0_GENERAL	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<13_0_GENE RAL>	N	Recorded by the office observer and Pre- and Post-inspections. This could include problems with the EM system including location and angle of cameras.
14_0_PROBs	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<14_0_PROB s>	N	Recorded by the office observer and Pre- and Post-inspections.
14_1_Form_ch_recs	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<14_1_Form _ch_recs>	N	Recorded by the office observer and Pre- and Post-inspections.
15_0_CONCL	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<15_0_CONC L>	N	Recorded by the office observer and Pre- and Post-inspections.
16_0_ACKs	Refer to relevant section in link above)	PRE OO POST	PRE OO POST	NText		<16_0_ACKs >	N	Recorded by the office observer and Pre- and Post-inspections.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

SET-LEVEL DATA

- LL_OBS_SET
- LL_SETHAULLOG
- LL_OBS_CATCH

LL_OBS_SET The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** SETUP PRE OO POST AG CF	**Future Entry Source** SETUP PRE OO POST AG CF	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
SET IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME	CF	CF			<L_SET_ID>	Y	
set_number	Unique # for the SET in this trip Can be filled out by an office observer viewing footage or automatically generated from a variety of the EM system components	**OO AG**	**OO AG**	Int		<set_number>	N	Increases sequentially throughout the trip in the order that they happen. Set number will normally be the same as the vessel's set number.
observed_yn	Flag to indicate whether set was observed or not. Were all the start and end positions observed directly	**OO**	**OO**	Bit		<observed_yn>	N	This is not a clear/appropriate definition for the EM process. *Needs to be reviewed by DCC / WCPFC.*
set_date	Start Date/time for set. Date/time when the first bouy is thrown into the water (radio bouy or normal bouy) Can be filled out by an office observer viewing images or automatically generated from a variety of the EM system components	**OO AG**	**OO -> AG AG**	REFER TO APPENDIX A1	Use UTC DATE/TIME. **Ship's date was the standard for hardcopy forms** **Must adhere to the ISO 8601 format in Appendix A1** **Must be after Date and time of departure from port and before date and time of return to port**	<set_date>	Y	Recorded by the EM system when flagged by the office observer (or is this flagged by the gear sensors?). Inherent in most EM systems using OO visual or combination of camera / sensor / GPS Position is also a requirement but captured elsewhere
	Number of hooks between floats							This was an issue in the Sol Is trial. Observers frequently lost count. They found this was the "most difficult to compile based issues identified in the comparison between the data collected by the on-board and office observers".

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_SET

The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
hk_bt_flt	Office observer interpret from images. Determine whether it is more efficient / accuate done on set or haul. Could be evaluated by total hooks per basket and then total floats per basket. Longer term there is potential for AG through serial interface connection with Linemaster or electronic tagging of hooks and floats	OO	OO CF Possible AG	SmallInt	Must be 1-60, or -1 for no information.	<hk_bt_flt>	Y	They recommended that float and hook counts be built into the EM systems if possible to ensure accurate and time efficient data collection. Potential for use of EM equipment to count hooks exists but there is a trade off with costs. It is also time intensive for OO to record from visual On LL-2/3, there is only one record per set, and the instructions call it the "most common or average data during setting".
bask_set	Number of baskets set. Office observer interpret from images. Can be calculated as the total number of floats - 1	OO	OO Possible AG	SmallInt		<bask_set>	Y	Not as big an issue, but as for HK_BT_FLT
bask_observed	Number of baskets observed (bottom of form, Nov 07 version) Office observer interpret from images. The intent is to monitor the entire haul of a set (not a subset of baskets)	OO	OO CF AG	SmallInt		<bask_observed>	Y	Field is critical for CPUE This can be different from above due to tangles / equipment malfunction. The office observer should record the number of baskets observed.
hook_set	Total number of hooks set. Office observer interpret from images. Determine whether it is more efficient / accuate done on set or haul. Could be calculated by hooks per basket x no. of baskets Longer term there is potential for AG through serial interface connection with Linemaster or electronic tagging of hooks and floats	CF	CF Possible AG	SmallInt	If no information (-1) in HK_BT_FLT or BASK_SET, then HOOK_SET = -1	<hook_set>	Y	Automatically calculated from the number of hooks between baskets x the number of baskets. That is how its calculated for the datasheet, and there is no point the observer doing the calculation.
hook_observed	Number of hooks observed and data recorded. Could be calculated from HK_BT_FLT x bask_observed	OO	OO CF AG	SmallInt		<hook_observed>	Y	This could be calculated from HK_BT_FLT x bask_observed

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_SET

The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
float_length	Length of floatline (m) **Very difficult to monitor**	PRE	PRE	SmallInt		<float_length>	Y	Recorded by the port data collection officer on FORM LL-2/3 and then entered into data capture screen
lspeed	Line setting speed. Can be calculated from rotational speed of roller on shooter Possisbly CF from	AG	AG CF?	Decimal (5,1)	If no information (-1) in HK_BT_FLT or BRANCH_DIST or HOOK_SET, then LSPEED = 1	<lspeed>	Y	Observers only record this when there is a line shooter onboard with a visible line setting guide, otherwise they indicate its absence with a "-".
lspeed_unit_id	Link to ref_ids table	AG	AG	CHAR(1)	Must be 'M' for metres/second or 'K' for knots	<lspeed_unit_id>	Y	If this was calculated as above, the units should always be m/s
branch_intvl	Time interval (secs.) between branchline sets. Use timestamp for sequential branchlines **Serial interface with linemaster (AG)** Total time beacon to beacon and number of branchline sets Use audio beeps	OO CF	OO CF AG	SmallInt		<branch_intvl>	Y	In accordance with the LL Observer Guide, they should calculate the average time between when two branchlines are attached over at least three baskets. Although this could be calculated by the EM syster
branch_dist	Mainline distance between branchlines (m).	CF	CF	Decimal (4,1)	If no information (-1) in LSPEED or BRANCH_INTVL, then BRANCH_DIST = -1	<branch_dist>	Y	Automatically calculated from LSPEED (m/s) x BRANCH_INTVL
vessel_SET_speed	Vessel setting Speed (Knots). Automatically generated from EM system components (VMS, GPS)	AG CF	AG CF	Decimal (5,1)		<vessel_SET_speed>	N	This should be available from the VMS / GPS. The LL Observer Guide is fairly loose about what the average vessel speed is "Use the GPS to record the average vessel setting speed in knots. It is best to watch the GPS for several seconds at a time and also to check it a number of times during setting"

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

LL_OBS_SET The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** SETUP PRE OO POST AG CF	**Future Entry Source** SETUP PRE OO POST AG CF	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	Notes
	Calculated from waypoints / time							Average vessel speed could be calculated by the EM system as the average speed between start_set and end_set time?
lightsticks	Number of lightsticks used Very difficult to monitor Use PRE to identify presence / absence. Compare this field with targeting field.	PRE OO	PRE OO	SmallInt		<lightsticks>	Y	The office observershould record the number of light sticks between one basket per set. This could be automatically multiplied by the number of baskets with the addition of another field in the EM system "LIGHTSTICKS_BASKET" which is for data entry of the number of light sticks used in one basket. That field is ther not picked up by the data loaded for the TUBS system. Sub-sampling may not be appropriate for accuracy. Full monitoring may be required The Sol Is report suggests that "The existence of TDRs and light-sticks can be checked prior to the trip and so it is not necessary to attE-Monitoring to obtain information for these fields on a set by set basis (but the pre-trip inspection would need to identify this)." But this only informs of their presence, not the number used. The observer Guide says "If the vessel is using light sticks, count the total number of light sticks used during the set. Generally, they are not placed on every single hook, so calculate the number of light sticks that are placed in one basket and multiply that number by the total number of baskets to get the total number of light sticks"

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_SET

The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TDRs	Number of Time Depth recorders used Very difficult to monitor Use PRE to identify presence / absence. Compare this field with targeting field.	PRE OO	PRE OO	SmallInt	There should be something in here that requires a value so that you know a 0 means none were used.	<TDRs>	Y	The Sol Is report suggests that "The existence of TDRs and light-sticks can be checked prior to the trip and so it is not necessary to attE-Monitoring to obtain information for these fields on a set by set basis (but the pre-trip inspection would need to identify this)." But this only informs of their presence, not the number used. The Observer Guide talks about them as if they are deployed by the observer. And just asks was at least one deployed ("Y" or "N"). Same with the datasheet LL – 2/3 But the ROP and Sol Is report specify the number of TDRs, and the ROP states that this field refers to "Does the vessel use TDRs on its line, record the number it may use and where along the mainline they attach them to the branch lines."
branch_length	Length of branchline (m) (If all are of a consistent length, otherwise use next set of fields). **SEE FLOATLINE** **Potential use of colour-coded branchlines**	PRE	PRE	Decimal (4,1)		<branch_length>	Y	Very difficult for OO to determine
branch_0_20	Number of branchlines between successive floats that are < 20 m.	-	-	SmallInt		<branch_0_20>	Y	Very difficult for OO to determine
branch_20_34	Number of branchlines between successive floats that are 20-35 m.	-	-	SmallInt		<branch_20_34>	Y	Very difficult for OO to determine
branch_35_50	Number of branchlines between successive floats that are 35-50 m.	-	-	SmallInt		<branch_35_50>	Y	Very difficult for OO to determine
branch_50_99	Number of branchlines between successive floats that are > 50 m.	-	-	SmallInt		<branch_50_99>	Y	Very difficult for OO to determine

