

Electronic Monitoring Workshop
Thursday 18th – Friday 19th July 2024
Wellington, New Zealand

AGENDA ITEM. 6.	DCC Longline EM Minimum Data Fields Standards
PAPER NUMBER:	WP.4
<p>Summary</p> <p>This paper provides background information and an overview of the DCC development of EM minimum data standards for longline monitoring. The progression of these standards has gained impetus through the WCPFC adoption of CMM2023-01 which allows for longline monitoring to be in part covered using EM. This is despite minimum data standards not yet having been adopted.</p> <p>Recommendations:</p> <p>The meeting is invited to:</p> <ol style="list-style-type: none"> Review and make recommendations regarding the draft Longline EM data standards. 	

Introduction

- 1) Establishing standard data fields for Electronic Monitoring (EM) of longline fishing in the WCPFC has progressed over the past 8 years through a series of workshops and analyses of EM data submitted to SPC. These are outlined below with relevant outcomes:
- 2) The first Electronic Monitoring (Longline) Process Standards Workshop was held in Noumea during the 27-29th June 2016. Draft EM Process Standards were based around the draft WCPFC E-Reporting Standard Data Fields for Operational Observer Data. The fields were given one of the following rankings: EM ready; EM with work; EM not likely; EM Natural Key; EM new field; EM redundant. The output was a tabulated assessment of whether the ER observer data fields for longline monitoring could be collected by EM.
- 3) The Second Regional Electronic Monitoring Process Standards Workshop was held 20-24 November 2017 in Nouméa, New Caledonia, to enhance the draft longline EM process standards for observer data developed in 2016. The report proposed draft process standards for EM in longline as well as purse seine and transshipment monitoring. The workshop also considered EM [Debriefing], i.e. EM Review verification and validation processes.
- 4) The DCC Longline Electronic Monitoring (EM) Planning Workshop in was held at FFA Honiara during the 16–18 October 2019. The main outcome of the workshop was the '*Regional Longline Fisheries Electronic Monitoring Policy (2020)*'. An element of the policy was that "*EM Records and EM Data will comply with regionally agreed data standards and formats*".
- 5) The WCPFC Project 93 identified areas where EM may supplement other data sources where monitoring coverage was insufficient, (WCPFC-SC15-2019/ST-WP-04). It was given

'Potential Verification' rating in fields related catch, effort identifying transshipment activity and mitigation methods.

- 6) [Tim Emery et al's \(2018\)](#) paper '*The use of electronic monitoring within tuna longline fisheries: implications for international data collection, analysis and reporting*' identified that 78% of the WCPFC ROP minimum standard observer longline data fields could be collected with current EM technology.
- 7) In 2020, the DCC held two meetings to refine the draft EM Longline data field standards. The first was held in Nadi in February but as this was the onset of COVID some of the participants were unable to attend and a second meeting was held in November (online) to add compliance fields. The final outcome was the Draft DCC Longline EM minimum data field standards.
- 8) In 2022 the FFC adopted the *FFA Standards Specifications and Procedures for EM longline monitoring*,
 - a) which identified the need for data standards under SSP2.b. (1. f.): "*EM Analysts will annotate EM Data required according to the latest version of the regional Longline EM Minimum Data Field Standards, Instructions and Protocols.*" Though the standards were not defined
 - b) and regarding data quality assurance, SSP2b. (2 a.): "*EM Data Quality Reviewer will conduct the systematic quality assurance review by re-analysing a stipulated proportion of the EM Data generated by the EM Analyst, including consideration of coverage and (field) completeness.*"
- 9) In 2022, DCC12 reviewed the EM data that had been submitted to SPC to assess the completeness of the EM data was being collected against the draft DCC Longline EM minimum data fields. The analysis found that, "*excluding fields under special gear attributes 27/71 (38%) fields are not populated/submitted by service providers.*"
- 10) The DCC12 also introduced a data process standard in JSON format for consideration. The JSON process field format can facilitate and simplify the current EM data transmission processes by using Application Programming Interfaces (APIs) for uploading EM data to TUFMAN2. The JSON formatted process standard also allows for improved EM data verification and validation.
- 11) In 2023, SPC developed an e-debriefing module and an EM data module in TUFMAN2. National implementation and training in this module is beginning in 2024.
- 12) In 2024, DCC13 reviewed and amended the Draft DCC Longline EM minimum data field standards to be considered for adoption by MOC and FFC in October 2024. This review included the protocols and whether the fields were to be regarded as a mandatory minimum standard field for catch and/or compliance monitoring purposes.
- 13) DCC13 also compared these draft Longline EM minimum data standards against the WCPFC ROP minimum data standards to highlight which ROP fields were not included in the Longline EM data fields.

