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Commission des Thons de l'Ocean Indien
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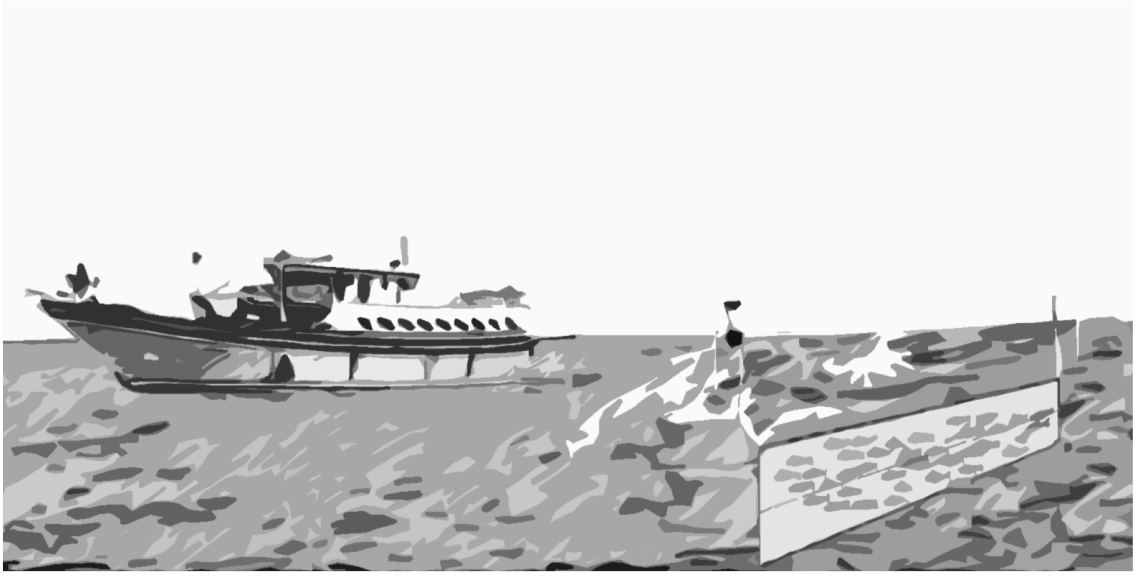
IOTC Regional Observer Scheme

Scientific Field Observer Training

Scientific Field Observer

Guidelines for Observers on Pelagic Drift Gill-netters



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INTRODUCTION

Observers collect valuable fisheries information which cannot be collected in any other way. They provide much of the information needed to understand and manage the fishery.

The data is costly to gather in terms of both funding and work hours. It is therefore important that observers follow work and sampling protocols, respect sampling instructions and priorities, and complete data collection forms accurately to ensure that the collected data is of high quality and can be used for the intended purposes.

Follow the simple instructions in this section to ensure accurate, clear data is collected.

Consult observer manual and workbook regularly to avoid repetitive errors.

OBSERVER CONDUCT

Your role is to monitor the fishing activities of a pelagic drift gill-net vessel for the entire duration of the trip. As an observer, you must collect accurate information and closely follow the instructions below:

- You've embarked with the consent of the vessel owner and of the captain. Nevertheless, your stay on the ship will go all the better if you integrate yourself with life on board.
- Keep good relations with the crew and inform them of your objectives.
- Explain to the captain your observers' duties and the data confidentiality issues and ask him where can you can place yourself when conducting your work. Find a solution that suits both parts if you think the first proposal is not good enough.
- The captain will be your constant source of information. However, be respectful and do not disturb him when he is busy with an important task. You must interfere as little as possible with fishing operations in general while conducting your work and without impeding the work of the crew.
- You must not get involved with the commercial fishing operation of the vessel or crew. You do not have to search for fish with the crew. You will not participate in the handling and operation of the gear.
- The information you collect is strictly confidential. You are not to make copies, share or mention what has taken place on board the vessel to anyone other than the captain of the vessel on which you've embarked and the persons responsible for the observer program, whether at sea or on land. This includes any photographs or video footage that you collect.

You are responsible for the accuracy of data collected.

FALSIFYING INFORMATION IS FAR MORE SERIOUS THAN NOT COLLECTING IT AT ALL.

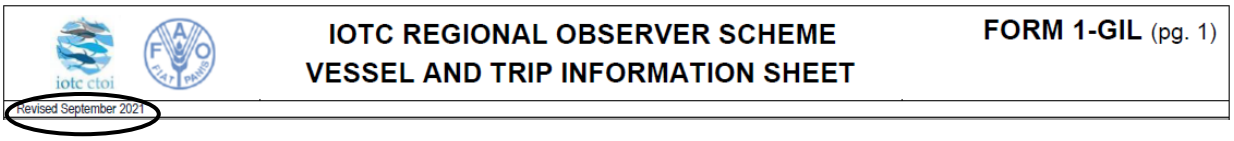
GENERAL INSTRUCTIONS

>> FORM EDITION

Observer forms may be revised by the IOTC. Changes that have been made to observer forms and other materials developed to support the IOTC Regional Observer Scheme are available on IOTC's website.

Which form edition to use?

CHECK you have the most current forms at https://iotc.org/science/regional-observer-scheme-science. *Ensure that old form editions haven't been picked up by mistake. All older editions should be disposed of. Avoid mixing forms from different editions (or revision dates) during one trip. However, if you find yourself at sea with mixed editions of forms fill in the forms as you find them, using the format and codes marked on the form. The form revision date is marked on the upper-left-hand corner of all observer forms and indicates the date the form was last reviewed.*



>> INSTRUCTIONS FOR FILLING IN THE FORMS

On the notes section of every observer form there are detailed instructions about the information to be recorded for each data field. **Read these instructions carefully to find out exactly what data to collect**. All forms will be reviewed at a debriefing at the end of the trip.

