7TH MEETING OF THE SCIENTIFIC COMMITTEE

La Havana, Cuba, 7 to 12 October 2019

SC7 – Doc11
Observer coverage in SPRFMO (coarse summary)

Secretariat

1. Background

SC7-Doc09 describes the intersessional web meetings the SPRFMO Scientific Committee (SC) held in July 2019 to plan and prepare for the main SC7 meeting.

> *During those meetings, there was a question on sampling representativeness over large spatial-temporal areas as found in the SPRFMO fisheries. There was an expectation that the fishing effort/observer overlap would vary (perhaps by catch/area or temporal scale) and that this variation needed to be identified and understood especially for those fisheries with less than 100% coverage*.

In addition, the current Scientific Committee multi-annual workplan (SC7-Doc05) asks the SC to:

> *"Provide advice on the appropriate levels of observer coverage for fisheries for which there is no fishery-specific CMM in force".*

The purpose of this paper is, therefore, to support SC7 Agenda item 8d) under which:

> *The SC will also discuss current observer coverage in SPRFMO fisheries, coverage rates and provide advice on the appropriate levels of observer coverage for fisheries for which there is no fishery-specific CMM in force.*

2. Observer data collection as per the Data standards (CMM02-2018)

Currently SPRFMO relies on data collected by the various national observer programmes. The Data standards CMM 02-2018 paragraph 2a) specifies that:

"Members and CNCPs are to develop, implement and improve observer programmes to attain the following objectives:

i) To collect vessel information, effort and catch data for all fisheries and fished species in the Convention Area, including target, by-catch and associated and dependent species;

ii) To collect biological or other data and information relevant to the management of fishery resources in the Convention Area, as specified in these standards, or as identified from time to time by the Scientific Committee or through processes identified by the Commission;

iii) To collect relevant scientific information related to the implementation of the provisions of the Conservation and Management Measures (CMMs) adopted by the Commission;

iv) To collect representative data, including length-frequency and biological samples, across the Convention Area, distribution of fishing effort, seasons, fishing fleets and fleet types."

The Information and Data to be collected by observer programmes is detailed in Annex 7 (Parts A to N) of CMM02-2018. Annex 1 of this document contains the list of fields and associated explanations for Observer trawl data. The other observer templates and associated explanation forms are available on the data section of the SPRFMO website.

Currently SPRFMO observer information is used to:

- Cross check information contained in the associated fishing activity data;
- Compile data on bycatch of marine mammals, seabirds, reptiles and other species of concern;
- Provide length frequency inputs for SPRFMO stock assessments;
- Complete certain information requests received by the Secretariat.

3. Fishery specific CMMs in SPRFMO

The level of Observer coverage in SPRFMO is currently mandated under three CMMs.

CMM 01-2019 (Jack mackerel) governs the jack mackerel fishery conducted in FAO Area 87. Paragraph 22 of this CMM provides that:

> *Until the Commission adopts an Observer Programme in accordance with Article 28 of the Convention, all Members and CNCPs participating in the Trachurus murphyi fishery shall ensure a minimum of 10% scientific observer coverage of trips for trawlers and purse seiners flying their flag and ensure that such observers collect and report data as described in CMM 02-2018 (Data Standards). In the case of the flagged vessels of a Member or CNCP undertaking no more than 2 trips in total, the 10% observer coverage shall be calculated by reference to active fishing days for trawlers and sets for purse seine vessels.*

CMM 03-2019 (Bottom fishing) governs the Trawl and Longline bottom fisheries conducted in FAO Area 81. Annex 8 of this CMM specifies minimum observer coverage levels of:

Gear Type	*Minimum level of observer coverage*
Vessel using bottom trawl and mid-water trawl gear	*100% observer coverage*
Bottom line gear	*At least 10% observer coverage for the fishing year* *(Expressed as the percentage of the total number of observed hooks)*

CMM 13-2019 (Exploratory Fisheries) governs the management of new and exploratory fisheries in the SPRFMO Convention Area. Paragraph 18 of this CMM provides that:

> *Members and CNCPs whose vessels participate in exploratory fisheries shall ensure that each vessel that flies its flag carries one or more independent observers sufficient to collect data in accordance with the Data Collection Plan.*

4. Fisheries covered by this paper

This paper provides summaries of observer coverage for the following SPRFMO Area fisheries:

- The Jack mackerel pelagic trawl fishery (corresponding to Fleet 4 in the assessment), and;
- The Bottom longline fishery (conducted in FAO Area 81).

The CMMs for both of the above fisheries require a minimum of 10% observer coverage. Other SPRFMO fisheries which are not covered in this this paper are:

- Fisheries which should have 100% coverage (i.e. Bottom/mid-water trawl and exploratory);
- The Squid jigging fishery (for which the Secretariat holds only one observed trip);
- Sporadically occurring fisheries (i.e. High seas purse seining, trawling for Squid and/or Alfonsino [in FAO 87]).

5. Methods

CMM 02-2018 (Data standards) and its predecessors have meant that the Secretariat holds row-by-row[1] fishing activity and observer data, in many cases beginning 2007. Both data sets contain data limited to actual fishing events and (in most cases) not time spent steaming or searching.

Each row in the "Catch Event" table within the database corresponds to one species caught within one fishing event at a particular time and place by one vessel. There may be multiple species caught within each fishing event and there may be multiple fishing events at various times/locations within a single day. Those data were extracted from the SPRFMO database in order to create summary plots of Observer coverage.

In all cases, active vessel days (AVD) was the metric used to compare fishing activity with observer coverage[2]. For the purposes of these comparisons, one AVD was defined as any day upon which one (or more) fishing event(s) was started. Multiple vessels beginning fishing events on the same day were counted as multiple AVDs. Similarly an AVD (observed) only counted then days in which at least one fishing event started (that had been observed).

6. Observer Coverage

6.1. Coverage by Member

Figure 1 shows that since 2012, effort (blue circles) in the offshore Jack mackerel trawl fishery has generally been constant. During that period Peru and Korea have maintained observer coverage levels of approximately 100%. All other Members have also maintained observer coverage at or well above 10% (except in 2015 for the Russian Federation and Vanuatu).