Issues

- 14) CMM2023-01 Conservation and Management Measure for Bigeye, Yellowfin and Skipjack Tuna in the Western And Central Pacific Ocean establishes catch limits by flag. However, it also allows flexibility for national catch limits to be exceeded by up to 10% provided an equivalent increase in monitoring is met by using observers and/or Electronic Monitoring.



15) However, the WCPFC ER&EM WG has not yet established and WCPFC has not yet adopted minimum EM data standards. This then raises the issue of what fields do need to be collected to meet the requirements of this monitoring obligation.

Approach

16) This meeting will allow a broader review and input into the Draft DCC Longline EM minimum data field standards through consideration by national technical staff. Broadening national input can refine the fields to meet the needs of individual national programmes. This will strengthen applicability of the fields to then be considered by FFA's MOC and FFC in October 2024. The meeting may consider if an information paper to be tabled at ER&EMWG if held in the margins of TCC20.



Appendix 1. Longline EM Minimum Data Fields Standards

Data Collection Committee (DCC)

Longline EM Minimum Data Fields Standard

June 2024

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Background

1. [The Draft DCC Longline EM minimum data field standards \(version DCC-November 2020\)](#) were developed in 2020. The header of this standard mentioned: *These standards are proposed for member countries to use when embarking on trials or implementation of E-Monitoring (EM) for longline vessels licensed to operate in your waters (and adjacent waters). These standards should be provided to the EM technical provider to ensure the minimum data fields specified here are generated from the EM system, according to the EM Protocol notes provided. These standards are in draft format and will be reviewed from time to time (Latest version: November 2020).*
2. In 2022, SPC evaluated the adherence to these standards by examining the EM data provided from seven member countries from 2015 to 2022 [Draft DCC LL EM standards data fields completeness for EM countries - Version May 2022 .xlsx](#) and https://oceanfish.spc.int/en/publications/doc_download/2119-dcc12-wp3-review-of-em-data-with-em-minimum-data-fields . For only two countries for which data was available after 2020, the EM data did not meet all the minimum data fields standard.
3. In 2022, the FFA final draft EM Standards, Specifications and Procedures (SSPs) were endorsed as interim guidelines and presented at WCPFC19 <https://meetings.wcpfc.int/node/17866> . In these SSPs, under section SSP2b: EM Records Analysis and Quality Assurance, the activity 1. EM Records Analysis and Development of EM Data is described as: EM Analysts will annotate EM Data required according to the latest version of the regional Longline EM Minimum Data Field Standards, Instructions and Protocols. In response to this need, the following table in Appendix 1 are the proposed DCC EM longline Minimum Data Field Standards.
4. Therefore, considering:
 - The FFA EM Longline Policy and the development of the SSPs;
 - The development of the PNA E-Monitoring Program and the intention to have EM data flow into the FIMS system;
 - The development of the WCPFC EM PROGRAMME;
 - SPC’s analysis of EM data received by one EM provider on behalf of countries, showing that some data fields were not provided;
 - SPC’s analysis of EM data flow, showing that missing meta data (such as EM analyst code, EM reviewer code, place of analysis, etc..) makes the upload and management of EM data cumbersome;
 - In the SPPs, under SSP2b, point b, notes “EM Analysts will analyse EM Records in accordance with the regional Longline EM Minimum Data Field Standards, Instructions and Protocols”;



- That on 15 and 16 April 2024, an informal subject matter expert group comprising staff from Australia, Fiji, FSM, SPC and FFA reviewed the Draft DCC Longline EM minimum data field standards (version DCC-November 2020) in light of the need to progress its consideration for adoption by FFC in October 2024.
- The potential objectives of a WCPFC EM programme and the ERandEM IWG email dated 4th March 2024 on Progressing Interim Electronic Monitoring Standards
- The DCC meeting 14th to 16th May reviewed the DCC Longline EM Minimum Data Fields Standard.

17)

This paper presents the **DCC Longline EM Minimum Data Fields Standard (version June 2024)**.