Each small box on a form is called a data field. The information collected in each data field is defined by the data field header.

>> FILL IN FORMS ONLY WHEN ONBOARD

Only start filling your notebook and forms when you embark the vessel you've been assigned to. The first data fields to be filled in will be the *departure port*, *date* and *time* on the *Form-1*. Form filling will then continue until the trip ends and the observer leaves the fishing vessel. The last data fields to be filled in will be the *return port*, *date* and *time* also on *Form-1*.

>> FILL IN ALL FORMS

At least one of each type of form must be filled in during every trip. If there is no relevant information to fill in for a particular form, make a comment on the first page of that form stating the reason. For instance, if there were no tag recoveries observed, make a comment such as "*No tag recoveries observed this trip*" on the Form-5. The person responsible for your debriefing will then know that no forms were forgotten / left out by accident. You do not have to repeat this declaration more than once per type of form.

>> FILL IN ALL REQUIRED DATA FIELDS

Every data field must be filled in or a dash (-) must be put in the field. Leaving data fields blank does not tell the person responsible for debriefing whether the information was simply not available or if the observer was unable to record it for some reason. A dash in the data field means the observer tried to get the information but could not. The information might not have been available, the language barrier may have made it difficult to get, or the observer may need extra guidance on how to collect the data. Whatever the reason, if a dash is inserted in a data field, **always make a note in your notebook or in the trip report to explain why the information was not filled in.** If the person responsible for debriefing can see why the data field was not collected (-), they can confirm that the observer has completed the work or, if necessary, give them further help on collecting the data and filling in the form.

>> CHOOSE THE BEST OR MOST INFORMATIVE CODE

Each data field should have only one answer (except for comment data fields and multiple answer data fields). Choose the most accurate or most informative code(s) when choosing between codes. For instance, if a damaged yellowfin tuna was retained onboard and then eaten by the crew, the observer may need to choose between multiple codes say, DPQ (discarded – unfit for human consumption), or RCC (retained - crew consumption). In this example, the observer should record the RCC fate code. Therefore, the RCC code is the most informative code.

>> ONLY RECORD DIRECTLY OBSERVED INFORMATION

All information recorded on data forms should be information that has been directly observed by the observer. Nonetheless, you should maintain constant communication with the crew as their collaboration can be helpful many times.

Do not copy information from the vessel's records on to the observer data collection forms unless this is clearly indicated. If observers do want to record information that they did not personally witness (for instance - they missed a set position) they must make a comment on the form, stating where the information came from.

 **Attention!**

Experience shows that vessels can deliberately give observers incorrect data. Such faulty data entries can harm the rest of the observer's data. Avoid this by always commenting if the information recorded was not directly observed. However, observers are recruited and paid to observe vessel activity and so generally they should not be recording information that they have not directly observed.

>> RECORD REPEATING VALUES FULLY

Do not use the ditto symbol (˝) when recording the same repeating values. There should be enough time to fill in every data field properly; this will help improve the clarity and readability of the form. Observers may be tempted to use the ditto symbol on the Form 5 to describe the same species. At times, things might get busy but there will be enough quiet times to make sure every data field is properly filled in.

>> USE PENCILS TO FILL IN YOUR FORMS

Use a pencil to fill in your data forms. Never use a pen to record samples details on waterproof paper. It's recommended to use 1B or 2B pencils as they are darker than normal HB pencils, especially on waterproof paper. This makes the work clearer and helps when the forms are photocopied or scanned. Always carry many backup pencils and a sharpener when you go to sea.

>> WRITE CLEARLY

It is no use if the person responsible for debriefing cannot read what has been recorded. Observers need good, clear handwriting. Aim to write clearly or to use capital letters when writing. Keep pencils sharpened and use a clean eraser to rub out errors.

>> FIXING ERRORS

If a mistake is made, simply erase it and write in the correct information. However, if a mistake is noticed after the day, it was made correct it but, then draw a neat circle around it and note next to it: Mistake corrected – see page '……'. referring to the page number of the notebook where a note about the mistake and how it was discovered can be found.

>> DO NOT RE-WRITE DATA

Fill in the observer forms when the event occurs, directly on to the form. Sampling details are to be written on waterproof slates, while sampling, and the information transferred to the respective data collection forms as soon as possible. There is no need to re-copy dirty forms onto clean observer forms, as Re-writing data has been found to be a common source of errors.

>> FILL IN THE HEADER DETAILS ON EVERY FORM

It is important that the header details are filled in on every used form. The header details are the first block of data fields at the top of each form. Forms can easily become separated during photocopying, scanning or filing, or while the observer is travelling to and from the vessel. Without the header details there is a risk that some of these separated forms will not be identifiable and the work the observer has done to collect the data will be wasted. Do not fill in the header details on forms before they are used. This can end up being a waste of blank data forms!

>> CARRY A NOTEBOOK

Carry a small notebook and pencil at all times. Use the notebook to write down any extra information that is picked up during the day. The notebook can also be used if the observer is under pressure to record information quickly and the relevant data form is not handy. For instance, if a marine mammal is sighted from the deck, the notebook can be used to record as much information about the sighting as possible before getting the form and filling in all the required data fields. Use the notes to help complete the form.