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_SET

The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
FLOAT_hook_n	The total number of hooks that have been hung directly from the floatline for this set. INCLUDE FLOAT HOOK LENGTH AS NEW FIELD	OO	OO	SmallInt		<FLOAT_hook_n>	Y	The office observer should record the shark lines observed being attached to floats during setting. Assume this is the "SHARK LINES on floats (Hook No.99s)" on the datasheet.
FLOAT_hook_l						<FLOAT_hook_l>		This needs to be checked was not in observer ER
tar_sp_code	Target Species id recorded on the form for this set (refer to the SPECIES table)	OO	OO	Char (3)	REFER TO APPENDIX 8.	<tar_sp_code>	Y	The Sol Is reported noted "Target species" at the set level should be determined from a combination of setting attributes (e.g. gear configuration and bait). Otherwise, the main target species should be known prior to and after the trip (e.g. examination of species composition of the catch)." Will need to be inferred by the OO from the gear.
target_tun_yn	ADDITIONAL FLAG indication for MULTIPLE targeting	OO	OO	Bit		<target_tun_yn>	Y	A combination of information from the pre-inspection and the gear configuration in the video, with the final decision made by the office observer.
target_swo_yn	ADDITIONAL FLAG indication for MULTIPLE targeting	OO	OO	Bit		<target_swo_yn>	Y	As above
target_skh_yn	ADDITIONAL FLAG indication for MULTIPLE targeting	OO	OO	Bit		<target_skh_yn>	Y	As above
setdetails	General notes on the setting procedures. Any comments relating to the setting strategy. For example has there been any specific targetting of shark in this set.	OO	OO	NText		<setdetails>	N	The office observer should record the general comments of set details.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_SET

The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
bait1_sp_code	Bait species id. # 1	PRE OO	PRE OO	Char (3)	REFER TO APPENDIX 8.	<bait1_sp_code>	Y	The office observer should record the bait species. Camera position and resolution needs to enable this identification
bait2_sp_code	Bait species id. # 2	PRE OO	PRE OO	Char (3)	REFER TO APPENDIX 8.	<bait2_sp_code>	Y	As above
bait3_sp_code	Bait species id. # 3	PRE OO	PRE OO	Char (3)	REFER TO APPENDIX 8.	<bait3_sp_code>	Y	As above
bait4_sp_code	Bait species id. # 4	PRE OO	PRE OO	Char (3)	REFER TO APPENDIX 8.	<bait4_sp_code>	Y	As above
bait5_sp_code	Bait species id. # 5	PRE OO	PRE OO	Char (3)	REFER TO APPENDIX 8.	<bait5_sp_code>	Y	As above
bait1_w	Weight of bait species #1 used, (kg) Determined by camera placement and view during setting. May be difficult	OO?	OO?	SmallInt		<bait1_w>	N	Camera will need to be positioned so that it can view the baiter
bait2_w	Weight of bait species #2 used, (kg)	OO?	OO?	SmallInt		<bait2_w>	N	As above
bait3_w	Weight of bait species #3 used, (kg)	OO?	OO?	SmallInt		<bait3_w>	N	As above
bait4_w	Weight of bait species #4 used, (kg)	OO?	OO?	SmallInt		<bait4_w>	N	As above
bait5_w	Weight of bait species #5 used, (kg)	OO?	OO?	SmallInt		<bait5_w>	N	As above
bait1_h	Hook number(s) in basket that Bait 1 was placed	OO?	OO?	NVarChar (25)	(Hook numbers separated by commas)	<bait1_h>	N	The office observer should record the hook numbers for each bait type.
bait2_h	Hook number(s) in basket that Bait 2 was placed	OO?	OO?	NVarChar (25)	(Hook numbers separated by commas)	<bait2_h>	N	As above
bait3_h	Hook number(s) in basket that Bait 3 was placed	OO?	OO?	NVarChar (25)	(Hook numbers separated by commas)	<bait3_h>	N	As above
bait4_h	Hook number(s) in basket that Bait 4 was placed	OO?	OO?	NVarChar (25)	(Hook numbers separated by commas)	<bait4_h>	N	As above
bait5_h	Hook number(s) in basket that Bait 5 was placed	OO?	OO?	NVarChar (25)	(Hook numbers separated by commas)	<bait5_h>	N	As above
bait1_dyed_yn	FLAG indication on dyed on bait #1	PRE OO	PRE OO	SmallInt		<bait1_dyed_yn>	Y	As above

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_SET The observer must PROVIDE the following information for EACH FISHING SET/HAUL during the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** SETUP PRE OO POST AG CF	**Future Entry Source** SETUP PRE OO POST AG CF	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	Notes
bait2_dyed_yn	FLAG indication on dyed on bait #2	PRE OO	PRE OO	SmallInt		<bait2_dyed_yn>	Y	As above
bait3_dyed_yn	FLAG indication on dyed on bait #3	PRE OO	PRE OO	SmallInt		<bait3_dyed_yn>	Y	As above
bait4_dyed_yn	FLAG indication on dyed on bait #4	PRE OO	PRE OO	SmallInt		<bait4_dyed_yn>	Y	As above
bait5_dyed_yn	FLAG indication on dyed on bait #5	PRE OO	PRE OO	SmallInt		<bait5_dyed_yn>	Y	As above
tori_poles_yn	FLAG indication on tori poles used	PRE OO	PRE OO	SmallInt		<tori_poles_yn>	Y	Presence should be determined from pre-inspection but use should be verified for each set by the office observer Camera will need to be positioned so that it can view the extent of the tori line
bird_curtain_yn	**PRE to determine whether they are onboard** **OO to determine whether they are used if yes for above**	**PRE** **OO**	**PRE** **OO**	SmallInt		<bird_curtain_yn>	Y	Presence should be determined from pre-inspection but use should be verified for each set by the office observer Camera will need to be positioned so that it can view both bird curtains while deployed.
wT_lines_yn	FLAG indication on weighted lines used Difficult to detect if weight is away from the hook	**OO**	**OO**	SmallInt		<wT_lines_yn>	Y	Presence should be determined from pre-inspection but use should be verified for each set by the office observer
uW_chute_yn	FLAG indication on underwater chute used	**PRE** **OO**	**PRE** **OO**	SmallInt		<uW_chute_yn>	Y	Although the presence of an underwater chute might be recorded from pre inspection, it can not be assumed that this will always be used. Could be hard to see with a camera.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_SETHAULLOG

The E-Reporting system must PROVIDE the following log information for EACH SET/HAUL during the period of the trip, typically on a 60-minute basis.

FIELD	Notes on Data Collection Guidelines	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
SET IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME	CF	CF			<L_SET_ID>	Y	
SETHAUL LOG IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME + LOG DATE + LOG TIME	CF	CF			<L_SETHAULOG_ID>	Y	
log_date	Date/TIME of log reading The date/time of the beginning of haul	OO -> AG	OO -> AG	REFER TO APPENDIX A1	**Must adhere to the ISO 8601 format in Appendix A1**	<log_date>	Y	In accordance with instructions on the back of logsheet FORM LL2/3, this could be set to automatically record details every half or 1 hour.
sethaul	Status of gear at this logged date/time : Set (S) Haul (H), Soak (K) or Float retrieved (F)	OO	AG	Char (4)	Must be either 'S', 'H', 'K' or 'F'	<sethaul>	Y	Datasheets and Observer Guide only ask for the haul log on hauling. But this could easily be recorded by the person responsible for reviewing the video and compiling ROP information. ***Now redundant due to field below - DCC / WCPFC tro review***
stend_id	Indicator for status of the SET-HAUL 83 – First log record for the SET (start of SET information) 84 – Last log record for the SET (end of SET information) 85 – First log record for the HAUL (start of HAUL information) 86 – Last log record for the HAUL (end of HAUL information) 87 - Location during setting per time period 88 – Location during haul per time period 91 – Float retrieval	 OO OO OO OO CF CF OO	 OO AG OO AG OO AG OO AG CF CF OO AG	Int	Must be 83, 84, 85, 86, 91 or NULL	<stend_id>	Y	As above, but this could easily be recorded by the person responsible for reviewing the video and compiling ROP information. Need to date/time each float retreived is being reviewed Can be calculated after the event For OO - only needs to record Start_Set End_Set Start_Haul End_Haul. Time period may be changed in future from 60 minutes All events are timestamp and position Should match VMS At this stage we don't know exactly how this will be done

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_SETHAULLOG

The E-Reporting system must PROVIDE the following log information for EACH SET/HAUL during the period of the trip, typically on a 60-minute basis.