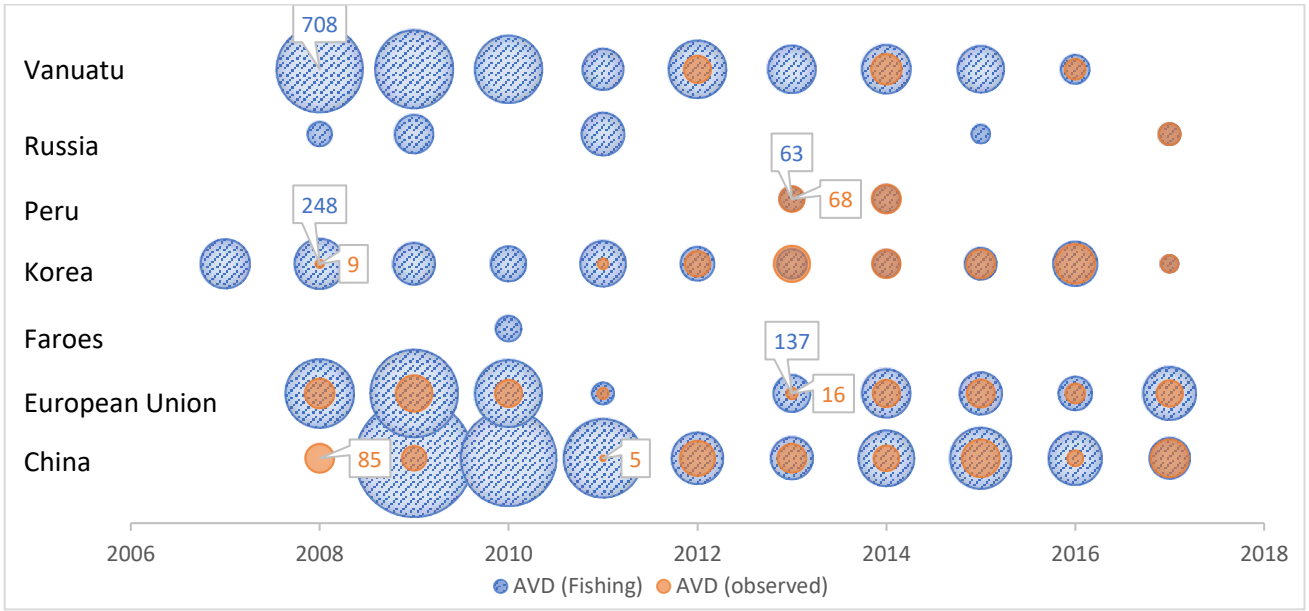

Figure 1: Observer coverage in the offshore Jack mackerel fishery (by Member)

[1] Also known as tow-by-tow, haul-by-haul, set-by-set or event data.

[2] Number of hooks would have been the preferred metric for bottom longline; but due to time constraints and the wish to have easily comparable plots a single metric was chosen.

Figure 2 indicates that observer coverage in the SPRFMO bottom longline fisheries appears to have significant gaps. These gaps appear generally because the associated submissions cannot be loaded into the SPRFMO database either because they were provided as 5x5 degree summarised information (in the case of New Zealand) or because the submissions fail validation (Australia). Individual Members have been made aware of these issues. For the years in which the information is available the average coverage level is 13% and appears steady.

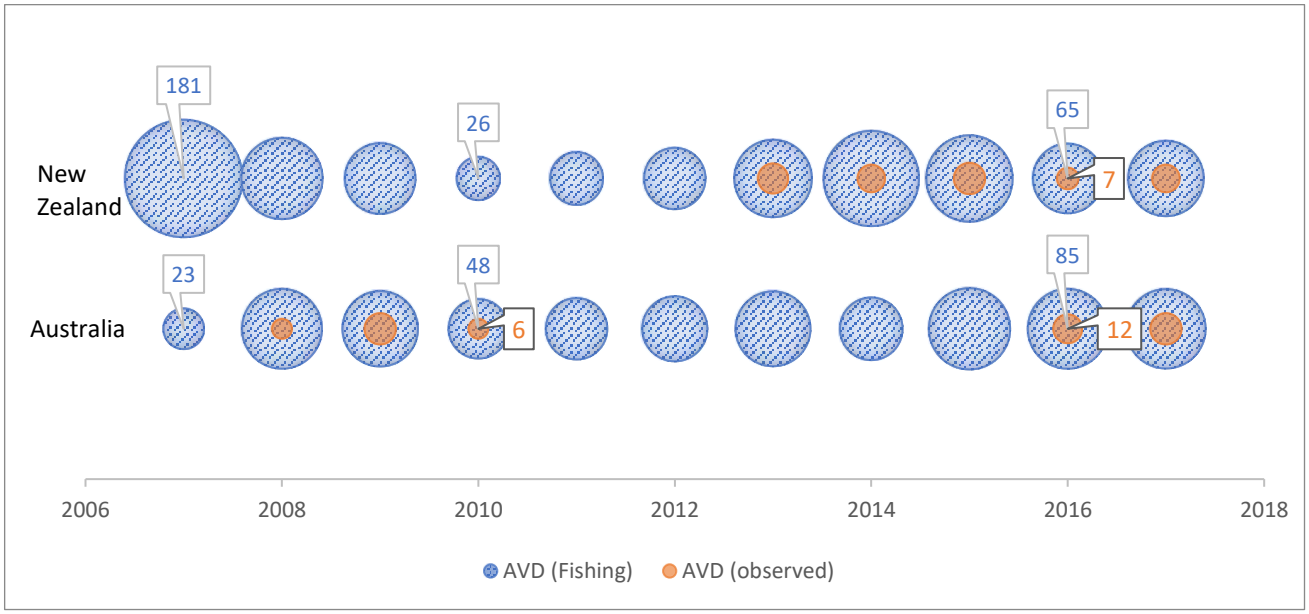

Figure 2: Observer Coverage in the SPRFMO Bottom Longline fisheries (by Member)

6.2. Temporal observer coverage

Figure 3 shows that since 2012 Jack mackerel observer coverage has covered the bulk of the fishing although the end of the season goes unobserved in most years.