Under no circumstances should the notebook be used to collect standard data to fill in forms later on a continual basis. Notebooks should be handed in to the person responsible for debriefing at the end of the trip in preparation for debriefing.

Can I show my data to the captain or crew?

It is best to keep data and forms to yourself, however, if the captain requests to see the data, he has the right to see it. The type of information observers collect is not a secret, but do not leave your data forms lying around. Forms should be stored away in a secure area when they are not being used. If you feel you are under constant pressure to hand over your data sheets, be careful to make a report of these incidents in your trip report. This should also be done if the captain changes anything on the data form, or requests that changes are made. Record these incidents in detail in your private notebook.

>> COMMENTS

Observers are encouraged to write comments on their notebooks. Record the notebook page number where the comments can be found in the forms (for example, *'see (a) page 12 of 50 in notebook'*). Comments by new observers can help to clarify any misunderstandings or mistakes they may have made with their data, while comments by experienced observers can draw attention to new fishing practices or highlight areas where changes in the form may be helpful, etc.

>> FILL IN YOUR NOTEBOOK

All observers are expected to keep a notebook / diary and to make an entry in it **at least once every day**. An entry is required even if very little happens during the day, or if the observer is tired at the end of the day. The entry should give a general idea of what happened on the vessel during the day. The notebook / diary can be used to note down any pieces of information that are picked up. This will help observers fill in their trip report later and refer back to specific events that took place on a certain day (since the notebook must have dates recorded). The notebook must be used to:

1) Clarify any mistakes that were made on the form and changed after the day they were recorded.

2) Continue comments from the comments section of the form.

3) Record any incidents on the day that it happened.

4) Keep a list of photos taken during the trip (data, time, number and short description of the film / photo).

All entries should be made on the day they happen and not on a later date. If more information is discovered later on, fill it in under the date that it was first discovered. It is very important that any *incidents* or *critical incidents* are reported in detail in the notebook / diary, even if these incidents are thought to be minor. Record information on the time, date (UTC) and position of occurrence of the incident. New information on the issue, or further developments, can be recorded on the day they are discovered. One idea is to draw up a table on a spare page of the notebook / diary (or spare page appended to the trip report) to record daily times, positions, etc., in one place.

>> AT THE END OF THE DAY

Get into the habit of checking completed forms at the end of each day. Check through them again when there is more spare time, for instance, on a rest day.

Take time to ensure:

1) The *header details* are filled in and the page numbers are up-to-date.

2) All data fields on forms that have been used are filled in, completed or dashes have been inserted when required.

3) The *set start times*, which refer to the same fishing operations or event, are the same on all forms.

>> AT THE END OF THE TRIP

Take time to check:

1) The *page numbering* is complete and the total number of pages used for each form type is filled in.

2) *Return port and date*—fill in the *date, time* and *port of return*. Observers who pack their forms into their bags before they have this information often forget to fill in these details.

>> COMPLETE DRAFT TRIP REPORT

Try to fill in every section of the trip report (Annex 4). If a section is not relevant to the trip (for instance, no species of special interest were seen during the trip), complete these sections by writing something like '*no interactions with species of special interest were observed*' in the space provided. Gaining experience will help observers write increasingly better trip reports as different trips or fishing strategies can be compared to the most recent trip and the observer builds on lessons learnt from past trips and debriefings.

>> TIMELY REPORTING

Complete the draft trip report, check through the data forms and submit all the information that has been collected during the trip as soon as possible. The longer it takes to fill in the written report, the more likely it is that information will be forgotten. The written report should always be completed within seven days of returning to the home port. Just because you have disembarked the vessel does not mean that your job is finished.

>> DEBRIEFING

Observers are to benefit from a comprehensive debriefing at the end of their trip. Debriefing gives observers a chance to learn about any mistakes they have made and to improve their observer skills. If observers have any problems collecting information during the trip, they should make a comment, and a further note in the trip report if necessary so the person responsible for debriefing can respond to the issue and update the observers' skills in that area if necessary.

WORK METHODOLOGY TO FOLLOW ON-BOARD A PELAGIC GILL-NETTER

>> PRIOR TO BOARDING

1. Following standby notification by your Coordinator or designated officer, you are to settle your personal affairs and to prepare yourself for the time you will be away from your home and family.

2. Prior to boarding the coordinator or designated officer shall arrange your briefing. The briefing shall include details on:

   I. Fishing Vessel
      a. Name
      b. Type
      c. Gear
      d. Target species
      e. Owner contact details

   II. Trip details
      a. Expected dates and location of departure and return
      b. Expected duration
      c. Area to be covered

   III. Work details
      a. Operational issues
      b. Tasks
      c. Protocols
      d. Samples

   IV. Safety at sea
      a. Instructions on the usage of personal lifesaving and safety equipment
      b. Vessel Safety Check (VSC) procedures
      c. Distress Codes
      d. Emergency Action Plan (EAP) procedures

   V. Reports
      a. Deployment report
      b. Weekly status report
      c. Trip summary report
      d. Trip final Report

   V. Allocation of material
      a. Work material
      b. Personal lifesaving and safety equipment

      1) Allocation of documents
         a. Pre-sea VSC form
         b. Copy of FV license conditions
         c. EAP protocol
         d. List of contacts
         e. Sampling instructions
         f. Data catch forms
         g. Species ID manuals
         h. Etc.