FIELD	Notes on Data Collection Guidelines	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
	Potential additions for review by DCC / WCPFC - Line Breaks - Line retrieval - Line tangles - Line rehaul - and others							Should we just mark float set and float haul events. If floats are electronically tagged then this will be AG.
lat		OO -> AG	AG	REFER TO APPENDIX A2	**Must adhere to the ISO 6709 format in Appendix A2**	<lat>	Y	This could be set to automatically record details at a finer timescale
lon		OO -> AG	AG	REFER TO APPENDIX A2	**Must adhere to the ISO 6709 format in Appendix A2**	<lon>	Y	This could be set to automatically record details at a finer timescale
comments	Office observer records any comments	OO	OO	NText		<comments>	N	Recorded by the office observer.
FLOAT_ID	Unique identifier for the Float retrieved Could be sequential or Timestamp In future could use tagged bouys (RFID for example)	OO	OO AG	NVARCHAR(15)	Only used when Float retrieved (STEND_ID = 91) **E-Monitoring ONLY**	<FLOAT_ID>	N	Maybe whenever a float comes onboard, the observer flags it " Float retrieved", and each float is given a sequential number from 1 to … Review by DCC or WCPFC
HK_BT_FLT	Hooks between this float retrieved and the next float Collect through the timestamp	OO	OO AG	SmallInt	Must be 1-60, or -1 for no information. Only used when Float retrieved (STEND_ID = 91)	<hk_bt_flt> Maybe needs to be renaemd so as not to conflict <log_hk_bt_flt>	N	Recorded by the person responsible for reviewing the video and compiling ROP information. If this could be done then this field could be used for the LL_OBS_SET

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_CATCH The observer must PROVIDE the following CATCH DETAILS for EACH FISHING HAUL for the period of the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** **SETUP PRE OO POST AG CF**	**Future Entry Source** **SETUP PRE OO POST AG CF**	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	**Notes**
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	**CF**	**CF**			<OBSTRIP_ID>	Y	
SET IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME	**CF**	**CF**			<L_SET_ID>	Y	
CATCH IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME + CATCH EVENT DATE + CATCH EVENT TIME	**CF**	**CF**			<L_CATCH_ID>	Y	
CATCH_date	Date/TIME of individual catch event Recorded by the EM system after being flagged by the office observer. Possible AG through video recognition software of catch events	**OO -> AG**	**OO -> AG** **AG**	REFER TO APPENDIX A1	**Must adhere to the ISO 8601 format in Appendix A1**	<catch_date>	Y	
lat	Latitude (long format) Recorded by the EM system after being flagged by the office observer.	**OO -> AG**	**OO -> AG** **AG**	REFER TO APPENDIX A2	Position of each catch event **E-Monitoring ONLY**	<lat>	N	
lon	Longitude (long format) Recorded by the EM system after being flagged by the office observer.	**OO -> AG**	**OO -> AG** **AG**	REFER TO APPENDIX A2	Position of each catch event **E-Monitoring ONLY** **Must adhere to the ISO 6709 format in Appendix A2**	<lon>	N	
hook_no	Hook number (since the last float). Hook number=99 represents catch on a hook hanging directly from the floatline. Counted by the office observer. Can also be counted as the 'No. of hooks per basket' minus the count of hooks until the next float. Automatically generated possible if Smart Hooks/Clips or rotation of line coiler. Could also use timestamp of catch event (down to second) against float event as a calculated field.	**OO** **CF**	**OO** **CF** **Possible AG**	SmallInt		<hook_no>	Y	**Recorded by the office observer.** If smarthooks then this field can link to set_haul log automatically
	Species code. Identified by office observer		**OO**					Camera lens clarity is important

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_CATCH The observer must PROVIDE the following CATCH DETAILS for EACH FISHING HAUL for the period of the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** SETUP PRE OO POST AG CF	**Future Entry Source** SETUP PRE OO POST AG CF	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	**Notes**
sp_code	Possible AG through video recognition software	OO	OO Possible AG	Char (3)	REFER TO APPENDIX 8.	<sp_code>	Y	
fate_code	FATE of this catch. This indicates whether it was RETAINED, DISCARDED or ESCAPED, and any specific processing. Office observer to use range of cameras to determine the fate.	OO	OO	Char (3)	REFER TO APPENDIX 9 Only shark species can have a FATE as 'RFR' and 'DFR'.	<fate_code>	Y	Need clear definitions.
cond_code	CONDITION of this catch on LANDING. Relevant for the Species of Special Interest. Identified by office observer	OO	OO	Char (2)	REFER TO APPENDIX 10	<cond_code>	Y	Need to ensure consistency in the collection of condition (life status) information
cond_REL_code	CONDITION of this catch on RELEASE/DISCARD. Relevant for the Species of Special Interest. Identified by office observer	OO	OO	Char (2)	REFER TO APPENDIX 10	<cond_REL_code>	Y	Need to ensure consistency in the collection of condition (life status) information Video camera(s) need to be directed to the area where discarding/release would always occur.
len	Length (cm). Recorded by the office observer using a digital measuring tool	OO	OO AG Possible POST	SmallInt	Refer to SPECIES RANGE table for these species	<len>	Y	Define the resolution / precision (e.g. 2cm or 1cm) Office observer needs to be properly trained in digital measuring tool Calibration and algoithm need to be well defined and validated. Use a rule on the vessel? Fish may be barcoded in future for CDS allowing measurement at port
len_code	Length measurement code Recorded by the office observer. EM could provide default code dependent on species ID	OO	OO Possible AG Possible POS	Char (2)	REFER TO APPENDIX 11	<len_code>	Y	**Recorded by the office observer.**
wt	Weight (kgs) – must be measured weight and not a visual estimate			Decimal (5,1)		<wt>	N	Image (or serial connection) of weight from motion compensated scales Potential to calculate it from a length weight relationship.
wt_code	Weight code.			Char (2)	REFER TO APPENDIX 22	<wt_code>	N	
	SEX of fish							**Will not cover all species**

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

LL_OBS_CATCH The observer must PROVIDE the following CATCH DETAILS for EACH FISHING HAUL for the period of the trip.								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
sex_code	Identified by office observer where possible	OO	OO	Char (1)	REFER TO APPENDEX 12	<sex_code>	Y	Investigate how to improve the consistency in the collection of sex information, if possible. The Observer Guide shows some examples of fish species where there are external differences in sex: Shark, Mahi mahi, Opah
gstage_CODE	GONAD STAGE CODE			Char (1)	REFER TO APPENDIX 23	<gstage_CODE>	N	
comments	Comments Record if tag fish encountered. Endeavour to complete tag recovery information	OO	OO	NVarChar (40)		<comments>	N	

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBSERVER (DAILY) MONITORING DATA

- OBS_TRIPMON
- OBS_TRIPMON_COMM
- VESSEL_AIR_SIGHT
- OBS_POLUTION
- OBS_POLUTION_DETAILS
- OBS_JOURNAL

OBS_TRIPMON

PROVIDE the details of the OBSERVER GEN-3 "OBSERVER VESSEL TRIP MONITORING FORM". One record per question.

FIELD	Data Collection Instructions	Current Entry Source OO PRE POS AG	Future Entry Source OO PRE POS AG	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Issues
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
TRIP MONITORING IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + UNIQUE SEQ NUMBER	CF	CF			<TRIPMON_ID>	Y	
	Unique CODE for each question in GEN3							
RS-A	Did the operator or any crew member assault, obstruct, resist, delay, refuse boarding to, intimidate or interefere with observers in the performance of their duties	OO AG	OO AG				Y	Was there any damage / tampering of the equipment? Other mischief?
RS-B	Request that an event not be reported by the observer						Y	N/A Interim obstruction? High level request of service provider?
RS-C	Mistreat other crew	OO	OO				N	Only in the visible field of the cameras
RS-D	Did operator fail to provide observer with food, accommodation, etc.						Y	N/A
NR-A	Fish in areas where the vessel is not permitted to fish	AG	AG				Y	AG
NR-B	Target species other than those they are licenced to target	OO	OO				N	Observer can recognise
NR-C	Use a fishing method other than the method the vessel was designed or licensed	OO	OO				Y	Observer can recognise if in field of view
NR-D	Not display or present a valid (and current) licence document onboard	PRE POS	PRE POS				N	
NR-E	Transfer or transship fish from or to another vessel	OO AG	OO AG				Y	Likely to be able to be detected by office observer EM system could detect this to automatically generate

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_TRIPMON

PROVIDE the details of the OBSERVER GEN-3 "OBSERVER VESSEL TRIP MONITORING FORM". One record per question.