Proposed amendments

1. The proposed amendments are based on inputs from several practicing EM systems and data subject matter experts as useful for ensuring improved EM data production, quality and flow.
2. One of the key proposed amendments is to consider the mandatory nature of a given data field. To consider this, the summary of some of the key findings from SC Project 93 related to WCPFC data gaps, and regarding the potential for E-monitoring to fill the gaps was used. Another column with 2 sub-columns is added to the table in Appendix 1. (References: Paragraph 7- <https://www.wcpfc.int/doc/wcpfc-erandemwg4-2020-04/outcomes-review-commissions-data-needs-and-collection-programmes-sc>) - WCPFC-SC15-2019/ST-WP-04 AND WCPFC-TCC15-2019-14

18)

3. Specifically, the major potential application of EM for fleets not already significantly covered by observers, includes:
 - a. Reporting against WCPFC longline catch limits, and improving the precision of longline catch data for scientific purposes
 - b. Bycatch and non-target catch monitoring -the biggest gap being for non-key species
 - c. Monitoring discards of, and interactions with, key species that do not result in retention or landing
 - d. Augmenting data for science where coverage is currently low (e.g. size data for key species in the longline fishery)
 - e. Monitoring any exceptional at-sea transshipments permitted under CMM 2009-06
 - f. Monitoring the application of bycatch mitigation measures

19)

4. Considering that the above potential objectives (a to d) address CATCH monitoring and that (e to f) address COMPLIANCE monitoring, we propose that the mandatory nature of each field be considered against these two main objectives categories.

20)

5. The table in Appendix 1 below shows the proposed amendments.

APPENDIX 1: Proposed DCC Longline EM Minimum Data Fields Standard

				Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>	
DCC LL E-Monitoring minimum data fields	Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>	
VESSEL IDENTIFICATION					
Vessel identification	Vessel name	Name of vessel. This information would normally be linked to a VESSEL reference database (e.g. FFA Vessel Register) which will ensure consistency/standardisation.	The EM system should have linkages into the regional VESSEL REGISTERs (WCPFC and/or FFA) and so these fields must be generated by the EM system to be consistent with these vessel registers. <i>Refer to https://vessels.wcpfc.int/ https://vessels.wcpfc.int/ AND https://vessel-register.ffa.int/</i>	X	X
	Flag State Registration Number	Flag registration number of the vessel		X	X
	Flag	Flag or chartering nation of the vessel		X	X
	International Radio Call Sign (IRCS)			X	X
	Unique Vessel Identifier	IMO, WCPFC Vessel ID and the FFA VID would be generated by the EM system using these VESSEL reference databases.		If the IMO, WCPFC VID or FFA VID is provided, then there is no need to provide the other vessel identification data. If the IMO, WCPFC VID and/or FFA VID are not provided, then the EM data provider needs to provide other data (Vessel Name, Flag State Registration and IRCS to uniquely identify the vessel).	X

				Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>	
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	Comment	Is useful to allow EM analysts to make comments at the trip level.	EM Analyst to add additional information that is not captured elsewhere or needs further detail.		
TRIP INFORMATION					
	EM trip ID	Trip identifier. This value must be unique.	Generated by EM analysis system. It should be generated by the source system and could for example be formatted as follow: VESSEL NAME + TRIP DEPARTURE DATE	X	X
Trip information	TRIP START Date and time	The UTC date and time the vessel DEPARTS a port to start its fishing trip. If the vessel is departing from a carrier vessel after an at sea transshipment, the UTC date and time of the departure from a carrier vessel will be used.	Dates must be ISO 8601 standard and UTC. Latitude and Longitude coordinates must be ISO 6709 standard. The international standard of Location Code (UNLOCODE) for PORTs must be used.	X	X
	TRIP START Latitude and longitude	Port of DEPARTURE (UNLOCODE) for when a vessel starts a new trip from a port. If the vessel is departing from a carrier vessel after an at sea transshipment, this field will be "AT SEA" and the coordinates of the 'at sea' departure MUST be provided.	Data is entered into EM records analysis system by EM Analyst or auto generated or a combination of both. Data can be confirmed by EM analysts using other sources. 21)	X	X

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	TRIP END Date and time	<p>The UTC date and time the vessel RETURNS to port to END its fishing trip for a full or partial unloading.</p> <p>If the vessel is ENDING its fishing trip to a carrier vessel for a full or partial unloading, the UTC date and time of when this activity begins with the receiving vessel will be used.</p>		X	X
	TRIP END Latitude and longitude	<p>Port of RETURN (UNLOCODE) for when a vessel ENDS a fishing trip for a full or partial unload.</p> <p>If the vessel is ENDING its fishing trip AT SEA to a receiving vessel for a full or partial unloading, this field will be "AT SEA" the receiving vessel name and the coordinates of the 'at sea' transhipment MUST be provided.</p>		X	X
	Name of receiving vessel	For when the vessel is engaged in a transhipment activity. This field only required when start or end of trip is 'AT SEA'	Entered into EM records analysis system by EM Analyst.	X	X
	Total number of sets	Total number of sets conducted by the vessel during the trip.	Generated by EM system based on sensors or vessel speed.	X	X
EM ANALYSIS INFORMATION					
EM	Analysis Start date and time				