3. Following the briefing you are to prepare for your deployment.

It is your responsibility as an observer to ensure that you are properly prepared for the trip, i.e., that you are in good health, good mental state, up to date with current requirements and that you have all necessary data collection forms, work and safety equipment.

It is therefore imperative that you check that all the following items are up to data and available.

Tick a box only when you are sure you have that item.

1	**Personal belongings for the trip**	
	✓ Clothes (work and leisure)	
	✓ Toiletries (shampoo, soap, tooth brush, tooth paste, deodorant, razor, etc.)	
	✓ Medicines (paracetamol, vitamins, etc.)	
	✓ Comfort foods (anything you might need until you adapt to vessel food)	
2	**Official documents required for the trip**	
	✓ Valid passport (valid > 6 months)	
	✓ Valid yellow-fever card	
	✓ Valid certificate of medical fitness	
	✓ Valid certificate of sea survival	
	✓ Valid Seamans book	
3	**Work materials**	
	✓ Laptop and required software (digital manuals, data base...)	
	✓ Photographic material (e.g.: camera, phone or tablet with incorporated camera…).	
	✓ Sampling material (e.g., callipers, measuring board, metric tape, scales, knife, etc…)	
	✓ Notebooks (1 notebook for every 15 days at sea)	
	✓ Gloves	
	✓ Box of pens and pencils (10 x 2B pencils; 2 x erasers; 1 x pencil sharpener; paper clips; 2 x pens; 1 ruler)	
4	**Personal lifesaving and safety equipment**	
	✓ Personal Floatation Device (PFD)	
	✓ Personal Localisation Beacon (EPIRB)	
	✓ Helmet	
	✓ Safety shoes or boots	
	✓ Two- way communication satellite device satellite	
5	**Documents**	
	✓ Pre-sea Vessel Safety Check Form	
	✓ FV license conditions	
	✓ Emergency Action Plan protocol	
	✓ List of contacts (including FV owner or operator, Observer Coordinator and any other contact considered important)	
	✓ Valid data collection forms (for every 15 days at sea you should have)	
	- 1 x Form 1-GIL – General information	
	- 1 x Form 2-GIL – Gear	
	- 50 x Form 3-GIL – Fishing event (FE)	
	- 50 x Form 4 -GIL – Fishing event catch details	
	- 1 x Form 5-GIL – Fishing event biometric information	
	- 100 x Form 6-GIL - Fishing event sample collection	
	- 1 x Form 7-GIL – Vessel transhipment	
	✓ Manuals (observer manual, ID manuals), guidelines and data collection instructions	

You will be asked to return materials in good working condition.

>> AT BOARDING

Upon arrival at the vessel, you are to:

1) Request permission to photograph the following outside areas of the vessel:

   - The tern displaying the vessel name and port of registration
   - The side displaying the vessel call sign
   - The bow displaying the vessel name and registration numbers

2) Request permission to take pictures of the following documents:

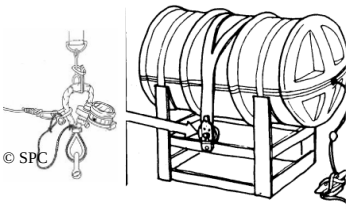
   - Vessel safety certificate
   - Fishing licence
   - Service documents if service dates are not clear on life rafts

3) Conduct the vessel "pre-sea" safety check inspection in the company of a vessel crew member and fill in "V*essel pre-sea safety check form"* (Annex 1). Ensure that the whole inspection form is complete and where there are spaces provide reasons.

4) The vessel will be considered safe to board if it meets the following Minimum Safety Requirements on:

   - Valid safety certificate
     i) present on-board
     ii) in date and not due to expire for a period of at least four (4) months
     iii) crew compliment, INCLUDING THE OBSERVER, must not exceed the maximum specified number of crew listed in the safety certificate

   - Life rafts
     i) capacity to accommodate full crew and the OBSERVER
     ii) within service date; not to expire during the trip
     iii) fitted with a Hydrostatic Release mechanism

   Life raft and Hydrostatic Release mechanism

   - Life Jackets
     i) sufficient number for the full crew and the OBSERVER
     ii) compliant with IMO – SOLAS LSA standards

   - GMDSS Requirements (Global Maritime Distress Safety Systems)
     i) compliant with the vessel tonnage and area of operation
     ii) GMDSS components within service date
        - EPIRBs
        - SART
        - VHF, MF and HF radios

5) You may "refuse to board a vessel" if:

   - the vessel does not meet "minimum compulsory requirements"
   - the overall vessel state puts its sea-worthiness in question

6) If you refuse to embark, you should immediately submit a report clearly stating the reasons to your Coordinator. Ensure that you take pictures for the expired document and equipment.

7) If you decide to embark, you should confirm your embarkation with your Coordinator by phone.

>> UPON EMBARKATION

1) Upon embarkation you are to:

   - Present yourself at the bridge and meet bridge officers (Captain, 1st officer, etc.).
   - Prepare your living and work area
   - Meet other key people such as the Bosun, and the Cook
   - Visit the vessel with the bosun or the lead crew member to familiarize yourself with vessel configuration/equipment layout
   - Inform the Bosun of your work objectives, ask for advice on how to meet the objectives without interfering with the crew work. Agree on your sampling areas (i.e., the areas from where you will observe line setting and line hauling operations and where you will conduct biometric sampling).