FIELD	Data Collection Instructions		Current Entry Source OO PRE POS AG	Future Entry Source OO PRE POS AG	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Issues
question_code	NR-F	Was involved in bunkering activities	OO AG	OO AG	Char (4)	REFER TO APPENDIX 16	<question_code>	N	Likely to be able to be detected by office observer EM system could detect this to automatically generate
	NR-G	Fail to stow fishing gear when entering areas where vessel is not authorised to fish	OO	OO				Y	Could get cameras to switch on with geo-fencing (beware accuracy +/- 3nm)
	WC-A	Fail to comply with any Commission Conservation and Management Measures (CMMs)	OO	OO				Y	Some CMMs may be able to be detected by office observer
	WC-B	High-grade the catch	OO POS -> CF	OO POS -> CF				Y	Compare lfreq of discarded
	WC-C	Fish on FAD during FAD Closure						N	N/A - purse seine
	LP-A	Inaccurately record vessel position on vessel log sheets for sets, hauling and catch	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	LP-B	Fail to report vessel positions to countries where required	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	LC-A	Inaccurately record retained 'Target Species' in the Vessel logs [or weekly reports]	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	LC-B	Inaccurately record 'Target Species' Discards	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	LC-C	Record target species inaccurately [eg. combine bigeye/yellowfin/skipjack catch]	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	LC-D	Not record bycatch discards	POS -> CF	POS -> CF				N	Reconcile EM observer data with logsheet data
	LC-E	Inaccurately record retained bycatch Species	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	LC-F	Inaccurately record discarded bycatch species	POS -> CF	POS -> CF				Y	Reconcile EM observer data with logsheet data
	SI-A	Land on deck Species of Special Interest (SSIs)	OO	OO				N	Observer can recognise
	SI-B	Interact (not land) with SSIs	OO	OO				Y	Observer can recognise
	PN-A	Dispose of any metals, plastics, chemicals or old fishing gear	OO	OO				Y	Only in the visible field of the cameras
	PN-B	Discharge any oil	OO	OO				Y	Only in the visible field of the cameras
	PN-C	Lose any fishing gear	OO	OO				Y	Only in the visible field of the cameras
	PN-D	Abandon any fishing gear	OO	OO				Y	Only in the visible field of the cameras
	PN-E	Fail to report any abandoned gear	OO	OO				Y	Only in the visible field of the cameras

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_TRIPMON

PROVIDE the details of the OBSERVER GEN-3 "OBSERVER VESSEL TRIP MONITORING FORM". One record per question.

FIELD	Data Collection Instructions		Current Entry Source OO PRE POS AG	Future Entry Source OO PRE POS AG	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Issues
	SS-A	Fail to monitor international safety frequencies						Y	
	SS-B	Carry out-of-date safety equipment	PRE POS	PRE POS				N	
answer	FLAG to indicate whether has been answered or NOT				Char (1)	MUST BE 'Y', 'N' or 'X'- not answered	<answer>	Y	See above
journal_page	Detail description of the incident		OO		NText		<journal_page>	Y	- Is a journal being kept by the office observer?

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_TRIPMON_COMMENTS

PROVIDE the details of the OBSERVER GEN-3 "OBSERVER VESSEL TRIP MONITORING FORM". One record per day of trip monitoring reported event/incident.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Issues
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE					<OBSTRIP_ID>	Y	
TRIP MONITORING COMMENTS IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + UNIQUE SEQ NUMBER					<TRIPMON_DET_ID>	Y	
gen3_date	Date of the incident on GEN3	OO -> AG	OO -> AG	REFER TO APPENDIX A1	**Must adhere to the ISO 8601 format in Appendix A1**	<gen3_date>	Y	
comments	Detail description of the incident	**OO**	**OO**	NText		<comments>	Y	**A list of events is required that the office observer needs to note depending on the camera?**

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

1. VES_AIR_SIGHT 2. PROVIDE the details on the GEN-1 form -- VESSEL AND AIRCRAFT SIGHTINGS / FISH, BUNKERING and OTHER TRANSFERS LOGS								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
SIGHTING IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SIGHT_DATE_TIME	CF	CF			<sight_ID>	Y	
sight_date_TIME	Date/Time of sighting			REFER TO APPENDIX A1	**Must adhere to the ISO 8601 format in Appendix A1**	<sighting_date>	Y	**It is very unlikely that EM will be able to be used effectively to monitor aircraft sightings.**
lat	Latitude of SIGHTING			REFER TO APPENDIX A2	**Must adhere to the ISO 6709 format in Appendix A2**	<lat>	Y	**As above.**
lon	Longitude of SIGHTING			REFER TO APPENDIX A2	**Must adhere to the ISO 6709 format in Appendix A2**	<lon>	Y	**As above.**
VESSEL IDENIFIER	REFER TO APPENDIX A4							
vatyp_id				Int	REFER TO APPENDIX 17	<vatyp_id>	Y	
bearing_dir				SmallInt		<bearing_dir>	Y	
distance				Decimal (7,3)		<distance>	Y	
dist_unit				INT	1 = Metres; 2 = kilometres; 3 = Nautical miles	<dist_unit>	Y	
action_code				Char (2)	REFER TO APPENDIX 18 for Vessel/Aircraft sightings only – only allow actions where FORM USED = 'GEN-1'	<action_code>	Y	
comments				NText		<comments>	Y	

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

1. VES_AIR_SIGHT 2. PROVIDE the details on the GEN-1 form -- VESSEL AND AIRCRAFT SIGHTINGS / FISH, BUNKERING and OTHER TRANSFERS LOGS								
FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
Comments				Ntext		<Comments>	1	

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_POLLUTION PROVIDE information any Pollution observed during the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** SETUP PRE OO POST AG CF	**Future Entry Source** SETUP PRE OO POST AG CF	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	**Notes**
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
POLLUTION EVENT IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + INCIDENT DATE/TIME	CF	CF			<POLL_ID>	Y	
inc_dATE	DATE & TIME of the incident	OO	OO -> AG	REFER TO APPENDIX A1	**Must adhere to the ISO 8601 format in Appendix A1.**	<inc_dtime>	Y	**Can be recorded by the OO only if in field of view of a camera.** **The Sol Is report stated on page 15 that "monitoring of marine pollution was possible with E-Monitoring", but acknowledged that it is restricted to the viewing range of the cameras.**
lat	Latitude where incident occurred	OO	OO -> AG	REFER TO APPENDIX A2	**Must adhere to the ISO 6709 Appendix A2.**	<lat>	Y	**Can be recorded by the OO only if in field of view of a camera.**
lon	Longitude where incident occurred	OO	OO -> AG	REFER TO APPENDIX A2	**Must adhere to the ISO 6709 in Appendix A2.**	<lon>	Y	**Can be recorded by the OO only if in field of view of a camera.**
port_id	PORT where incident occurred	OO	OO -> AG	REFER TO APPENDIX A3	**Must adhere to the UN/LOCODE standard UN/LOCODE standard Appendix A3.**	<port_id>	N	**Can be recorded by the OO only if in field of view of a camera.**
activ_id	Activity when event occurred	OO	OO	REFER TO APPENDIX A5		<activ_id>	N	**Can be recorded by the OO only if in field of view of a camera.**
VESSEL IDENIFIER	REFER TO APPENDIX A4							
vatyp_id	Vessel / Aircraft type			Int	REFER TO APPENDIX 17	<vatyp_id>	N	**It is very unlikely that EM will be able to be used effectively to monitor pollution by other vessels.**
bearing_dir	Compass Bearing to offending vessel			SmallInt		<bearing_dir>	N	**As above**

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_POLLUTION PROVIDE information any Pollution observed during the trip.								
FIELD	**Data Collection Instructions**	**Current Entry Source** SETUP PRE OO POST AG CF	**Future Entry Source** SETUP PRE OO POST AG CF	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	**Notes**
distance	Distance to offending vessel			Decimal (7,3)		<distance>	N	**As above**
comments	Additional comments			NText		<comments>	N	**As above**
stickers_ans	Response to "Stickers" question			Char (1)	'Y' or 'N'	<stickers_ans>	N	**As the GEN-6 form is completed after the port visit, if this field is required then it should be reported for each trip by the PDCO.**
aware_ans	Response to "MARPOL" question	POST	POST	Char (1)	'Y' or 'N'	<aware_ans>	N	**As the GEN-6 form is completed after the port visit, if this field is required then it should be reported for each trip by the PDCO**
advised_ans	Response to "INFRINGEMENTS" question	POST	POST	Char (1)	'Y' or 'N'	<advised_ans>	N	**This is not applicable – the question is "If there were any infringements to the MARPOL Regulations did you advise the Captain of these infringements?"**
photos_ans	Response to "PHOTOS" question			Char (1)	'Y' or 'N'	<photos_ans>	N	**Recorded by the office observer from EM video.**
photo_numbers	Number of photos taken on the incident			NVarChar (50)		<photo_numbers>	N	**Recorded by the office observer.**