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
		The date and time when the analysis of the EM records STARTED. Required for national EM program management purposes.	Generated by the EM analysis system based on EM analyst activity.		
	Analysis End date and time	The date and time when the analysis of the EM records ENDED. Required for national EM program management purposes.	Generated by the EM analysis system based on EM analyst activity.		
	EM Analyst(s) code(s)	List of EM Analyst's EM Analyst code to identify who produced EM data.	Entered into EM system by EM Analyst. The EM Analyst code should correspond to the regional EM Analyst code reference table maintained at SPC.	X	X
	EM programme code	EM programme provider code e.g. FJEM (Fiji E-Monitoring Programme).	Entered into EM system by EM Analyst. It should adhere to the format "xxEM" where xx is the ISO two-letter country code of the country providing the data, and appropriate two-letter codes for any sub-regional programme.	X	X
	EM Data Quality Reviewer Code	The EM data Quality Reviewer is a qualified EM analyst who reviews EM data to verify and validate EM information produced by the EM analyst. List of EM Data Quality Reviewer (TRIP LEVEL). When this field is populated, it means that there was a data quality conducted.	Entered into EM system by EM Analyst (from a list of recognised EM staff). <u>The EM data quality review SSPs have yet to be agreed.</u>	X	X

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	HAUL analysis rate strategy	The review objective and the percentage of analysis rates are recommended to be between 10 – 20% (SC18-ST-IP-06). Programmes may vary analysis rates according to national procedures and rationale.	The options for HAUL coverage for SCIENCE and COMPLIANCE is entered by Analyst on % rate of review and objective.	X	X
	EM Service provider	The name of the EM technical service provider for the EM records analysis software. This may be different from the provider of EM equipment/hardware on the vessel.	Generated by the EM System	X	X
	EM system software name and version	Software name and version of the system used to analyse the EM records.	Generated by the EM system	X	X
CALIBRATION OF LENGTH MEASURING TOOL					
	Digital Calibration before analysis	Has the EM analyst performed a digital calibration of the measuring tool before the start of EM records analyses? Used to understand accuracy of length measurements when they are generated.	Yes or No. Entered by the EM analyst.	X	
SETTING AND HAULING INFORMATION					
	EM Set ID	Set identifier. This value must be a unique identifier for the whole set.	Generated by the EM system and must be formatted as follow: VESSEL NAME + TRIP DEPARTURE DATE + START OF SET DATE AND TIME	X	X
	Set Analysis method		Comments entered by EM analyst.		

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>	
DCC LL E-Monitoring minimum data fields	Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	At this stage it is recommended that national EM programmes and EM service providers describe here how EM records are generated, in particular how AI models are used. Longer term work on this field is needed to understand how some data fields are generated using human analysis only, AI or a combination of both.			
Set number	The number of the SET in the trip. This is to identify the SET for which EM data is produced. For example: A trip has 10 sets, the second set is analysed and EM data produced, the number for this field is 2.	Entered by the EM analyst	X	X
EM Set Analyst code	Code or list of Codes for the EM analyst(s) who produced EM data at the SET level.	Entered by the EM analyst	X	X
Set Analysis Start Date and Time	Date and time in UTC when the analysis of the set started. Required for national EM programme management.	Entered by Analyst or auto generated when analyst starts analysing the set OR when EM system on vessel automatically produces EM data using AI computing.		
Set Analysis End Date and Time	Date and time in UTC when the analysis of the set ended. Required for national EM programme management.	As above		

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
Setting and Hauling information					
	EM set reviewer code	Code or list of codes for the EM Data Quality Reviewer(s) who conducted a data quality review of EM data at the SET level.	As above		
	Data Quality Control (DQC) Process	To indicate if Data Quality Control procedures were conducted at the SET level. Data quality procedures include a secondary review which may be to verify or validate for example species identification of catch or SSIs caught including fate condition etc (Refer to FFA EM SSPs Activity 2b). Data quality procedures may be conducted for both science and potential compliance events.	The EM system should indicate whether DQC process(es) was followed and provide a description of the review protocol according to FFA EM SSPs Activity 2b.	X	X
	Date & time start of SET	Date and time when the first buoy enters the water to start the setting of line	Auto-generated by the EM system from the <u>float SET timestamping</u> . Minimum resolution of position is 1/1000 of a minute.	X	X
	Latitude and longitude of start of SET	GPS reading at time first buoy enters water		X	X
	Date and time of end of SET	Date and time the last buoy enters the water		X	X

