SECOND E- REPORTING AND E-MONITORING INTERSESSIONAL WORKING GROUP MEETING (ERandEMWG2)

The Stones Hotel, Bali, INDONESIA

1 – 2 August 2016

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

WCPFC-2016-ERandEMWG2-IP03

15 July 2016

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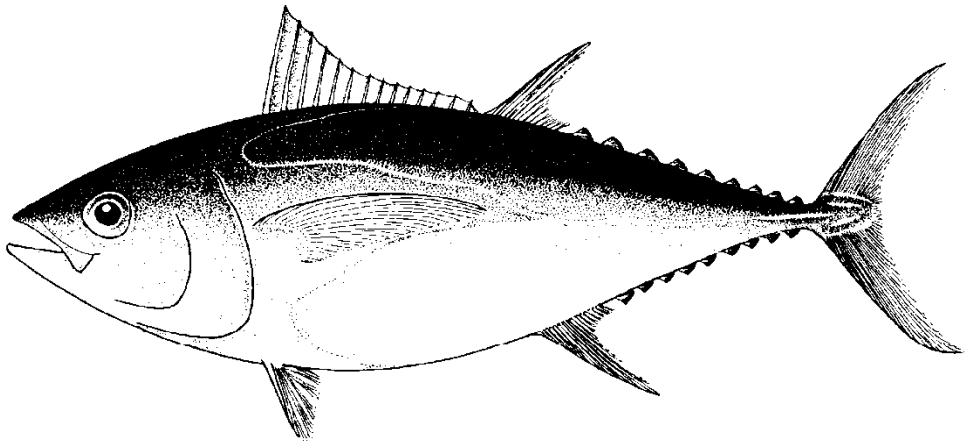

Oceanic Fisheries Programme
Pacific Community
Noumea, New Caledonia

Forum Fisheries Agency
Honiara
Solomon Islands

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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).

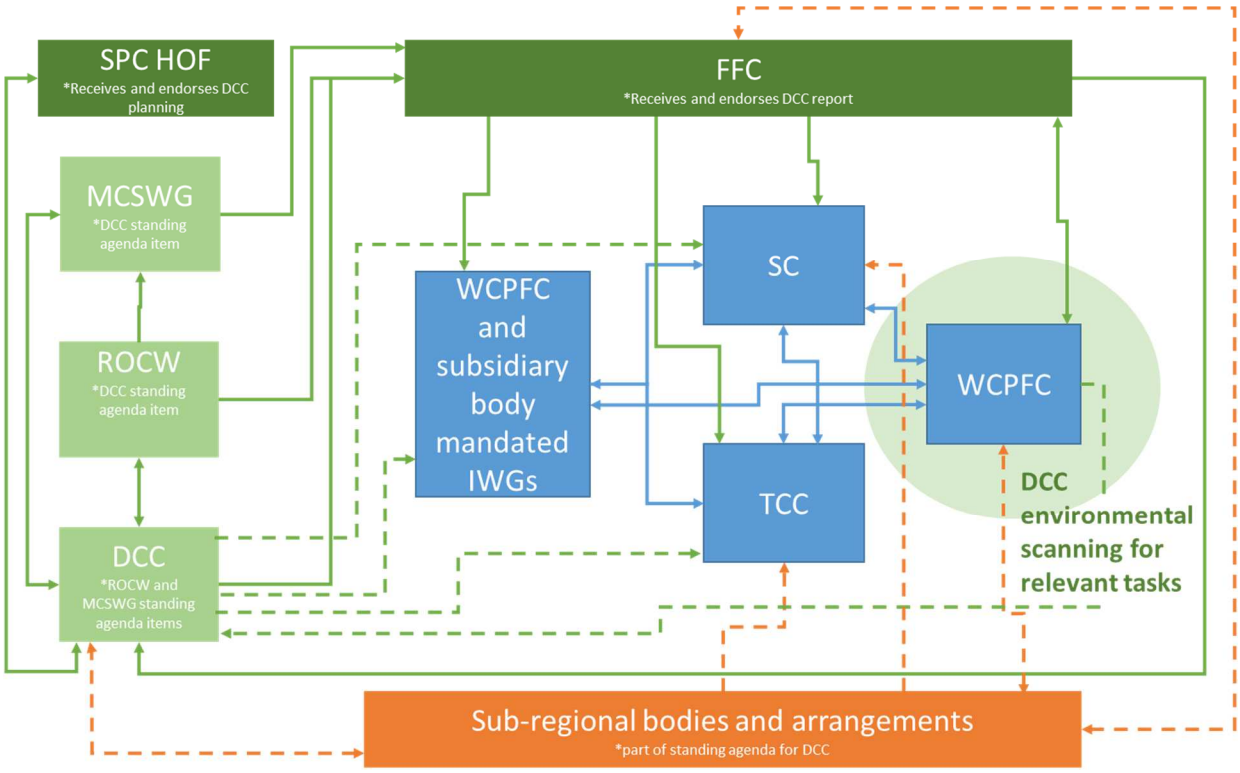


Figure 1. Schematic diagram of the relationship of DCC with the annual regional work programme with respect to fisheries. Note that this is focussed on the DCC role and does not try to reflect all connections for other identified bodies. Legend: Blue - WCPFC processes; Green - FFA/SPC processes; Orange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