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_POLLUTION_DETAILS

PROVIDE information on any Pollution details observed during the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
POLLUTION EVENT IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + INCIDENT DATE/TIME	CF	CF			<POLL_ID>	Y	
pollutiontype_id	Pollution type code	OO	OO	REFER TO APPENDIX A31	For example, Disposal of OFFAL MANAGEMENT is a WCFPC required field.	<pollution type_id>	Y	**Can be recorded by the OO only if in field of view of a camera.**
material_id	Pollution Materials code	OO	OO	REFER TO APPENDIX A29		<material_id>		**Can be recorded by the OO only if in field of view of a camera.**
POLL_GEAR_ID	Pollution Gear code	OO	OO	REFER TO APPENDIX A28		<POLL_GEAR_ID>		**Can be recorded by the OO only if in field of view of a camera.**
POLL_SRC_ID	Pollution Source code	OO	OO	REFER TO APPENDIX A30	For example, Disposal of OFFAL MANAGEMENT is a WCFPC required field.	<POLL_SRC_ID>	Y	**Can be recorded by the OO only if in field of view of a camera.**
poll_desc	Description of pollution type	OO	OO	NText	For example, Disposal of OFFAL MANAGEMENT is a WCFPC required field.	<poll_desc>	Y	**Can be recorded by the OO only if in field of view of a camera.**
poll_qty	Description of pollution quantity	OO	OO	NText	For example, Disposal of OFFAL MANAGEMENT is a WCFPC required field.	<poll_qty>	Y	**Can be recorded by the OO only if in field of view of a camera.**

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_SSI

The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. There may be one or many records for each SSI record in PS_OBS_CATCH. When SIGHTED only, then this table is linked to the OBS_TRIP database table.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
SET IDENTIFIER - PS	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME	CF	CF		To be used to link to PS OBS SET when relevant Must be consistent with PS_OBS_ACTIVITY record where S_ACTIV_ID = 1 (A fishing set).	<S_SET_ID>	Y	
CATCH IDENTIFIER - PS	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME + SPECIES CODE + FATE CODE	CF	CF		To be used to link to PS OBS CATCH when relevant Must be a link to the corresponding PS_OBS_CATCH record for this SSI	<S_CATCH_ID>	Y	
SET IDENTIFIER – LL	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME	CF	CF		To be used to link to LL OBS SET when relevant Must be consistent with PS_OBS_ACTIVITY record where S_ACTIV_ID = 1 (A fishing set).	<L_SET_ID>	Y	
CATCH IDENTIFIER – LL	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + SET START DATE + SET START TIME + SPECIES CODE + FATE CODE	CF	CF		To be used to link to LL_OBS_CATCH when relevant Must be a link to the corresponding PS_OBS_CATCH record for this SSI	<L_CATCH_ID>	Y	
SSI CATCH IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + DAY LOG + SIGHTING TIME + SPECIES CODE + FATE CODE	CF	CF			<SSI_ID>	Y	
sgtype	Type of Interaction : 'L' - Landed; "S"- Sighted; "I" - Interacted with Gear Recorded by the office observer.	OO	OO	Char (1)	Must be 'L' - Landed; "S"- Sighted; "I" - Interacted with Gear	<sgtype>	Y	Sightings will not be included It is likely that only interactions that involve the gear will be captured, and this depends heavily on the positioning of the cameras, particularly for mitigation of seabirds south of 25°S.

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_SSI The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. There may be one or many records for each SSI record in PS_OBS_CATCH. When SIGHTED only, then this table is linked to the OBS_TRIP database table.								
FIELD	Data Collection Instructions	**Current Entry Source** **SETUP PRE OO POST AG CF**	**Future Entry Source** **SETUP PRE OO POST AG CF**	**Field format notes**	**Validation rules**	**XML TAG**	**WCPFC FIELD**	Notes
	Needs to be restricted to only landings and interactions with the gear during fishing. Required appropriate placement of cameras focussed towards gear entering exiting water.							Difficult to determine interaction with gear setting.
sgtime	Time of Interaction : 'L' - Time of Landing; "I" - Time of Interaction / sighting This is the time first observer sighting			Char (1)	**Must adhere to the ISO 8601 format in Appendix A1**	<sgtime>	Y	
SSI_date	Local/Ship's date and time when this SSI was encountered. Generated by EM when flagged by the office observer.	**OO -> AG**	**OO -> AG**	REFER TO APPENDIX A1	When SGTYPE = 'L' or 'I' Must be consistent with PS_OBS_ACTIVITY record – ACT_DATE **Must adhere to the ISO 8601 format in Appendix A1**	<SSI_date>	Y	Not using ship's time for EM
UTC_SSI_DATE	UTC equivalent of SSI_DATE Generated by EM when flagged by the office observer.	**OO -> AG**	**OO -> AG**	REFER TO APPENDIX A1	When SGTYPE = 'L' or 'I' Must be consistent with PS_OBS_ACTIVITY record – UTC_ACT_DATE **Must adhere to the ISO 8601 format in Appendix A1**	<UTC_SSI_DATE>	Y	This should be consistent with simialr field in OBS_Catch. Potentially redundant for landings
lat	Latitude at which this SSI was encountered	**OO -> AG**	**OO -> AG**	REFER TO APPENDIX A2	When SGTYPE = 'L' or 'I' **Must adhere to the ISO 6709 format in Appendix A2**	<lat>	Y	This should be consistent with similar field in OBS_Catch. Potentially redundant for landings
lon	Longitude at which this SSI was encountered	**OO -> AG**	**OO -> AG**	REFER TO APPENDIX A2	When SGTYPE = 'L' or 'I' **Must adhere to the ISO 6709 format in Appendix A2**	<lon>	Y	This should be consistent with similar field in OBS_Catch. Potentially redundant for landings
sp_code	SSI Species encountered. Link to species table Potential for AG using image recognition	**OO**	**OO Potentially AG**	Char (3)	REFER TO APPENDIX 8. Must correspond to the PS_OBS_CATCH record	<sp_code>	Y	This should be consistent with similar field in OBS_Catch. Potentially redundant for landings
sp_desc	Extended Species Description Recorded by the office observer.	**OO**	**OO**	NText		<sp_desc>	N	

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_SSI

The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. There may be one or many records for each SSI record in PS_OBS_CATCH. When SIGHTED only, then this table is linked to the OBS_TRIP database table.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
landed_cond_code	Condition code on LANDING Recorded by the office observer.	OO	OO	Char (2)	REFER TO APPENDIX 10	<landed_cond_code>	Y	Probably redundant - recorded in OBS_CATCH Work to improve the consistency in the collection of condition (life status) information Potentially redundant if OBS_CATCH has correct codes. ***DCC / WCPFC need to review codes for consistency and relevance to the field***
landed_cond_desc	Description of Condition on Landing or at start of interaction with vessel's gear Recorded by the office observer.	OO	OO	NText		<landed_cond_desc>	Y	Work to improve the consistency in the collection of condition (life status) information
landed_handling	Describe interaction / treatment / release Recorded by the office observer.	OO	OO	NText		<landed_handling>	N	Work to improve the consistency in the collection of condition (life status) information
landed_len	Length of landed species			Decimal (5,1)		<landed_len>	Y	Already recorded in OBS_CATCH. Potentially redundant ***Needs to be reviewed / agreed by DCC / WCPFC***
len_code	Length code of the individual			Char (2)	REFER TO APPENDIX 11	<len_code>	Y	Already recorded in OBS_CATCH. Potentially redundant ***Needs to be reviewed / agreed by DCC / WCPFC***
landed_sex_code	Sex code of the individual			Char (1)	REFER TO APPENDIX 12	<landed_sex_code>	Y	Already recorded in OBS_CATCH. Potentially redundant ***Needs to be reviewed / agreed by DCC / WCPFC***
discard_cond_code	Condition code on RELEASE/DISCARD, or at the END of interaction with vessel's gear			Char (2)	REFER TO APPENDIX 10	<discard_cond_code>	Y	Already recorded in OBS_CATCH. Potentially redundant ***Needs to be reviewed / agreed by DCC / WCPFC***