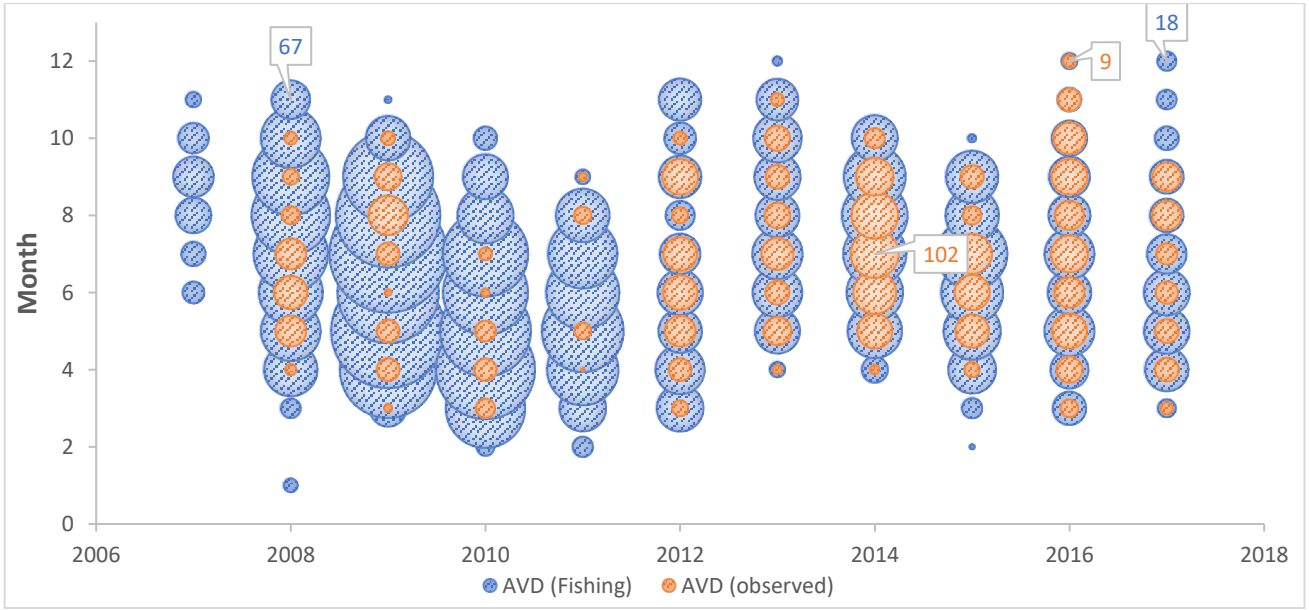

Figure 3: Observer coverage in the offshore Jack mackerel fishery by month and year.

Temporal observer coverage in the SPRFMO bottom longline fisheries is shown in Figure 4. Because these fisheries generally only have one to two vessels active at any one time the information has been grouped up into quarters. The 3rd quarter (July -Sept) does not tend to be observed, but the 4th quarter is consistently covered.

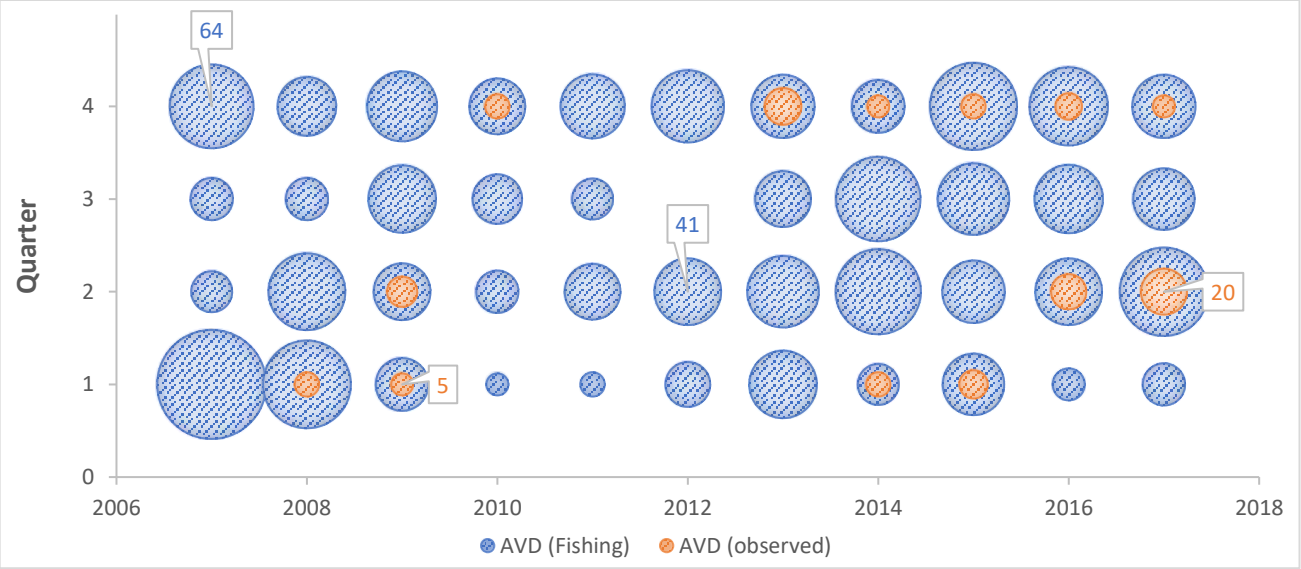

Figure 4: Observer coverage in the Bottom longline fishery by quarter and year.

6.3. Spatial coverage

Figure 5 shows the distribution of observer coverage outside the EEZs of Chile, Peru and Ecuador. In general, most major fishing areas are covered although it does appear that there may be some fishing that is occurring very close to the EEZ boundaries which is not being observed.