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DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	Latitude and longitude of end of SET	GPS reading at time last buoy enters water		X	X
	Date and time of start of HAUL	Date and time the first buoy of the mainline is hauled from the water to start the haul		X	X
	Latitude and longitude of start of HAUL	GPS reading at time first buoy is hauled from the water	Auto-generated by the EM system from the <u>float HAUL timestamping</u> . Minimum resolution of position is 1/1000 of a minute.	X	X
	Date and time of end of HAUL	Date and time the last buoy of the mainline is hauled from the water to end the haul		X	X
	Latitude and longitude of end of HAUL	GPS reading at time last buoy is HAULED		X	X
	Date and time stamp for each FLOAT DEPLOYED	UTC Date and time (to nearest second) of each FLOAT SET Generated by the EM Analyst event declaration in the EM system. Analysis of this information usually takes 30-60 minutes per set. Potential to do this using technical enhancements in the future (i.e. RFID ¹ s or other sensors on FLOATS).			
	Latitude and longitude of each FLOAT DEPLOYED	GPS reading of each FLOAT SET (as recorded by EM equipment).		Minimum resolution of position is 1/1000 of a minute.	

¹ RFID - Radio-frequency identification

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	Date and time stamp for each FLOAT HAULED	UTC Date and time (to nearest second) of each FLOAT HAULED (<u>depending on target coverage</u>). These data are important for estimation of hook number of catch event, only the timestamps for the hauled floats either side of catch event may only be required (to be discussed further).	Generated by the EM Analyst declaration in the EM system. Potential to do this using technical enhancements in the future (i.e. RFIDs or other sensors on FLOATS). Minimum resolution of position is 1/1000 of a minute.	X	
	Latitude and longitude of each FLOAT HAULED	GPS reading of each FLOAT HAULED depending on target coverage (as recorded by EM equipment).	Generated by the EM Analyst event declaration in the EM system	X	
	Total number of baskets or floats	Number of baskets set; usually it is the same as the number of floats set minus one	With each float timestamped, the EM system should automatically calculate this.	X	
	Number of hooks between floats or number of hooks per basket	Number of hooks between floats. For calculating total number of hooks and depth range fished from the main line catenary curve.	PROTOCOL is to count hooks from first 3 baskets, middle 3 baskets and last 3 baskets and the average HOOKS per BASKET (successive floats) can then be determined. [SC18-ST-IP-6 suggests that the current protocol is insufficient]	X	
	Total number of hooks used in a set	Total number of hooks set, calculated by multiplying the number of baskets by number of hooks between floats	EM system calculates total number of HOOKS SET, calculated by multiplying the number of baskets by number of hooks between floats.	X	

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	Bait species	At the set level record the bait species used. Should cater for more than one species. [Crew can be informed in the vessel monitoring plan to show bait to the camera.]	PROTOCOL is to review the BAIT used during the analyses conducted over the setting of the first 3 baskets, the middle 3 baskets and the last 3 baskets. This should be possible using appropriate placement of the camera mounted to view the SETTING process. [Pending further discussions if this field is to be required, then there would be an additional ACTION for DCC to develop a protocol for how the EM Analyst will record this field. Whether it is an EM field or collected in another way.] .	X	
	Number of baskets	The total number of floats or baskets monitored by the EM Analyst in a single HAUL.	EM System calculates total number of BASKETS monitored using the FLOAT HAUL TIMESTAMP data.	X	
SPECIAL GEAR ATTRIBUTES					
Note that under WCPFC CMM 2018-03 - only applies between 25°S and 23°N; or exempted vessels: longline vessels are encouraged to employ one or more of the seabird mitigation measures listed in Table 1. (though encouraged, this is not mandatory) – This means it is unlikely that LL Vessels operating in and adjacent to FFA member countries will be deploying this gear (in the context of DCC EM minimum data fields). However, these data fields are required for other WCPFC fisheries and therefore are included for consistency, these fields could be populated even if the vessel is operating within 25°S and 23°N.					
Special gear	Tori line	Recorded at the set level whether the vessel uses a single or double tori lines when setting.	BIRD MITIGATION. PROTOCOL is to review the TORI POLE usage during the video analyses conducted over randomly selected video periods of the SET based on the compliance coverage strategy (yet to be established).		X