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

OBS_SSI

The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. There may be one or many records for each SSI record in PS_OBS_CATCH. When SIGHTED only, then this table is linked to the OBS_TRIP database table.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
discard_cond_desc	Description of Condition on RELEASE/DISCARD, or at the END of interaction with vessel's gear	OO	OO	NText		<discard_cond_desc>	Y	Recorded by the office observer.
shk_fin_wt_kgs	Estimated SHARK FIN WEIGHT (kgs)	POST	POST	Decimal (5,0)		<SHK_FIN_WT_KGS>	Y	Alternate sampling means (e.g. sampling elsewhere) to ensure the requirements are met.
shk_fin_body_kgs	Estimated SHARK CARCASS WEIGHT (kgs)	POST	POST	Decimal (5,0)		<SHK_FIN_BODY_KGS>	Y	
tag_ret_no	Tag Number recovered from animal Record if tag fish encountered. Endeavour to complete tag recovery information	OO -> POST	OO -> POST	NVarChar (7)		<tag_ret_no>	Y	Unlikely that tag number will be recorded Flagged by office observer and then probably best collected at post-inspection. On the Gen – 2 form, they will also need to record the time and date of landing and species to be able to match it up with the video.
tag_ret_type	Type of Tag recovered from animal Office observer record the tag type			NVarChar (5)		<tag_ret_type>	Y	Flagged by office observer and then probably best collected at post-inspection. On the Gen – 2 form, they will also need to record the time and date of landing and species to be able to match it up with the video.
tag_ret_org	Origin of Tag recovered from animal (Organisation)	POST	POST	NVarChar (10)		<tag_ret_org>	Y	Unlikely that organisation will be identified
tag_place_no	Tag number placed on animal			NVarChar (14)		<tag_place_no>	Y	Not applicable. But noting that this is a ROP minimum requirement, additional tagging could be conducted during onboard observer trips.
tag_place_type	Type of Tag placed on animal			NVarChar (8)		<tag_place_type>	Y	Not applicable
tag_place_org	Origin of Tag placed on animal (Organisation)			NVarChar (10)		<tag_place_org>	Y	Not applicable

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_SSI

The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. There may be one or many records for each SSI record in PS_OBS_CATCH. When SIGHTED only, then this table is linked to the OBS_TRIP database table.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
intact_id	Vessel activity when INTERACTION occurs Recorded by the office observer.	OO CF	OO CF	Int	REFER TO APPENDIX 13	<intact_id>	Y	Recorded automatically by the EM system. Potentially reduntant because datetime of interaction is recorded and can be linked back to SETHAUL LOG By cross-referencing with set/haul start and end times.
intact_other	Other types of interaction Recorded by the office observer.	OO	OO	NVarChar (20)		<intact_other>	Y	Not applicabel because we have limited office observations to only setting and hauling Unlikely this would be used with EM
int_describe	Description of the interaction Recorded by the office observer.	OO	OO	NText		<int_describe>	Y	Potentailly redundant because description mentioned above. Needs to be reviewed by DCC WCPFC
sgact_id	Vessel activity when SIGHTING occurs			Int	REFER TO APPENDIX 13	<sgact_id>	Y	General sightings will not be recorded by LL EM
sgact_other	Indicates "other" Vessel Activity			NVarChar (20)		<sgact_other>	N	General sightings will not be recorded by LL EM
sight_n	Number of individuals sighted			SmallInt		<sight_n>	Y	General sightings will not be recorded by LL EM
sight_adult_n	Number of adults sighted			SmallInt		<sight_adult_n>	N	General sightings will not be recorded by LL EM
sight_juv_n	Number of juveniles sighted			SmallInt		<sight_juv_n>	N	General sightings will not be recorded by LL EM
sight_len	Estimated overall length (Average if more than one individual)			NText		<sight_len>	N	General sightings will not be recorded by LL EM
sight_dist	Distance of sighted animals from vessel			Decimal (7,3)		<sight_dist>	N	General sightings will not be recorded by LL EM

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_SSI

The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. There may be one or many records for each SSI record in PS_OBS_CATCH. When SIGHTED only, then this table is linked to the OBS_TRIP database table.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
sight_dist_unit	Units used for SIGHT_DIST			INT	1 = Metres; 2 = kilometres; 3 = Nautical miles	<sight_dist_unit>	N	General sightings will not be recorded by LL EM
sight_dist_nm	Distance in nautical miles			Decimal (10,4)		<sight_dist_nm>	N	General sightings will not be recorded by LL EM
sight_behav	Description of behaviour of Sighted animals			NText		<sight_behav>	N	General sightings will not be recorded by LL EM

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_SSI_DETAILS

The observer must PROVIDE the following SPECIES OF SPECIAL INTEREST CATCH DETAILS for EACH FISHING SET for the period of the trip. The specific detail of eac interaction needs to be recorded/stored here.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Notes
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	Y	
SSI CATCH IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + DAY LOG + SIGHTING TIME + SPECIES CODE + FATE CODE	CF	CF		Link to OBS_SSI table	<SSI_ID>	Y	
SSI DETAILS IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE + DAY LOG + SIGHTING TIME + SPECIES CODE + FATE CODE	CF	CF			<SSI_DET_ID>	Y	
start_end	Indication of “START” or “END” of interaction Recorded by the EM system after being flagged by the office observer.	OO -> AG	OO -> AG	Char (1)	Must be either ‘S’ for START or ‘E’ for END	<start_end>	Y	Likely to be birds or large animal entangled in line
SSI_number	Number of animals interacted Counted by the office observer	OO	OO	Int		<SSI_number>	Y	Need good definitions of interactions to maintain consistnecy between observers
cond_code	CONDITION at the point of recording (either START or END)			Char (2)	REFER TO APPENDIX 10	<cond_code>	Y	This differs from landed_cond_code from the previous table in that it can be and interaction with the vessel of gear before the animal is landed on deck.
description	Descriptions of the interaction **Recorded by the office observer**	OO	OO	VarChar (100)		<description>	N	**For example caught on the branch line, tangled in the sharkline?**

EM ready
EM Natural Key
EM with work
EM new field
EM not likely
EM redundant

OBS_JOURNAL

PROVIDE a description of the day's activities in a daily journal record for the trip.

FIELD	Data Collection Instructions	Current Entry Source SETUP PRE OO POST AG CF	Future Entry Source SETUP PRE OO POST AG CF	Field format notes	Validation rules	XML TAG	WCPFC FIELD	Issues
TRIP IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBSTRIP_ID>	N	
DAILY JOURNAL IDENTIFIER	Internally generated. Can be NATURAL KEY or unique integer. NATURAL KEY would be VESSEL + DEPARTURE DATE	CF	CF			<OBS_JRNL_ID>	N	
JRNL_date	DATE of Journal entry	OO	OO	REFER TO APPENDIX A1	**Must adhere to the ISO 8601 format in Appendix A1**	<JRNL_date>	N	**Recorded by the office observer.**
JRNL_TEXT	Daily journal entry	OO	OO	NText		<JRNL_TEXT>	N	**Recorded by the office observer.**

EM ready
EM with work
EM not likely
EM Natural Key
EM new field
EM redundant

APPENDICES

APPENDIX A1 – DATE/TIME FORMAT

The DATE/TIME formats must adhere to the following standard:
ISO 8601 - Dates and times format – both local and UTC dates

[YYYY]-[MM]-[DD]T[HH]:[MM]Z for fields designated as UTC date/time

[YYYY]-[MM]-[DD]T[HH]:[MM] for fields designated as LOCAL date/time

APPENDIX A2 – POSITION/COORDINATE FORMAT

The Latitude and Longitude coordinates must adhere to the ISO 6709 – Positions
Degrees and minutes to 3 decimal places

LATITUDE	+/- DDMM.MMM
LONGITUDE	+/- DDDMM.MMM

APPENDIX A3 – PORT LOCATION CODES

The PORT LOCATION Codes must adhere to the UN/LOCODE standard UPPERCASE CHAR(5)
United Nations - Code for Trade and Transport Locations (UN/LOCODE) – see
http://www.unece.org/cefact/locode/service/location

APPENDIX A4 – VESSEL IDENTIFICATION

The attributes to be provided for the VESSEL needs to be consistent with several VESSEL registers at the global and regional level. The most important are the proposed IMO/UVI standard vessel identifier (UVI), the WCPFC vessel register and the FFA Vessel register.