2) **Locate the GPS that displays latitude and longitude in degrees (°), minutes (') and seconds (").** Latitude and Longitude can be read in a GPS in THREE different notations:

   1. DMS: degrees, minutes, and seconds (*Lat dd mm ss / Long ddd mm ss*). *Note seconds will always only be recorded as two digits.*
   2. DDM: degrees and decimal minutes (*Lat dd mm.mmm / Long dd mm.mmm*). *Note the minutes can be recorded to more than two decimal places.*
   3. *DD: decimal degrees* (*Lat dd.ddd / Long dd.ddd*). *Note the degrees can be recorded to more than two decimal places.*

IT IS VERY IMPORTANT that you are absolutely certain of which notation is displayed on the GPS to ensure that you collect the degrees, minutes, and seconds notation (DMS).

If you can't find a GPS that collects position in the DMS format, you should note on the data collection forms, notebook and final report the format collected.

You ARE NOT to convert DDM / DD positions into DMS format has this has proven to be a major source of errors.

3) **Set all your personal work devices (watch, laptop, voice recorder, digital camera/smartphone) to UTC time** and start taking notes on your journal. Setting your personal **work devices** to UTC time shall give you access to the UTC time, as you will always have UTC time on personal **work devices**.

4) Start filling IOTC form 1-GIL.

5) Check how many pelagic drift gill-nets are onboard the vessel.

6) Characterize the different pelagic drift gill-nets present onboard the vessel.

   - Check the *number of panels* for each individual pelagic drift gill-net and verify it there are any *panels stacked*;
   - Ascertain *net length, depth, material* and *web colour(s);*
   - Measure *stretched mesh lengths and range* and calculate average;
   - Count the *number of vertical meshes* in the net;

- Calculate net *hanging ratio*.;
- Check *float type(s),* estimate *float number* and calculate the *average distance between floats*;
- Check *if droplines are used*, *measure length and calculate droplines average length*;
- Check the *number and the weight of the sinkers used (per type).*

7) Record the above information on IOTC form 2- GIL - fishing gear.

8) Verify if the vessel caries depredation/mitigation device(s) and describe them on your notebook.

9) Confirm that the vessel caries line cutters and detail them on your notebook.

10) **Within 24h of embarking request the bridge officers to facilitate the submission of an email containing your deployment report** (Annex 2) and a **copy of your vessel inspection report** to your Coordinator. This opens a channel of communication with the coordinator and ensures your safety.

11) After requesting the permission of the captain, you are to familiarize yourself with vessel instruments: navigation system, depth sounder, sonar, bird radar, etc. Make sure to take an interest in vessel safety procedures and equipment: life jackets, life rafts, fire extinguishers, first aid kit, etc.

>> DURING THE COURSE OF THE TRIP

> Active days

The amount of time observers will need to spend on deck on pelagic drift gill-net vessels depend on the total length of the net-string. Some vessels will set a comparatively short net-strings (up to 2.5 km) and observers should have no problems monitoring every single part of the fishing operation. However, some of the larger gill-netters will set very long net-strings (up to 20 km or more) making it difficult for one observer to monitor every fishing operation.

Observers are required to fully monitor all periods of the fishing event. A fishing event includes the set and the haul periods. However, **observers can choose the number of fishing operations that they will fully monitor**. This choice should be based on the average length of the net being set by the vessel. A rough guideline for how many fishing operations should be monitored by observers on pelagic drift gill-net vessels is given below.

All observers are encouraged to aim for 100% coverage of all fishing operations. Many observers achieve this, and national coordinators are requested to recognise observers who make the extra effort to monitor as many fishing operations as is comfortably possible.

If observers are not able to achieve 100% coverage, they should follow these rough guides for choosing how many fishing operations to monitor:

- For **vessels setting pelagic drift gill-nets of less than 2.5 Km**, the observer is expected to **monitor every fishing operation**.
- For **vessels setting pelagic drift gill-nets between 2.5 and 12 Km**[1], the observer is expected to **monitor two out of every three fishing operations**.

[1] The IOTC defines large-scale driftnet as a driftnet, or combination of other nets, of more than 2.5 Km in length. The Res. 17/07 prohibits the use of large-scale driftnets in the IOTC area but CPCs can authorise its use within their EEZ.

- For **vessels setting pelagic drift gill-nets longer that 12 Km**, the observer is also expected to **monitor two out of every three fishing operations**. However, on especially long trips (over one month), observers are advised to keep their own personal well-being in mind and are permitted to **take additional rest days if necessary**.

Before setting

1) Ensure you are present at least 30 minutes before the commencement of the setting activity, to check what pelagic drift gill-net is going to be used or if any last-minute changes have been made to net specifications;

2) Familiarize yourself with setting times;

3) Discuss with the bosun or the lead crew member to understand the setting instructions from the fishing master which will include *setting strategy, shape, and depth*. Setting depth (*surface or sub-surface*) can be determined by the number and weight of sinkers to be set between floats, the usage of droplines and droplines length;

4) Verify if there are any *depredation / mitigation devices attached to the gear*, if yes provide details in your notebook; and

5) Record information collected on IOTC form 3-GIL.

During setting

The setting operation time varies with the length of the pelagic drift gill-net set. There is no sampling required during the setting operation but the data collection during this time is crucial for the CPUE and spatial data.

Caution: The start of the fishing operation is defined as when the first radio buoy/float is thrown into the water. However, if the vessel cuts its net during setting (for example, due to the presence of whales) and moves a considerable distance (more than 2-3 nautical miles) away. Then you should start a new GIL-2/3 forms with a new start of set date and time. Make sure you complete previous GIL -2/3 forms, that you cross out the 'Hauling operations' section and indicate on the form and on your notebook the reason why.