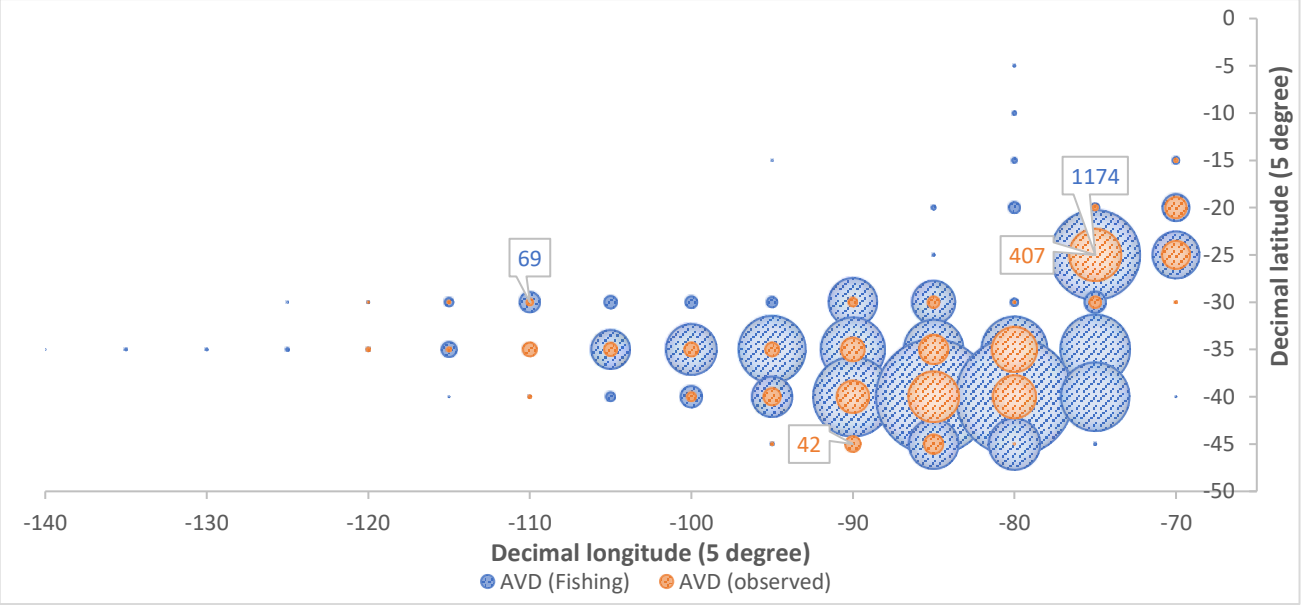

Figure 5: Spatial observer coverage in the offshore Jack mackerel fishery.

Figure 6 shows the distribution of observer coverage to the West and East of New Zealand. While most fishing that is occurring in the Tasman seas is observed the rare longline fishing activities that occurred on the Louisville Ridge and further south were not observed.

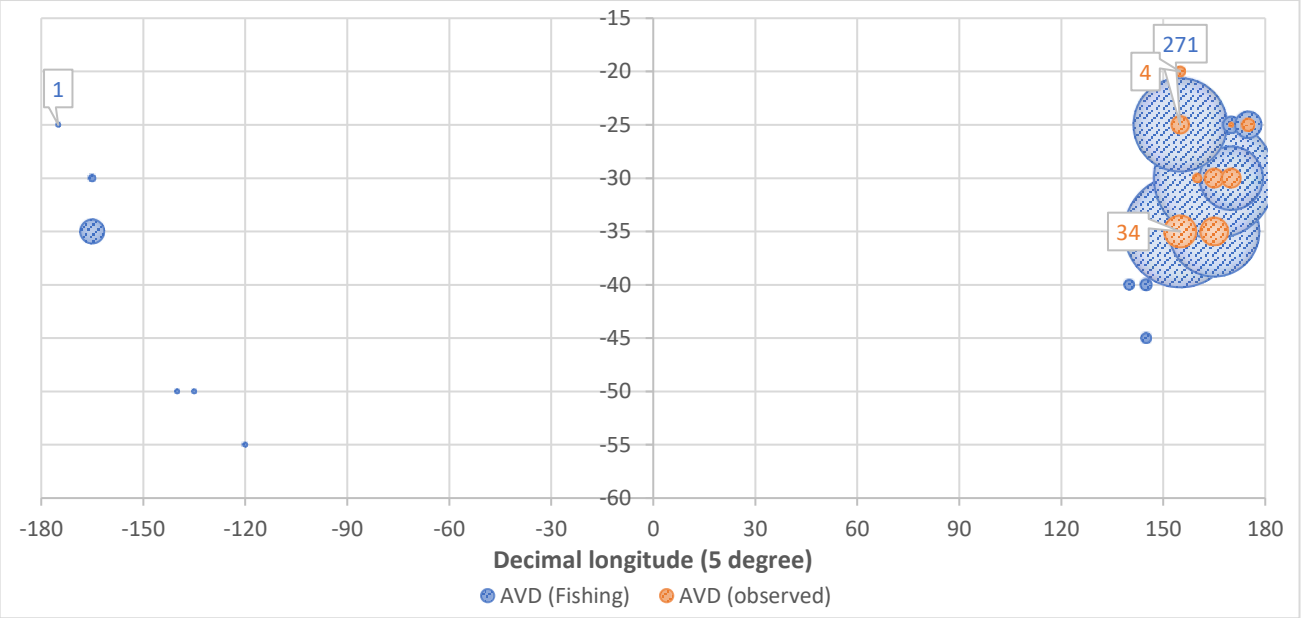

Figure 6: Spatial observer coverage in the SPRFMO bottom longline fisheries.

7. SPRFMO SC considerations

- SC7 is asked to consider and discuss the information provided on observer coverage rates in the SPRFMO Jack mackerel and Bottom Longline fisheries presented above and provide any advice it deems appropriate.