FIELD	Data Collection Instructions	Field format notes	Validation rules	XML TAG	WCPFC FIELD
VESSEL NAME	PROVIDE the VESSEL attributes which should be consistent with the attributes stored in the WCPFC and FFA Regional Vessel Registers	CHAR(30) UPPER CASE	Must be consistent with the WCPFC and FFA Vessel Registers	<VESSELNAME>	Y
COUNTRY OF VESSEL REGISTRATION		CHAR(2) ISO 3166-1 alpha-2 two-letter country code UPPER CASE	ISO 3166-1 alpha-2 two-letter country code Must be consistent with the WCPFC and FFA Vessel Registers Country of registration is distinct from the chartering nation, where relevant	<COUNTRYREG>	Y
VESSEL REGISTRATION NUMBER Fishing Vessels		CHAR(20) UPPER CASE	Must be consistent with the WCPFC and FFA Vessel Registers	<REGNO>	Y
FFA VESSEL REGISTER NUMBER		INTEGER(5)	Must be consistent with the FFA Vessel Register	<FFAVID>	N
WCPFC RFV VID		INTEGER(10)	Must be consistent with the WCPFC RFV	<WIN>	Y
UNIVERSAL VESSEL IDENTIFIER (UVI)		INTEGER(10)	Must be consistent with the WCPFC and FFA Vessel Registers	<IMO_UVI>	N
VESSEL INTERNATIONAL CALLSIGN		CHAR(10) UPPER CASE	Must be consistent with the WCPFC and FFA Vessel Registers	<IRCS>	Y

APPENDIX A5 –OBSERVER ACTIVITY CODES (PARTIAL PURSE SEINE)

S_ACTIV_ID	Description	FAD reference (to record BEACON field)	FORM Code version (old)
1	Set	YES	1
2	Searching		2
3	Transit		3
4	No fishing - Breakdown		4
5	No fishing - Bad weather		5
6	In port - please specify		6
7	Net cleaning set		7
8	Investigate free school		8
9	Investigate floating object	YES	9
10	Deploy - raft, FAD or payao	YES	10D
11	Retrieve - raft, FAD or payao	YES	10R
12	No fishing - Drifting at day's end		11
13	No fishing - Drifting with floating object	YES	12
14	No fishing - Other reason (specify)		13
15	Drifting -With fish aggregating lights	YES	14
16	Retrieve radio buoy	YES	15R
17	Deploy radio buoy	YES	15D
18	Transhipping or bunkering		16
19	Servicing FAD or floating object	YES	17
20	*Helicoptor takes off to search*		*H1*
21	*Helicopter returned from search*		*H2*

APPENDIX A6 –TUNA SCHOOL ASSOCIATION CODES (PURSE SEINE ONLY)

S_ACTIV_ID	Description	SCHOOL TYPE CATEGORY
1	Unassociated (free school)	UNASSOCIATED
2	Feeding on Baitfish (free school)	UNASSOCIATED
3	Drifting log, debris or dead animal	ASSOCIATED
4	Drifting raft, FAD or payao	ASSOCIATED
5	Anchored raft, FAD or payao	ASSOCIATED
6	Live whale	ASSOCIATED
7	Live whale shark	ASSOCIATED
8	Other (please specify)	
9	No tuna associated	

APPENDIX A7 – PURSE SEINE TUNA SCHOOL DETECTION CODES (PURSE SEINE ONLY)

DETON _ID	Description
1	Seen from vessel
2	Seen from helicopter; Use when vessel gets to the school of tuna that helicopter either: 1. reported on; or 2. dropped buoy on.
3	Marked with beacon
4	Bird radar
5	Sonar / depth sounder
6	Info. from other vessel
7	Anchored FAD / payao (recorded)

APPENDIX A8 – SPECIES CODES

Refer to the FAO three-letter species codes:

http://www.fao.org/fishery/collection/asfis/en

APPENDIX A9 – OBSERVER FATE CODES

FATE CODE	DESCRIPTION
DCF	Discarded - Line cut or Other
DDL	Discarded - Difficult to land
DFR	Discarded - fins removed and trunk discarded
DFW	Discarded - Discarded from well
DGD	Discarded - Gear damage
DNS	Discarded - No space in freezer
DOR	Discarded - other reason (specify)
DPA	Discarded - Protected species - Alive
DPD	Discarded - Protected species - Dead
DPQ	Discarded - poor quality
DPS	Discarded - protected species (e.g. turtles)
DPU	Discarded - Protected Species - Condition unknown
DSD	Discarded - Shark damage
DSO	Discarded - rejected (struck off before landing)
DTS	Discarded - too small
DUS	Discarded - Undesirable species
DVF	Discarded - Vessel fully loaded
DWD	Discarded - Whale damage
ESC	Escaped
RCC	Retained - Crew Consumption
RFL	Retained - Filleted
RFR	Retained - fins removed and trunk retained
RGG	Retained - gilled and gutted (retained for sale)
RGO	Retained - gutted only
RGT	Retained - gilled gutted and tailed (for sale)
RHG	Retained - headed and gutted (Marlin)
RHT	Retained - Headed, gutted and tailed
RMD	Retained - fins removed/trunk retained (MANDATORY)
ROR	Retained - other reason (specify)
RPT	Retained - partial (e.g. fillet, loin)
RSD	Retained - Shark damage
RTL	Retained - Tailed
RWD	Retained - Whale Damage
RWG	Retained - Winged
RWW	Retained - whole
UUU	Unknown - not observed

APPENDIX A10 – OBSERVER CONDITION CODES

CONDITION CODE	Description
A0	Alive but unable to describe condition
A1	Alive and healthy
A2	Alive, but injured or distressed
A3	Alive, but unlikely to live
A4	Entangled, okay
A5	Entangled, injured
A6	Hooked, externally, injured
A7	Hooked, internally, injured
A8	Hooked, unknown, injured
D	Dead
D1	Entangled, dead
D2	Hooked, externally, dead
D3	Hooked, internally, dead
D4	Hooked, unknown, dead
U	Condition, unknown
U1	Entangled, unknown condition
U2	Hooked, externally, condition unknown
U3	Hooked, internally, condition unknown
U4	Hooked, unknown, condition unknown

APPENDIX A11 – LENGTH CODES

Length Code	Description
AN	Anal fin length
BL	Bill to fork in tail
CC	Curved Carapace Length
CK	Cleithrum to anterior base caudal keel
CL	carapace length (turtles)
CW	Carapace width
CX	Cleithrum to caudal fork
EO	Posterior eye orbital to caudal fork
EV	Posterior eye orbital to vent
FF	1st dorsal to fork in tail
FN	Weight of all fins (sharks)
FS	1st dorsal to 2nd dorsal
FW	Fillets weight
GF	Gilled, gutted, headed, flaps removed
GG	Gilled and gutted weight
GH	Gutted and headed weight
GI	Girth
GO	Gutted only (gills left in)
GT	Gilled, gutted and tailed
GX	Gutted, headed and tailed
LF	lower jaw to fork in tail
NM	not measured
OW	Observer's Estimate
PF	pectoral fin to fork in tail
PS	Pectoral fin to 2nd dorsal
SC	Straight Carapace Length
SL	Tip of snout to end of caudal peduncle
TH	Body Thickness (Width)
TL	tip of snout to end of tail
TW	total width (tip of wings - rays)
UF	upper jaw to fork in tail
US	Upper jaw to 2nd dorsal fin
WW	Whole weight

APPENDIX A12 – SEX CODES

Sex Code	Description
F	Female
I	Indeterminate (checked but unsure)
M	Male
U	Unknown (not checked)

APPENDIX A13 – VESSEL ACTIVITY (SSI INTERACTION) CODES

Activity Code for interaction	Description
1	SETTING
2	HAULING
3	SEARCHING
4	TRANSITING
5	OTHER

APPENDIX A14 – SIZE AND SPECIES COMPOSIION SAMPLE PROTOCOL (PURSE SEINE ONLY)

Sample Type	Description
R	Random (GRAB) sample
S	SPILL sample
B	Bycatch only sampling
F	Small-fish only sampling
O	Other type of sampling protocol (please specify)

APPENDIX A15 – MEASURING INSTRUMENTS CODES (MODIFY FOR EM)

Measure Code	Description
B	BOARD
C	CALLIPER - ALUMINIUM
E	EYE
R	RULER
T	TAPE
U	UNKNOWN
W	CALLIPER - WOOD

APPENDIX A16 – TRIP MONITORING QUESTION CODES

QUESTION CODE	Description	WCPFC Question
RS-A	Did the operator or any crew member assault, obstruct, resist, delay, refuse boarding to, intimidate or interefere with observers in the performance of their duties	Y
RS-B	Request that an event not be reported by the observer	Y
RS-C	Mistreat other crew	N
RS-D	Did operator fail to provide observer with food, accommodation, etc.	Y
NR-A	Fish in areas where the vessel is not permitted to fish	Y
NR-B	Target species other than those they are licenced to target	N
NR-C	Use a fishing method other than the method the vessel was designed or licensed	Y
NR-D	Not display or present a valid (and current) licence document onboard	N
NR-E	Transfer or transship fish from or to another vessel	Y
NR-F	Was involved in bunkering activities	N
NR-G	Fail to stow fishing gear when entering areas where vessel is not authorised to fish	Y
WC-A	Fail to comply with any Commission Conservation and Management Measures (CMMs)	Y
WC-B	High-grade the catch	Y
WC-C	Fish on FAD during FAD Closure	N
LP-A	Inaccurately record vessel position on vessel log sheets for sets, hauling and catch	Y
LP-B	Fail to report vessel positions to countries where required	Y
LC-A	Inaccurately record retained 'Target Species' in the Vessel logs [or weekly reports]	Y
LC-B	Inaccurately record 'Target Species' Discards	Y
LC-C	Record target species inaccurately [eg. combine bigeye/yellowfin/skipjack catch]	Y
LC-D	Not record bycatch discards	N
LC-E	Inaccurately record retained bycatch Species	Y
LC-F	Inaccurately record discarded bycatch species	Y
SI-A	Land on deck Species of Special Interest (SSIs)	N
SI-B	Interact (not land) with SSIs	Y
PN-A	Dispose of any metals, plastics, chemicals or old fishing gear	Y
PN-B	Discharge any oil	Y
PN-C	Lose any fishing gear	Y
PN-D	Abandon any fishing gear	Y
PN-E	Fail to report any abandoned gear	Y
SS-A	Fail to monitor international safety frequencies	Y
SS-B	Carry out-of-date safety equipment	N