During this period, you are to:

1) Place yourself strategically to observe setting operations without disturbing crew activities;

2) Monitor *setting start and end date, time and position; vessel average speed; setting strategy; and setting shape* (i.e., the spatial configuration in which the pelagic drift gill-net was set); and

3) ***Fill in all data fields within the setting operations section of the IOTC form 3-GIL for every fishing event*** (set), even for fishing events where nothing is caught.

MONITORING THE SETTING OF THE PELAGIC DRIFT GILLNET

The time and position for the start and end of every set must always be observed directly and recorded, even on rest days. Observers must make an effort to always record this information and should ask the captain and crew to wake them up at these times.

You are required to fully monitor all of the first three setting operations you have decide to monitor. 'Fully monitoring' the set means being on deck for all of the setting period. This allows observers to see for themselves how the setting is done and what the standard setting specifications are. After the first three sets, you can stay on standby during the setting periods. Standby is not a time for sleeping however.

During standby observers should make regular visits to the deck to confirm and record information on setting specifications. When the net setting specifications are the same, you only need to confirm this while on deck. Net setting specifications can be cross-checked again during the hauling period. However, if the net setting specifications change within the setting period, then you need to pay close attention and spend more time on deck during the following setting period.

Before hauling

1) Ensure you are present at least 30 minutes before the commencement of the hauling activity;

2) Discuss with the bosun or the lead crew member of the sampling protocol you plan to follow (see Chapter 2: Sampling protocols to follow on-board a pelagic drift gill-netter) and of your placing during the hauling observation periods and the biometric sampling periods.

During hauling

The hauling operation time varies with the length of the gill net set, the volume of the catch, the weather conditions and the conditions of the gear.

1) For *every fishing event*, even where nothing is caught, gather information on fishing event *start hauling* and *end hauling date, time* and *position*.

2) Depending of where the net is hauled you should place yourself on the opposite side so as not to impact on the operations but still have a visual view of the net being hauled during *net hauling observation periods*.

3) Observe hauling operations according to the chosen *sampling protocol* and monitor:

- *net condition;*
- *number of panels retrieved;*
- *target catches (number per species);*
- *non-target catches (number per species and condition); and*
- *SSIs catches (number per species and condition, gear interaction and handling method);*

4) **Complete 3-GIL Form "Hauling Operations" section for every observed set,** even for those where nothing is caught.

5) **Fill in IOTC form 4-GIL – Catch details**.

6) **Collect biometric information** according to priorities listed in these guidelines (page21) and **fill in IOTC form 5-GIL - Biometrics**.

7) **Collect required biological samples** (*e.g., otoliths, stomachs, genetic samples, etc*.) as detailed during briefing and fill **in IOTC form 6-GIL – Biological sample collection**.

MONITORING THE HAULING OF THE PELAGIC DRIFT GILLNET

You are to be on deck for the entire haul of every fishing operation you have chosen to monitor. If you need to leave the deck for more than a few minutes, you should always record on your notebook the time when you left and when you returned to the deck. Do not ask the crew to record the data if away from the deck for extended periods. It is unnecessary and may result in incorrect data.

The most important thing during hauling is that observers carefully record all the species and all the net panels that they have observed directly. So, scientists can assess the observed 'catch per unit effort' (n° fish caught/ per panel observed).

> Rest days (if any)

Rest days are days with fishing operations that the observer has chosen not to monitor. On these days you must directly observe the start and end of the set, and the start and end of the haul and record times and positions for every fishing operation made by the vessel. This includes fishing operations that you have chosen not to monitor.

When not monitoring, observers can use the rest days to:

1) Get some rest.

2) Continue to fill in the relevant forms.

3) Take photos (for example, of the vessel, the gear and marine species).

4) Ensure that any previously collected samples are properly labelled and packaged. Check to see that samples are correctly stored, have not been moved, and are not in a position that may cause problems for others.

5) Check how the vessel is using its electronics and fishing equipment. In particular, note how the electronics are being used during fishing and gather extra information about the vessel and its fishing strategy. Make notes on your notebook.

6) Check the completed data forms; make sure every data field is filled in or a dash is inserted.

7) Work on the trip report. Look at the type of questions that are asked and make notes on these topics in the diary. This will make it easier to complete the trip report later.

If the vessel does not set the on any day, due to a long transit period, etc., you should record it on your notebook (and explain why) as you will need this information to complete Form 1-GIL. During days when the vessel does not set the line, the observer can also carry out many of the items listed above.

> Every 7 days

1) Every seven days, you will submit by email your weekly status report to your Coordinator as per the format provided (Annex 3).

2) The report period will be for the preceding seven (7) days.

3) Be aware that if the report is not received within 24h of the date it is due, your Coordinator shall start the process to establish contact via the vessel operator to ensure your safety.

> Upon offloading and/or transhipment

1) Be present 15 minutes before the start of the operation;

2) Fill in IOTC Form GIL-7;

3) If requested by your Coordinator sample catch being offloaded / transhipped;

4) Follow sampling protocol provided by your Coordinator; and

5) Fill in the sampling form provided by your Coordinator for this purpose.

>> PRIOR TO DISEMBARKING

1) Inform your Coordinator of vessel expected date and time of arrival (EDA & ETA) to a specific port so logistics can be arranged to organize for your travel to your home if and where needed.

2) Prepare your draft trip report (Annex 4).

3) **Finish filling IOTC Form LL-1** with disembarkation information.