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
			EM analyst indicates Yes, No or Undetermined.		
	Blue dyed bait	Recorded at the set level, whether the vessel used bait that has been dyed especially to look blue.	BIRD MITIGATION. PROTOCOL is to review the BLUE DYED BAIT usage during the video analyses conducted over randomly selected video periods of the SET based on the compliance coverage strategy (yet to be established). EM analyst indicates Yes, No or Undetermined.		X
	Deep setting line shooter	Recorded at the set level whether the vessel used a deep setting line shooter.	BIRD MITIGATION. PROTOCOL is to review the DEEP SETTING Line shooter during the video analyses conducted over randomly selected video periods of the SET based on the compliance coverage strategy (yet to be established). EM analyst indicates Yes, No or Undetermined.		X
	Strategic offal disposal	Recorded at the SET level whether the vessel used strategic offal disposal.	BIRD COMPLIANCE at SET level. PROTOCOL is to review the OFFAL discharge during the video analyses conducted over randomly selected video periods of the SET based on the compliance coverage strategy (yet to be established). Potential with camera in setting area to capture field for verification (presence/absence). This would be evident if the		X

				Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>	
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
			vessel throws the offal on the same side or area as the hooks are being SET and so the EM analyst should be able to view this practice. The EM analyst indicates Yes, No or Undetermined.		
CATCH EVENT INFORMATION					
Catch event information	Catch Analysis Method	At this stage it is recommended that national EM programmes and EM service providers describe here how EM records with respect to catch eg. Species and length data are generated, whether AI models are used. Longer term work on this field is needed to understand how some data fields are generated using human analysis only, AI or a combination of both.	Comments to be entered by EM analyst.		
	EM catch analyst code	List of code/s for the EM analysts who produced EM data at the CATCH level.	Entered by EM Analyst	X	X
	EM catch reviewer code	List of code/s for the EM Data Quality Reviewers who conducted a data quality review of EM data at the CATCH level.	Entered by EM Analyst	X	X

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	[Catch] Event clip	A ten second short video clip in MP4 format of the catch event. Recommended for catch and compliance events.	<p>For example, each time an EM analyst produces data from analysing an event on the EM records, a short video clip (e.g. 5 seconds before and 5 seconds after the event) is produced and saved. Another approach could be that EM analysts decide if an event should have a short video clip produced. This would depend for example on the objective of the EM records analyses. Another though could be that the short clip is produced automatically for specific types of events (e.g. all interactions with SSIs, all pollution events).</p> <p>[link protocol versus field to be discussed] [longer video lengths can be compressed into 10 second timelapse videos]</p>		
	Hook number of Catch Event	Hook number <u>between successive floats</u> that the fish is caught on.	<p>EM Analyst to determine HOOK NUMBER for catch events.</p> <p>With the availability of FLOAT timestamp and the timestamp for when SNAP of each catch event comes onboard, an algorithm may be used as a proxy to estimate this field.</p>		

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
	Species code	FAO code of the species caught, identified by the EM Analyst and verified by EM Data Quality Reviewer.	Entered by EM Analyst	X	X
	Catch Length	The length of catch measured using recommended standard protocols. Noting the need for an assigned area on the deck where the fish should be measured for use of a digital measuring tool.	EM Analyst using the calibrated digital measuring tool to collect the appropriate length of the catch.	X	
	Length code	Length code for the type of measurement produced	EM Analyst declaration depending on how the catch was measured. <u>Must use regional standard codes for LENGTH CODES</u>	X	
	Digital measuring method	The code (M1, M2 or M3) of the digital measuring method used to provide length of specimens. EM analyst using a calibrated measuring tool to produce a digital length measurement = M1; EM analyst using a reference length to produce a visual estimate = M2; and Artificial intelligence tool to produce digital length measurement = M3.	EM analyst to select the code.		
	Catch image quality	Is the quality of the footage clear enough and free from obstructions that the snout and the	A yes or no field to be selected by EM analyst.	X	X

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
		tail of the fish are visible to a resolution where the measurement can be precisely taken, and the species identified with confidence because the determining characteristics are clearly visible.			
	Location of fish with respect to calibration area.	Is the measured fish located well within the calibration area on deck?	A yes or no field to be selected by EM analyst.		
	Length accuracy	The digital length measurement is precise or not? If yes, then the processes used to determine that the length measurement is precise must be provided. For the digital length measurement to be labelled as precise, values for the fields, 'digital calibration before analysis', 'catch image quality', and 'location of fish with respect to calibration area' MUST ALL BE YES. If digital measuring method=M2 then by default Length accuracy is FALSE.	Generated by the EM analyst using the criteria.	X	
	Sex	Sex of the species, if possible, to determine from external morphology.	EM Analyst declaration. Not possible for most species. Can collect sharks and rays sex, for example, if shown		