In formulating its advice, the SC may wish to consider the recent Commission request (contained in COMM7-report, paragraph 110) relating to observers on board fishing boats for which there is no fishery-specific CMM in force:

> *" … The SC shall provide advice to the 8th meeting of the Commission in 2020 on the appropriate levels of Observer coverage for these fisheries. …"*

The SC may also wish to consider CMM 16-2019 (Observer programme) paragraphs 14 and 15 which state:

> *"For fisheries where 100 percent of observer coverage is not required, Members and CNCPs shall ensure that the method of assigning observers on vessels flying their flag is representative for the fishery to be monitored and commensurate with the specific data needs of the fishery as a whole. This requirement is subject to practical constraints related to Members and CNCPs with a small number of fishing vessels or trips.*
>
> *In relation to paragraph 14 of this CMM, Members and CNCPs shall document and provide information on the methods used to allocate observers on fishing vessels flying their flag to meet the observer coverage requirements, and shall also provide this information in their National Annual Report to the SC. The SC shall review the method used by each Member or CNCP and provide recommendations for improvement, when necessary."*

Annex 1: The Explanatory template for SPRFMO Observer Trawl data collection

Observer Trawl Data				
Observer Vessel Header (one row per submission):				
Data Field	**Reference (CMM 02)**	**Data Type**	**Example**	**Additional Explanation**
Current vessel flag	Annex 7 part A 2a)	ISO 3-alpha country code	AUS	The Flag State or Member the vessel was registered with during this fishing
Vessel name	Annex 7 part A 2b)	Capitalised Free text	FV. EAGLE	The current vessel name
First Name of the Captain	Annex 7 part A 2c)	Free text	John	The first name of the vessel Captain during the observed fishing trip
Surname(s) of the Captain	Annex 7 part A 2c)	Free text	Smith	The surname of the vessel Captain during the observed fishing trip
First Name of Fishing Master	Annex 7 part A 2d)	Free text	John	The first name of the fishing master of the vessel during the observed fishing trip
Surname (s) of Fishing Master	Annex 7 part A 2d)	Free text	Smith	The surname of the fishing master of the vessel during the observed fishing trip
Vessel registration number	Annex 7 part A 2e)	Free text and/or numeric	7767	The registration number issued to the vessel
International radio call sign (if any)	Annex 7 part A 2f)	Free text and/or numeric	AXA1552	The call sign of the vessel
Lloyd's/ IMO number (if allocated)	Annex 7 part A 2g)	Vessel identifying 7 digit number	1234567	The unique identifier assigned to the ship by IHS Fairplay
Previous names (if known)	Annex 7 part A 2h)	Comma separated Free text	PRION, GULL	A list showing all previous vessel names
Port of registry	Annex 7 part A 2i)	Free text	Sydney	The home port that the vessel is currently registered with
Previous flag (if any)	Annex 7 part A 2j)	ISO 3-alpha country code	PER	The previous flag state (if different to current)
Type of vessel: ISSCFV codes	Annex 7 part A 2k); K 4c)	Alpha or numeric code (ISSCFV)	01.2.0	The vessel type (singular), as listed in Annex 10 of CMM 02 (both standard abbreviations or codes accepted)
Type of fishing method(s): ISSCFG codes	Annex 7 part A 2l); K 4b)	Alpha or numeric code (ISSCFG)	03.2.0	The fishing gear this vessel uses as listed in Annex 9 of CMM 02 (both standard abbreviations or codes accepted)
Length (m)	Annex 7 part A 2m); K 5b)	Numeric	51	The length of the vessel in metres
Length Type: e.g. LOA or LBP	Annex 7 part A 2n)	*e.g.* LOA or LBP	LOA	The type of length measurement used (either LOA for length overall or LBP for length between perpendiculars)
Beam (m)	Annex 7 part A 2o); K 5b)	Numeric	8.2	Width of the hull in metres
Gross Tonnage (GT)	Annex 7 part A 2p)	Numeric	655	Volume of all the ship's enclosed spaces measured to the outside of the hull framing (GT is the preferred unit of tonnage)
Gross Register Tonnage (GRT)	Annex 7 part A 2q)	Numeric		Total measured cubic content of the permanently enclosed spaces of a vessel, with deductions for living quarters (to be provided if GT is not available, or in addition to GT)
Power of main engine(s) (kW)	Annex 7 part A 2r); K 5d)	Numeric	2500	The total power of the main engine(s). Report as a single figure in kilowatts
Hold capacity (m^3)	Annex 7 part A 2s); K 5c)	Numeric	250	The volume of the fish hold in cubic metres
Equipment on board which may affect fishing power	Annex 7 part A 2t)	Free text	Doppler current monitor	Record of the equipment on board which may affect

				fishing power factors (navigational equipment, radar, sonar systems, weather fax or satellite weather receiver, sea-surface temperature image receiver, Doppler current monitor, radio direction finder), where practical
Total number of crew (all staff excluding observers)	Annex 7 part A 2u)	Numeric	99	The total number of staff on board the vessel during the fishing trip, excluding observers
Total No. Tows or Sets in trip		Whole number	46	The total number of tows during the fishing trip
No. of Sets/ Tows observed		Whole number	23	The total number of tows during the fishing trip that the observer was able to observe
Observer Person header (one line per observer, 2 max):				
Observer Number (1 or 2)		Numeric (eg 1 or 2)	1	An identifying number for this Observer within this particular trip
Observer First Name	Annex 7 part A 3a)	Free text	David	The first name of the Observer
Observer surname	Annex 7 part A 3a)	Free text	Jones	The surname of the Observer
Observer's Organisation Name	Annex 7 part A 3b)	Free text	National Science Research Organisation	The Organisation that the Observer represented
Date Observer Embarked (UTC)	Annex 7 part A 3c); K 2	Date format YYYY-MON-DD	2017-Jul-01T00:00:00	The date (UTC) that the Observer embarked for this observed trip
Port of Embarkation	Annex 7 part A 3d)	Free text	Sydney	The port at which the Observer embarked
Date Observer Disembarked (UTC)	Annex 7 part A 3e); K 2	Date format YYYY-MON-DD	2017-Jul-31T23:59:59	The date (UTC) that the Observer disembarked from this observed trip
Port of Disembarkation	Annex 7 part A 3f)	Free text	Sydney	The port at which the Observer disembarked
Trawl (one line for each different species caught per tow, or one line per tow if nothing was caught):				
Observer Number [Number of the Observer observing this tow]		Numeric (eg 1 or 2)	1	This number can be used to identify which Observer observed this particular tow
Tow start date and time (UTC)	Annex 7 part B 2a; K 2	Datetime format YYYY-MON-DDThh:mm:ss	2017-Jul-17T13:10:00	The date/time (UTC) at the start of the tow (the time gear starts fishing). Cannot be within any other towing period
Tow end date and time (UTC)	Annex 7 part B 2b; K 2	Datetime format YYYY-MON-DDThh:mm:ss	2017-Jul-17T17:30:00	The date/time (UTC) at the end of the tow (the time the gear begins to be hauled back on board). Cannot be within any other towing period
Tow start: Latitude	Annex 7 part B 2c; K 3	Latitude (decimal degrees)	-43.97	The latitude of the position of the start of the tow (resolution 2 decimal places ~one minute). Southern latitudes should be indicated by the use of negative decimal degree values.
Tow start: Longitude	Annex 7 part B 2c; K 3	Longitude (decimal degrees)	-86.25	The longitude of the position of the start of the tow (resolution 2 decimal places ~one minute). Western longitudes should be indicated by the use of negative numbers.
Tow end: Latitude	Annex 7 part B 2d; K 3	Latitude (decimal degrees)	-43.75	The latitude of the position of the end of the tow (resolution 2 decimal places ~one minute). Southern latitudes