APPENDIX A17 – VESSEL / AIRCRAFT SIGHTINGS CODES (DIFFICULT FOR EM)

CODE	Description
1	SINGLE PURSE SEINE
2	LONGLINE
3	POLE AND LINE
4	MOTHERSHIP
5	TROLL
6	NET BOAT
7	BUNKER
8	SEARCH, ANCHOR OR LIGHT BOAT
9	FISH CARRIER
10	TRAWLER
11	LIGHT AIRCRAFT
12	HELICOPTER
13	OTHER

APPENDIX A18 – ACTION CODES (PARTIAL PURSE SEINE)

Action Codes	Description	FORM Used
AG	Aground	GEN6
BG	Bunkering (transfer of fuel), vessel observer is on is GIVING	GEN1, GEN6
BR	Bunkering (transfer of fuel), vessel observer is on is RECEIVING	GEN1, GEN6
CR	Retained from a set solely because of catch-retention rules	PS5
DF	Dumping of fish	GEN1
DS	Discarded into the sea	PS5
FI	Fishing	GEN1, GEN6
FO	Fish On-board	PS5
FS	From set	PS5
NF	Not fishing	GEN1
OG	Other, vessel observer is on is GIVING	GEN1
OR	Other, vessel observer is on is RECEIVING	GEN1
PF	Possibly fishing	GEN1
SG	Set sharing, vessel observer is on is GIVING	GEN1
SR	Set sharing, vessel observer is on is RECEIVING	GEN1,PS5
TG	Transferring fish between vessels, vessel observer is on is GIVING	GEN1,PS5, GEN6
TR	Transferring fish between vessels, vessel observer is on is RECEIVING	GEN1,PS5, GEN6
UL	Unloaded at cannery or cool store	PS5
WT	Transferred between wells	PS5

GEN1 – Vessel / Aircraft sightings
GEN6 – Pollution Report
PS-5 – Purse seine Well transfer

APPENDIX A19 –CREW JOB CODES (PARTIAL PURSE SEINE)

CODE	Description
1	CAPTAIN
2	NAVIGATOR/MASTER
3	MATE
4	CHIEF ENGINEER
5	ASSISTANT ENGINEER
6	DECK BOSS
7	COOK
8	HELICOPTER PILOT
9	SKIFF MAN
10	WINCH MAN
11	HELICOPTER MECHANIC
12	CREW
13	NAVIGATOR
14	FISHING MASTER
15	RADIO OPERATOR
16	TRANSLATOR

APPENDIX A20 – MARINE DEVICES CODES (SOME DIFFICULT FOR EM)

Code	Description	WCPFC FIELD	GEAR LIST CODES
1	BATHYTHERMOGRAPH MBT	YES	
2	BIRD RADAR	YES	SP
3	CHART PLOTTER	YES	LSP
4	DEPTH SOUNDER	YES	LSP
5	DOPPLER CURRENT MONITOR	YES	
6	SATELLITE BUOY	YES	S
7	FISHERY INFORMATION SERVICES	YES	LSP
8	GPS	YES	LSP
9	NAVIGATIONAL RADAR #1	YES	LP
10	RADIO BUOYS - CALL-UP	YES	LSP
11	RADIO BUOYS - NON CALL-UP	YES	LSP
12	RADIO BEACON DIRECTION FINDER	YES	LSP
13	SATELLITE - HF TELEX	YES	
14	SEA SURFACE TEMP. GAUGE	YES	LP
15	SONAR	YES	LSP
16	HF RADIO TELEPHONE	YES	
17	SMART-LINK PHONE	YES	
18	TRACK PLOTTER	YES	LSP
19	VESSEL MONITORING SYSTEM (VMS)	YES	LSP
20	WEATHER FACSIMILE	YES	LP
21	WEATHER SATELLITE MONITOR	YES	
22	NET SOUNDER		LSP
23	BINOCULARS		P
24	ECHO SOUNDING BUOY		S
25	EPIRB		

APPENDIX A21 – DEVICE USAGE CODES

Code	Description
	Not mentioned
ALL	used all the time for fishing
BRO	broken now but used normally
NA	Not applicable / Not filled
NOL	no longer ever used
OIF	used only in transit
RAR	used rarely
SIF	used often but only in fishing
TRA	used all the time

APPENDIX A22 – WEIGHT MEASUREMENT CODES

Weight measurement code	Description
CW	Captain's Estimate
FN	Weight of all fins (sharks)
FW	Fillets weight
GF	Gilled, gutted, headed, flaps removed
GG	Gilled and gutted
GH	Gutted and headed
GO	Gutted only (gills left in)
GT	Gilled, gutted and tailed
GX	Gutted, headed and tailed
NM	Not measured
OW	Observer's Estimate
TW	Trunk weight
WW	Whole weight

APPENDIX A23 – GONAD STAGE CODES

Gonad stage code	Short description	Description
N	No information	No information
I	Immature	Ovary small and slender. Cross-section round
E	Early Maturing	Enlarged, pale yellow ovaries. Ova not visible.
L	Late Maturing	Enlarged, turgid, orange-yellow ovaries. Ova opaque
M	Mature	Enlarged, richly vascular, orange ovaries, losing turgidity. Ova translucent.
R	Ripe	Greatly enlarged ovaries, not turgid. Ova easily dislodged and extruded by pressure.
S	Spent	Flaccid, vascular ovaries. Most ova gone. Often dark orange-red coloration.
R	Recovering	Vascular ovaries. Next batch of ova developing.

APPENDIX A24 – FAD ORIGIN CODES (PURSE SEINE ONLY)

FAD ORIGIN CODE	Description
1	Your vessel deployed this trip
2	Your vessel deployed previous trip
3	Other vessel (owner consent)
4	Other vessel (no owner consent)
5	Other vessel (consent unknown)
6	Drifting and found by your vessel
7	Deployed by FAD auxiliary vessel
8	Origin unknown
9	Other origin

APPENDIX A25 – FAD DETECTION CODES APPENDIX A25 – FAD DETECTION CODES (PURSE SEINE ONLY)

FAD DETECTION CODE	Description
1	Seen from Vessel (no other method)
2	Seen from Helicopter
3	Marked with Radio beacon
4	Bird Radar
6	Info. from other vessel
7	Anchored (GPS)
8	Marked with Satellite Beacon
9	Navigation Radar
10	Lights
11	Flock of Birds sighted from vessel
12	Other (please specify)
13	Vessel deploying FAD (not detected)

APPENDIX A26 – FAD MATERIAL CODES (PURSE SEINE ONLY)

FAD MATERIAL CODE	Description
1	Logs, Trees or debris tied together
2	Timber/planks/pallets/spools
3	PVC or Plastic tubing
4	Plastic drums
5	Plastic Sheeting
6	Metal Drums (i.e. 44 gallon)
7	Philippines design drum FAD
8	Bamboo/Cane
9	Floats/Corks
10	Unknown (describe)
11	Chain, cable rings, weights
12	Cord/rope
13	Netting hanging underneath FAD
14	Bait containers
15	Sacking/bagging
16	Coconut fronds/tree branches
17	Other (describe)

APPENDIX A27 – FAD TYPE CODES (PURSE SEINE ONLY)

FAD TYPE CODE	Description
1	Man made object (Drifting FAD)
2	Man made object (Non FAD)
3	Tree or log (natural, free floating)
4	Tree or logs (converted into FAD)
5	Debris (flotsam bunched together)
6	Dead Animal (specify; i.e. whale, horse, etc.)
7	Anchored Raft, FAD, or Payao
8	Anchored Tree or Logs
9	Other (please specify)
10	Man made object (Drifting FAD)-changed

APPENDIX A28 – POLLUTION GEAR CODES

POLLUTION GEAR CODE	DESCRIPTION
1	Lost during fishing
2	Abandoned
3	Dumped

APPENDIX A29 – POLLUTION MATERIALS CODES

POLUTION MATERIALS CODES	DESCRIPTION
1	Plastics
2	Metals
3	Waste Oils
4	Chemicals
5	Old fishing gear
6	General garbage

APPENDIX A30 – POLLUTION SOURCE CODES

POLLUTION SOURCE CODES	DESCRIPTION
1	Vessel Aground/Collision
2	Vessel at Anchor/Bearth
3	Vessel Underway
4	Land Based Source
5	Other

APPENDIX A31 – POLLUTION TYPE CODES

POLLUTION TYPE CODES	DESCRIPTION
1	Waste dumped overboard
2	Oil splillages and leakages
3	Abandoned or Lost Fishing Gear