4) Verify, organize and pack away your personal, work and safety materials so you don't forget anything on-board (filled data collection forms, sampling materials, safety materials, personal items).

>> UPON DISEMBARKING

1) The forms that you filled must always stay with you (do not leave any form on-board – even blank forms!). **During your return trip, they should be kept as "hand luggage"**. Under no circumstances should they be handed over to a third party or deposited.

2) At the end of the trip, you will report to your Coordinator any special event that could inform port sampling operations (e.g., large set of bigeye tuna, major rejections, etc.).

3) **Upon arriving at your final destination**, you are to **immediately contact your Coordinator** to organize for early submission of the draft trip report, all data collection forms, electronic data, notebooks, samples (if any). You should also return work and safety materials that have been issued to you by the Observer Programme Coordinator.

4) Approximately one (1) week following disembarkation you are to participate in the debriefing. Following debriefing you are to correct data forms, electronic data and finalize the trip report as instructed.

5) **All final, revised documents are to be submitted to your Coordinator a maximum of 4 weeks after disembarkation.**

SAMPLING PRIORITIES TO FOLLOW ON-BOARD A GILL-NETTER

>> TUNA DISCARDS

- Estimate 'tuna discards' weight (or number) per species and fate;
- Sample discarded/rejected tuna (per species) for length frequency.
  - Exhaustive sampling if less than 50 individuals per species
  - Stratified sampling is more than 50 individual per species

>> SPECIES OF SPECIAL INTEREST

- Estimate *SSI bycatch number* (or weight) per species, fate and *condition at capture* and *at release* (if released/discarded). If number is collected and it is not possible to conduct size sampling (immediate release for instance), a mean size or mean weight is also needed, even if it is estimated by eye.
- Collect other catch information on SSI specimens caught, as per required by the IOTC (*e.g.: gear interaction, handling method if brought on-board, etc.*);
- *Sample SSI specimens caught for length frequency (and gender for elasmobranch and turtle spp.).*
  - For NON-SORTED catch note as PROPORTIONAL SAMPLING
  - For SORTED catch note as STRATIFIED SAMPLING
  - If sampling all SSI specimens for a particular spp. note as EXAUSTIVE for that spp.

>> OTHER BYCATCH SPECIES

- Estimate 'other bycatch' weight (or number) per species, fate and condition (at capture & release);
  - Proportional estimation RAISED TO TOTAL CATCH if the catch is NOT SORTED
  - Proportional estimation RAISED TO TOTAL BYCATCH if the catch is SORTED
- Sample 'other bycatch' species for length frequency (and sex for spp. whose gender is identifiable through external features).
  - For NON-SORTED catch note as PROPORTIONAL SAMPLING
  - For SORTED catch note as STRATIFIED SAMPLING
  - If sampling ALL 'other bycatch' specimens for a particular spp. note as EXHAUSTIVE for that spp.

>> RETAINED TARGET CATCH (TUNA)

- Estimate retained target catch weight (or number) per *species and fate*;
  - For NON-SORTED catch note as PROPORTIONAL SAMPLING
  - For SORTED catch note as STRATIFIED SAMPLING

To extrapolate proportional samples, you will need to calculate each fishing event total catch weight. This can be done by requesting information from captain on volume of fish stored.

WORK STRATEGIES TO FOLLOW ON-BOARD A GILL-NETTER

The IOTC is responsible for the overall management of tuna and tuna like species within their Convection Area in the Indian Ocean. This includes a conservation role of species of special interest (SSI) that interact with the fishery. To fulfil these task, scientist and fisheries managers require a range of information on the fishery, actual catches at sea, interactions with SSIs and commercial landings.

Information on the catch composition of a fishing event can be obtained from the vessel logbook (catch statistics) of recorded production. The Fishing Master will typically only record in his logbook the total retained catch and sometimes discarded catch for sharks and Species of Special Interest (SSIs). However, this will not necessarily reflect any of the catch lost at the surface or unwanted by-catch that is discarded or has no commercial value.

The catch composition of the target and commercial by-catch species is routinely recorded from monitoring landings ashore. The length frequencies of these species can also be recorded from shore-based sampling.

To capture information that is not routinely available, observers are deployed onboard vessels to provide independent information on the timing and location of fishing operations, the total effort (number of lines and hooks) deployed by the vessel and the vessel total catch composition (including retained, discarded and released specimens).

During the hauling operation on a gill-net vessel each fish is brought onboard individually allowing the opportunity to collect detailed information on the catch.

To collect all this information, the observers need to follow two main working strategies:

1. **Strategy 1** - monitoring a percentage of the net panels hauled, recording catch details for each panel, the catch (species) and the fate of the catch (retained, discarded dead or released alive; etc.), and
2. **Strategy 2** - biometric sampling of a representative portion of the catch and SSI's.

By correctly following these strategies the information recorded allows for the statistical analysis of catches and biological information on size, biology of various species in relation to ocean areas and time of the year. *For example; which species are found where at times of the year and when and where they possibly spawn etc*.

Normally, only one observer is deployed at a time on a gill-net vessel and it would be impossible for the observer to conduct accurate and comprehensive net-string observation as well as detailed biometric sampling periods at the same time. Meaning that you (or your coordinator) will have to decide on sampling priorities to follow to adequately meet the objectives of both sampling strategies.