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>	
DCC LL E-Monitoring minimum data fields	Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
		ventrally. Some other species may be possible (e.g. mahi mahi, opah and sea turtles). Must use regional standard codes for SEX.		
Condition when caught	Condition of the catch when caught.	EM Analyst declaration. Must use the regional standard codes for CONDITION.	X	X
Fate	Fate of the catch. This indicates whether it was RETAINED, DISCARDED, or ESCAPED and how it is PROCESSED.	EM Analyst declaration. Must use the Regional standard codes for FATE.	X	X
Interaction	For Species of Special Interest (SSIs) only, details of the gear interaction with the SSI. For example, hooking position for marine turtles and sharks.	EM Analyst declaration. Must use the Regional standard codes for INTERACTION.		X
Condition when released	Condition of the catch if released or discarded.	EM Analyst declaration. Must use the regional standard codes for CONDITION.	X	X
Catch event date and time	UTC Date and time (to nearest second) of the catch event (as recorded by EM equipment).	Field automatically generated by EM system when the EM analyst registers the catch coming onboard or if not landed at all, when it is struck off, released or discarded.	X	X
Catch SNAP date and time	UTC Date and time (to nearest second) of when the branchline SNAP for each catch event is removed from the mainline.	Fields automatically generated by EM system and stored with the other relevant catch event data.		
Catch event latitude and longitude	Latitude and longitude of each catch (ISO 6709 standard)	Field automatically generated by EM system. Minimum resolution of position is 1/1000 of a minute.	X	X

				Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>	
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
POTENTIAL COMPLIANCE EVENTS					
Potential Compliance event	Date and time of potential compliance event	UTC Date and time (to nearest second) for each potential compliance issue recorded by the EM Analyst (the position as generated by EM equipment). <u>Note that Potential Compliance events can be recorded outside the fishing operation period.</u>	Fields automatically generated by EM system and stored with the related potential compliance event information.		X
	Latitude and longitude of compliance event	GPS reading for the potential compliance issue recorded by the EM Analyst (as generated by EM equipment)	Fields automatically generated by EM system and stored with the related potential compliance event information. Minimum resolution of position is 1/1000 of a minute.		X
	Compliance category code	Category (code) for the <u>potential</u> compliance issue as viewed and recorded by the EM Analyst, including <u>MARPOL (waste disposal, strategic disposal), TARGETTING species not licensed to do so</u> (e.g. shark , squid, DWS), <u>SOCIAL BEHAVIOUR</u> , alleged <u>CRIMINAL BEHAVIOUR</u> , <u>Licencing Conditions</u> , <u>SSI (birds, marine turtles, sharks)</u> , <u>GEAR Compliance (wire trace, shark line, etc.)</u> , <u>EM EQUIPMENT TRANSHIPMENT event</u> , other national regulations not covered. (See TABLE 2)	EM Analyst declaration when a compliance event is identified on the video. There will be a list of broad COMPLIANCE CATEGORIES to choose from <u>with these standards are yet to be determined</u> (e.g. the MCS Working Group may determine the list of broad COMPLIANCE Categories). The EM System will need to have a component that allows the EM Analyst to efficiently enter a potential compliance event when viewed in the video (and based on the standard viewing or any additional EM analysis rate based on compliance only). The EM System will allow the EM Analyst to do the following:		

			Minimum Data Field? <i>a-f refers to Project 93 potential objectives</i>		
DCC LL E-Monitoring minimum data fields		Description	Notes on EM PROTOCOL <i>(How the data are to be acquired)</i>	CATCH Monitoring <i>(a to d)</i>	COMPLIANCE Monitoring <i>(e to f)</i>
			<ul style="list-style-type: none"> ○ At the relevant point in the video, the EM Analyst will SELECT the Potential Compliance event TOOL option. ○ Selecting this option will display the range of Compliance CATEGORIES and then the EM Analyst will select one of these. ○ The range of potential compliance events under the selected CATEGORY will be displayed and the EM Analyst will select the relevant compliance event. ○ The EM Analyst will add any necessary comments related to this particular potential compliance event and on selecting the SAVE/SUBMIT option, the information, with the timestamp and position relevant to that point in the video, will be stored by the EM system with the compliance information. 		
	Compliance event type [coded]	Specific Compliance Event under this category (See Table 2)			X
	Compliance note	Notes from the EM Analyst on each potential compliance issue [Event clip can also capture potential compliance events for secondary review by EM data quality reviewer as per FFA EM SSPs Activity 2b. Note that as it is in the table this is captured as Catch event short clip but can be used for compliance events as well]	EM Declaration. The EM analyst (sometimes in conjunction with compliance personnel) will provide detailed notes on the compliance issue.		
	Others				