				should be indicated by the use of negative decimal degree values.
Tow end: Longitude	Annex 7 part B 2d; K 3	Longitude (decimal degrees)	-86.67	The longitude of the position of the end of the tow (resolution of 2 decimal places ~one minute). Western longitudes should be indicated by the use of negative numbers.
Intended Target Species	Annex 7 part B 2e; K 4a)	Species code (FAO 3-alpha code)	CJM	The species that the fishing operation was aiming to catch (using FAO code http://www.fao.org/fishery/collection/asfis/en)
Trawl type ISSCFG code	Annex 7 part B 2f; Annex 10	Alpha or numeric code (ISSCFG)	TM	The type of fishing gear being used as specified by bottom or midwater trawl codes from the standard ISSCFG fishing gear standards in Annex 9 of CMM 02, for example either 03.2.9 or TM for midwater trawls or 03.1.9 or TB for bottom trawls.
Trawl type (Single S/ Double D/ Triple T)	Annex 7 part B 2g	*e.g.* S, D or T	S	The configuration of the trawl - whether there are 1 (S), 2 (D), or 3 (T) nets
Height of Net Opening (m)	Annex 7 part B 2h; K 5b)	Numeric	60	The average distance from the ground rope of the net to the headline during the tow
Width of Net Opening (m)	Annex 7 part B 2i; K 5b)	Numeric	120	A measure of how wide the net opening is during the tow
Mesh size (mm)	Annex 7 part B 2j	Numeric	110	The mesh size of the cod-end net (measured in millimetres, when stretched)
Mesh type	Annex 7 part B 2j	Free text	Diamond	A description of the type of mesh (diamond, square etc)
Gear depth (m)	Annex 7 part B 2k; K 5b)	Numeric	100	The depth of the net footrope, taken at the start of fishing
Bottom depth (m)	Annex 7 part B 2l; K 5b)	Numeric	600	The distance from the seabed to the ocean surface, taken at the start of fishing
Bycatch mitigation measures employed	Annex 7 part B 2q	Free text	T1, B1	Identify any measures employed to mitigate bycatch, using where appropriate the code for each piece of equipment described on the the Bird Scaring Line or Bird Baffler tabs, for example T1, B1 for a tori line and a Bird baffler.
Total quantity of Sensitive Benthic Species caught (live weight - kg)	Annex 7 part H 1c); K 5a)	Numeric	126	An overall estimate of the total live weight (kg) of all sensitive benthic species caught in the tow
Total quantity of Sensitive Benthic Species caught (volume - m^3)	Annex 7 part H 1c); K 5c)	Numeric	2.5	An overall estimate of the total volume (in cubic metres) of all sensitive benthic species caught in the tow
Species Code	Annex 7 part B 2m; K 4a); G 1a	Species code (FAO 3-alpha code)	MAS	The species that was caught, retained or discarded (using FAO code http://www.fao.org/fishery/collection/asfis/en). This will be a fish species, sensitive benthic species, mammal, bird or a reptile. Use the lowest known taxon (species if possible, but genus or family is acceptable)

Retained catch (Live weight - kg, excludes sensitive benthic species)	Annex 7 part B 2m; K 5a)	Numeric	30000	A live weight (kg) estimate of the catch that was retained on board (one line per species). If the Species Code (in column W) refers to a sensitive benthic species, then leave blank
Discarded catch (Live weight - kg, excludes sensitive benthic species)	Annex 7 part B 2p; K 5a)	Numeric	105	A live weight (kg) estimate of the catch that was discarded (one line per species). If the Species Code (in column W) refers to a sensitive benthic species, then leave blank
Discarded catch (volume estimate m^3, excludes sensitive benthic species)	Annex 7 part B 2p; K 5c)	Numeric	2.5	A volume (m^3) estimate of the catch that was discarded (one line per species). If the Species Code (in column W) refers to a sensitive benthic species, then leave blank
Amount of Sensitive Benthic Species caught (live weight - kg)	Annex 7 part H 1b); K 5a)	Numeric		A live weight (kg) estimate of the amount of sensitive benthic species caught (particularly vulnerable or habitat forming species such as a sponges, sea-fans or corals). Leave blank, unless the Species Code (in column W) refers to a sensitive benthic species
Amount of Sensitive Benthic Species caught (volume estimate - m^3)	Annex 7 part H 1b); K 5c)	Numeric		A volume (m^3) estimate of the amount of sensitive benthic species caught (particularly vulnerable or habitat forming species such as a sponges, sea-fans or corals). Leave blank, unless the Species Code (in column W) refers to a sensitive benthic species
Incidental Captures of Species of Concern (Marine mammal/Bird/Reptile/Other) (count)	Annex 7 part B 2n; G 1b)	Numeric		A count of incidental captures by species. Leave blank, unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern (as listed in Annex 14 of CMM 02).
No. Bycatch Adults in Vigorous State	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of adults that were in a vigorous state when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern.
No. Bycatch Adults Alive	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of adults that were alive (but not vigorous nor lethargic) when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern
No. Bycatch Adults in Lethargic State	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of adults that were in a lethargic state when released. Leave blank unless the Species Code (in column W) was a mammal, bird or