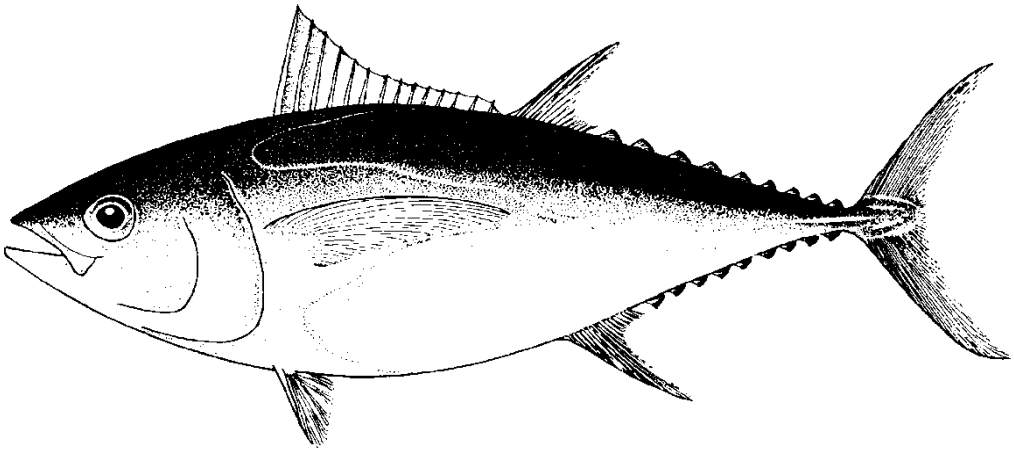
3.3. Closing

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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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.

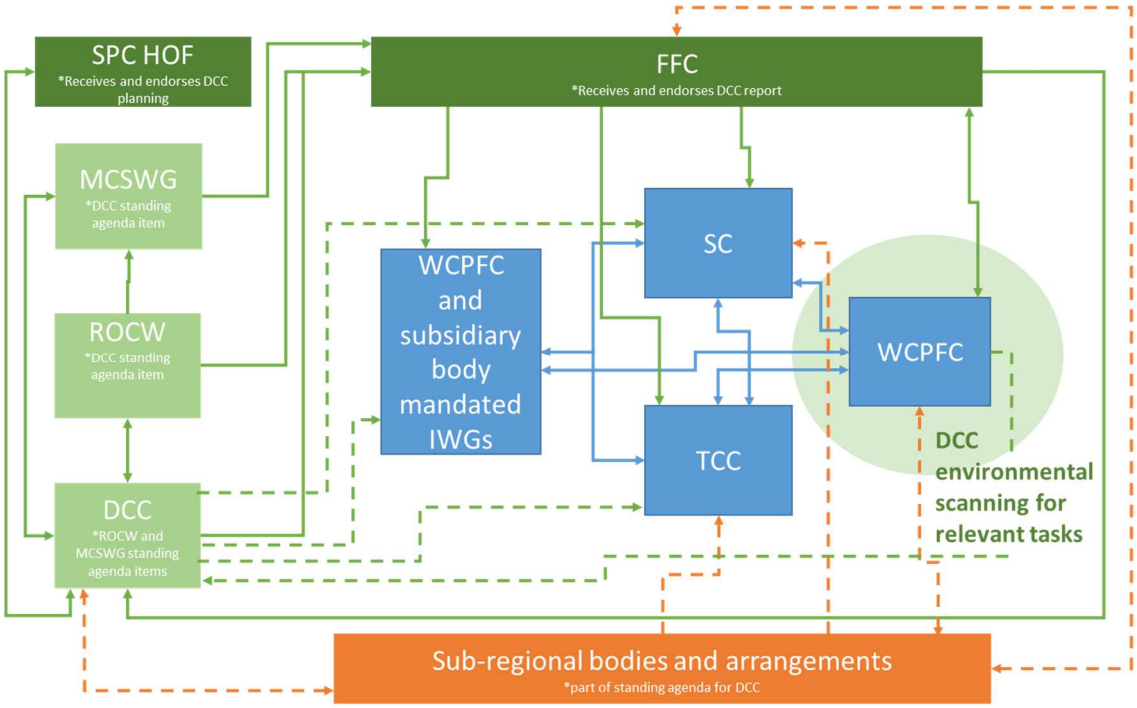
The secondary role of the DCC is, as required, to:

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.



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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

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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