Table 2. Potential Compliance CATEGORIES and EVENTS reference codes table (for internal EM system database)

CATEGORY CODE	CATEGORY	COMPLIANCE EVENT CODE	GEN-3 code	COMPLIANCE EVENT	Description	
P	POLLUTION	P1	PN-a	Waste disposal at sea	Disposal of any metals, plastics, chemicals, or fishing gear	Generated by the EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy
		P2	PN-b	Oil discharged	Discharge of any oil	
T	TARGETTING	T1	NR-b	Target species	Target species other than those they are licensed to target	EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy <i>Maybe be confirmed from the species (composition) recorded under the Catch Event information section</i>
B	SOCIAL BEHAVIOUR	B1		Observer safety	Did the operator or any crew member assault, obstruct, intimidate, or interfere with observers in the performance of their duties	EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy
		B2	RS-a	Crew safety	Mistreat other crew	
C		C1		Extreme violence		EM Analyst declaration during video analyses conducted over randomly selected video

CATEGORY CODE	CATEGORY	COMPLIANCE EVENT CODE	GEN-3 code	COMPLIANCE EVENT	Description	
	ALLEGED CRIMINAL BEHAVIOUR	C2		Transfer/transport of people		periods based on compliance coverage strategy
		C3		Contraband	Importing/exporting goods illegally including drug trafficking	
L	LICENSING	L1	NR-a	Prohibited areas	Fish in areas where the vessel is not permitted to fish	EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy <i>Maybe auto generated if possible by EM, based on the info in the SETTING AND HAULING section? (info there included date & time start & end of SET, position data for start & end of set etc)</i>
		L2	NR-f	Bunker	Was involved in bunkering activities	EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy
		L3	NR-g	Stowing of gear	Fail to stow fishing gear when entering areas where vessel is not authorised to fish	EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy
S	SSIs	S1	SI-a	SSI landed	Land on deck Species of Special Interest (SSIs)	<i>For SSIs that are recorded (eg. OCS, FAL):</i> Auto generated by the EM system base on the <u>Species Code</u> + <u>Fate</u> field under CATCH EVENT INFORMATION <i>[NOT SURE WHETHER THIS IS NEEDED, MAYBE NOT, BUT....For SSI that may not be recorded but were landed on deck eg. turtles:</i>

CATEGORY CODE	CATEGORY	COMPLIANCE EVENT CODE	GEN-3 code	COMPLIANCE EVENT	Description	
						<i>EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy</i>
		S2	SI-b	SSI interaction	Interact (not land) with SSIs	EM Analyst declaration during video analyses conducted over randomly selected video periods based on compliance coverage strategy
		S3		Shark finning	Prohibit shark finning	
G	GEAR	G1		Large scale driftnet	Did the vessel use large scale driftnet?	EM Declaration. The EM analyst (sometimes in conjunction with compliance personnel) will provide detailed notes on the compliance issue.
		G2		Wire trace/Shark lines	Did the vessel use wire trace or have shark lines?	EM Declaration. The EM analyst (sometimes in conjunction with compliance personnel) will provide detailed notes on the compliance issue.
		G3		Line cutters & de-hookers	Did the vessel carry and use line cutters & de-hookers to handle and release turtles?	Check if there was a SSI interaction that involve turtle: EM Declaration. The EM analyst (sometimes in conjunction with compliance personnel) will provide detailed notes on the compliance issue.

CATEGORY CODE	CATEGORY	COMPLIANCE EVENT CODE	GEN-3 code	COMPLIANCE EVENT	Description	
E	EM EQUIPMENT	E1		EM Equipment tampering [maintenance]	Tampering with EM equipment eg. blocking/obstructing/cutting the camera	EM Declaration. Noted on occasions when the EM analyst identifies tampering with EM equipment. Could also be autogenerated through EM equipment sensors.
T	TRANSHIPMENT	T1	NR-e	[Possible] transshipment	Did two vessels come together alongside each other? [EM Analyst witnessed]	Can be auto generated base on vessels proximity?
	OTHER			Other		

**add other to capture other compliance events not in the table above.