				reptile or other species of concern
No. Bycatch Adults Dead	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of adults that were dead when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern.
No. Bycatch Juveniles in Vigorous State	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of Juveniles that were in a vigorous state when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern.
No. Bycatch Juveniles Alive	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of Juveniles that were alive (but not vigorous nor lethargic) when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern.
No. Bycatch Juveniles in Lethargic State	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of Juveniles that were in a lethargic state when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern.
No. Bycatch Juveniles Dead	Annex 7 part G 1a); G 1d)	Numeric		If there were incidental captures, then this is the number of Juveniles that were dead when released. Leave blank unless the Species Code (in column W) was a mammal, bird or reptile or other species of concern.
Length frequencies (one sheet per submission, one line per length category per sample):				
Observer Number		Numeric (eg 1 or 2)	1	This number can be used to identify which Observer conducted this length frequency measurement
Tow/Set Start Date and Time (UTC)	Annex 7 part B 2a; K 2	Datetime format YYYY-MON-DDThh:mm:ss	2017-Jul-17T13:10:00	The date/time (UTC) at the start of the tow; must match the time listed on the Trawl worksheet
Tow/Set End Date and Time (UTC)	Annex 7 part B 2b; K 2	Datetime format YYYY-MON-DDThh:mm:ss	2017-Jul-17T17:30:00	The date/time (UTC) at the end of the tow; must match the time listed on the Trawl worksheet
Total weight of sample from this set/tow (kg)	Annex 7 E; K 5a)	Numeric	50	The total weight (kg) of the length frequency sample
Method of estimating total weight of sample	Annex 7 E	Free text	Salter scales	A description of how the total weight of the sample was measured or estimated
Species Code: FAO 3-alpha code	Annex 7 E; K 4a)	Species code (FAO 3-alpha code)	MAS	The species code for the fish that is being measured (using FAO code http://www.fao.org/fishery/collection/asfis/en). There should also be a corresponding retained catch amount on the Trawl tab

				(as the fish must have been caught in order to have been sampled)
Length of fish Submit all lengths in mm (even if they were measured to the nearest cm)	Annex 7 E	Numeric	410	The measured length of the fish (in mm): i) Fish species (other than skates, rays and sharks) should be measured in fork length. If maximum length is greater than 400 mm fork length, then measure to the nearest 10 mm (else to the nearest millimetre). ii) Use maximum disk width for skates and rays iii) shark species should be measured using an appropriate length measurement (refer FAO technical report 474 on measuring sharks). Total length is the default
Number of fishes measured at this length	Annex 7 E	Whole number	4	The number of fish (of this species) measured at this length from this tow. Note that this is a number, not a percentage
Type of measurement used	Annex 7 E	Free text	Fork Length	A description of the measurement used to determine the fish length (for example, total length, standard length or fork length).
Biology & Individual Lengths (one sheet per submission, one line per fish examined):				
Observer Number		Numeric (e.g. 1 or 2)	1	This number can be used to identify which Observer conducted this biological sample
Tow Start Date and Time (UTC)	Annex 7 part B 2a; K 2	Datetime format YYYY-MON-DDThh:mm:ss	2017-Jul-17T13:10:00	The date/time (UTC) at the start of the tow; must match the time listed on the Trawl worksheet
Tow End Date and Time (UTC)	Annex 7 part B 2b; K 2	Datetime format YYYY-MON-DDThh:mm:ss	2017-Jul-17T17:30:00	The date/time (UTC) at the end of the tow; must match the time listed on the Trawl worksheet
Total weight of sample from this tow (kg)	Annex 7 E; K 5a)	Numeric	50	The total weight (kg) of the biological sample
Method of estimating total weight of sample?	Annex 7 E	Free text	Salter scales	A description of how the total weight of the sample was measured or estimated
Species Code: FAO 3-alpha code	Annex 7 part F 1a); K 4a)	Species code (FAO 3-alpha code)	MAS	The species code for the fish that is being measured (using FAO code http://www.fao.org/fishery/collection/asfis/en). There should also be a corresponding retained catch amount on the Trawl tab (as the fish must have been caught in order to have been sampled)
Was this fish included in the length frequency information? (Y/N)		e.g. Y or N	Y	If this fish is also included in a length frequency sample the record "Y". If this is the only record pertaining to this fish in this submission then record "N"
Length of fish Submit all lengths in mm	Annex 7 part F 1b)	Numeric	310	The measured length of the fish (in mm):

(even if they were measured to the nearest cm)				i) Fish species (other than skates, rays and sharks) should be measured in fork length. If maximum length is greater than 400 mm fork length, then measure to the nearest 10 mm (else to the nearest millimetre). ii) Use maximum disk width for skates and rays iii) shark species should be measured using an appropriate length measurement (refer FAO technical report 474 on measuring sharks). Total length is the default
Sex (Male, Female, Immature, Unsexed)	Annex 7 part F 1c)	e.g. M, F, I, U	F	The sex of the fish, assessed as Male (M), Female (F), Immature (I) or Unsexed (U).
Maturity Stage	Annex 7 part F 1d)	Free text	IV	The degree of ripeness of the fish gonads. For example: I Immature II Maturing virgin and recovering spent III Ripening IV Ripe V Spent (refer FAO Manual of Fisheries Science Part 2, Chapter 5 Sex, maturity and fecundity).
Tissue Sample Collected? Y/N	Annex 7 part F 2	e.g. Y or N	N	Whether or not a tissue sample was taken from this fish.
Otoliths Collected? Y/N	Annex 7 part F 2	e.g. Y or N	Y	Whether or not otoliths were taken from this fish.
Stomach samples Collected? Y/N	Annex 7 part F 2	e.g. Y or N	Y	Whether or not a stomach sample was taken from this fish.
Type of measurement used	Annex 7 part F1b)	Free text	Fork Length	A description of the measurement used to determine the fish length (for example total length, standard length or fork length).
Bird Scaring Line (one description for each different line, make additional copies if you need more)				
Trip Number	CMM 02 Annex 7L	Numeric	1	This is always 1.
Bird scaring line equipment code	CMM 02 Annex 7L	Numeric	T1	Each different bird scaring line should have a unique identifier, consisting of T plus a number. For example, it could be T1 for the starboard bird scaring line, T2 for the port bird scaring line. If a piece of equipment is replaced during a trip, it can be given a new code, for example T3.
Bird scaring line position	CMM 02 Annex 7L	String	Starboard	Where the bird scaring line is located, must be Port, Starboard, Stern (port side, starboard side or centre) as selected from the drop-down list.
Backbone length	CMM 02 Annex 7L	Numeric	20	The length of the backbone of the streamer along the diagonal, in metres.
Aerial coverage length	CMM 02 Annex 7L	Numeric	25	The horizontal distance from the start of the streamer to

				where it reaches sea level, in metres.
Attached height above water	CMM 02 Annex 7L	Numeric	15	The highest point that the streamer line starts from. This is the distance from the top of the boom to the water for 'Boom and Bridle' systems.
Bird scaring line material	CMM 02 Annex 7L	Character	T	The material that the bird scaring line is made of, must be T (Plastic tubing), S (Plastic strapping), O (Other)
Bird scaring line design	CMM 02 Annex 7L	String	Paired	Whether the design of the scaring line consists of single streamers or pairs of streamers - must be "Single" (meaning that a single streamer comes off the backbone) or "Paired" (meaning that two streamers are joined at the attachment to the backbone) as listed in the drop-down box.
Distance between streamers	CMM 02 Annex 7L	Numeric	1.5	The distance in metres between the attachment point of the streamers along the backbone
Streamer length (min)	CMM 02 Annex 7L	Numeric	0.5	The length of the shortest streamer in metres
Streamer length (max)	CMM 02 Annex 7L	Numeric	8	The length of the longest streamer in metres.
Streamer colour	CMM 02 Annex 7L	Character	P	What colour the streamers are, must be P (Pink), R (Red), O (Other) and so on as set out in the drop-down box.
Streamer material	CMM 02 Annex 7L	Character	S	What the streamer is made of, must be T (Plastic tubing), S (Plastic strapping), or O (Other) as listed in the drop-down box.
Number of streamers	CMM 02 Annex 7L	Numeric	7	The number of streamers used (one for each pair in a paired design)
Towed object	CMM 02 Annex 7L	Character	F	What the object is that is being towed, it must be F (Inverted funnel/plastic cone), L (length of thick line), K (knot or loop of thick line), B (buoy) etc as listed in drop down list.
Additional comments	CMM 02 Annex 7L	Free Text	Broke off after third streamer after tenth day of trip	Comments to explain which part of trip the bird scaring line was used for, and how and why it changed
Bird Baffler Form (Fill in the boxes on the picture. One description for each bird baffler configuration, make additional copies if you need more)				
Bird baffler equipment code		Free text	B1	Each bird baffler should have a unique identifier, consisting of B plus a number, such as B1. If the bird baffler is modified during a trip, it can be given a new code, for example B2.
Distance from stern	CMM 02 Annex 7N	Numeric	2	The distance in metres between the attachment point of the side boom and the stern of the vessel.
Side Boom				
Boom Length	CMM 02 Annex 7N	Numeric	4	The distance in metres from the side of the vessel to the attachment point of the last streamer.

Number of streamers	CMM 02 Annex 7N	Numeric	5	The number of streamers attached to the boom.
Avg. distance b/w streamers	CMM 02 Annex 7N	Numeric	0.8	The average distance (in metres) between streamers (i.e. the length of the boom divided by the number of streamers).
Height above water	CMM 02 Annex 7N	Numeric	0.5	The height of the bottom of the streamer weight above water level (in metres).
Streamer colour	CMM 02 Annex 7N	Free text	Pink	The colour of the streamer.
Streamer material	CMM 02 Annex 7N	Free text	Plastic strapping	The material that the streamer is made of.
Aft Boom				
Boom length	CMM 02 Annex 7N	Numeric	3	The distance in metres from the stern of the vessel to the attachment point of the last streamer.
Number of streamers	CMM 02 Annex 7N	Numeric	5	The number of streamers attached to the boom.
Avg. distance b/w streamers	CMM 02 Annex 7N	Numeric	0.6	The average distance (in metres) between streamers (i.e. the length of the boom divided by the number of streamers).
Height above water	CMM 02 Annex 7N	Numeric	0.5	The height (in metres) of the bottom of the streamer weight above water level.
Streamer colour	CMM 02 Annex 7N	Free text	Pink	The colour of the streamer.
Streamer material	CMM 02 Annex 7N	Free text	Plastic strapping	The material that the streamer is made of.
Side-Aft Curtain				
Curtain length	CMM 02 Annex 7N	Numeric	5	The length (in metres) of the curtain between the end of the side boom and the end of the aft boom.
Number of streamers	CMM 02 Annex 7N	Numeric	5	The number of streamers hanging between the end of the side boom and the end of the aft boom.
Avg. distance b/w streamers	CMM 02 Annex 7N	Numeric	1	The average distance (in metres) between streamers (i.e. the length of the curtain divided by the number of streamers).
Height above water	CMM 02 Annex 7N	Numeric	0.5	The height of the bottom of the streamer weight above water level (in metres).
Streamer colour	CMM 02 Annex 7N	Free text	Yellow and Blue	The colour of the streamer.
Streamer material	CMM 02 Annex 7N	Free text	Plastic tubing	The material that the streamer is made of.
Aft Curtain				
Curtain length	CMM 02 Annex 7N	Numeric	6	The length of the curtain (in metres) between the ends of the two aft booms.
Number of streamers	CMM 02 Annex 7N	Numeric	5	The number of streamers hanging between the ends of the two aft booms.
Avg. distance b/w streamers	CMM 02 Annex 7N	Numeric	1.2	The average distance (in metres) between streamers (i.e. the length of the curtain divided by the number of streamers).
Height above water	CMM 02 Annex 7N	Numeric	0.5	The height of the bottom of the streamer weight above water level (in metres).
Streamer colour	CMM 02 Annex 7N	Free text	Yellow and Blue	The colour of the streamer.
Streamer material	CMM 02 Annex 7N	Free text	Plastic tubing	The material that the streamer is made of.