In addition, observers also need to monitor a host of other information on the relevant form that include:

1) set and hauling date, time, and positions;
2) setting operations to record setting specifications (e*.g.: vessel speed; setting strategy, shape, and position in the water column*) and any *mitigation* deployed;
3) hauling operations to record net condition, number of panels retrieved and observed, and measures used to land or release SSIs;

4) tag returns; and

5) transhipment information if this takes place.

The work strategies you select will also be dependent on several additional factors including:

- the sea-state;
- catch rate;
- working space on deck; and
- observer safety to conduct sampling etc.

Some of these elements can be determined before the vessel sails and agreed with the coordinator which strategy to prioritise with respect to the percentage of the line observed and number of biometric samples to take per species. In other times it will be up to you (the observer) to decide which work strategy is most appropriate while you are at sea.

There are a number of sampling protocols that can be used for each of the two strategies:

- exhaustive sampling
- random sampling
- systematic sampling
- exhaustive when present

>> EXHAUSTIVE SAMPLING

If selecting **Strategy 1** recording catch is prioritised over **Strategy 2** for taking biometric sampling and the following process is to be followed:

A. ensure that the entire net-string hauled is visually monitored, i.e., you have to observe all panels hauled; and

B. record catch details:

a) species and fate for all specimens caught;
b) condition (at catch and at release), only for bycatch species (including SSIs);
c) gear interaction, handling method, revival, and photo, only for SSIs biometric data estimation (and sex where possible) for bycatch specimens 'cut off' (including SSIs);

In this case Strategy 2 for the biometric sampling requirements will be a low priority. Should it be possible, the crew could be requested to set aside a representative number of specimens for the observer to sample after the last net panel has been hauled. As this is unlikely to be practical for target or commercial by-catch, it is only likely to entail SSIs that could not be released.

You will therefore proceed as follows:

1) Collect start hauling date, time, and position at the hauling of the first dhan buoy and / or radio buoy;

2) Record the above information on Form 3-GIL;

3) Observe the totality of the net panels hauled, collect the following data and record it on Form 4-GIL:

- species and fate data for all specimens caught;
- depredation details for all depredated specimens;

- condition at capture for all non-target specimens caught and condition at release for all non-target specimens released; and
- gear interaction, handling information (i.e., if the specimen was brought on board and how) and release information for all SSIs specimens caught.

4) Collect estimated biometrics on all SSIs on Form 5-GIL, and ONLY IF HAULING IS SUSPENDED you can leave your observation point to collect physical biometric data.

>> RANDOM SAMPLING

A simple random sample is where panels hauled and / or fish are selected randomly for sampling during an entire net hauling period. A simple random sample is meant to be an unbiased representation of the catch on an entire net string.

If selecting this strategy, the observer should be able to follow both sampling Strategies 1 and 2.

Essentially, following a random sample table (for Strategy 1 to sample catch details), a random sample of the net panels hauled would be selected to record catch details on the selected hooks. For biometrics sampling (Strategy 2), fish would be randomly selected as they are caught to meet the number of fish (per species) required to be sampled.

In practice, it would be difficult for an observer to practically sample net panels randomly as it would result in the observer having to spend time waiting during the entire hauling operation, and only record details from the randomly selected net panels.

Example:

A random table selects / generates the numbers 4, 19, 27, 31, 42, 53, 67, 80, 81, 97, for monitoring the catch. The observer would only record the details for these net panels and ignore the other. Similarly, for panels selected for biometrics. Note also; that SSIs should all be sampled by estimation or physically where possible.

Random table for 10 panels (*the minimum of 10%*) out of a total of 100 panels set. (Note; *Where two numbers are the same the next panel would be monitored*)									
4	19	27	31	42	53	67	80	81	97

Random tables can be generated in excel using the function RANDBETWEEN selecting the range Top [1] and Bottom [the total number of net panels set] Then copy the function to the total number of net panels that you want to sample. The list of numbers generated can then be sorted from lowest to highest to get a sampling sequence.

Note: that to follow this sampling protocol you must be able to distinguish between net panels and record the number as they are hauled.

You will therefore proceed as follows:

1) Collect start hauling date, time, and position at the hauling of the first dhan buoy and / or radio buoy;
2) Record the above information on Form 3-GIL;
3) Prepare ahead of time a random sampling table that takes into account the total number of net panels that need to be hauled and the number of net panels to be sampled.

4) Starting numbering with the first panel hauled and keep track of the panels hauled, collect for:

   - net panels randomly selected for catch composition (FORM 4-GIL):

     i) number (or weight) per species and fate for all species caught;
     ii) depredation details;
     iii) condition at capture for all non-target specimens caught and condition at release for all non-target specimens released;
     iv) gear interaction, handling information (i.e., if the specimen was brought on board and how) and release information for all SSIs specimens caught; and
     v) estimated biometrics on all SSIs caught (record details on Form 5-GIL).

     Note that during 'net hauling observation periods' ONLY IF HAULING IS SUSPENDED you can leave your observation point to collect physical biometric data.

   - net panels randomly selected for biometrics (FORM 5-GIL) record;

     i) species code;
     ii) fate;
     iii) species length and length type;
     iv) weight and weight collection / estimation method;
     v) processing details;
     vi) and where possible sex.

THIS SAMPLING METHOD MUST BE STRICTLY ADHERED TO BE STATISTICALLY VALID

>> SYSTEMATIC SAMPLING

Systematic sampling is a probability sampling method whereby a fixed number of net panels would be sampled, or a fixed sampling period is selected (time wise), but the start times are randomly selected. *A random sampling table should be used to determine random sampling times or periods.*

Considering that systematic sampling includes an element of random selection as well as exhaustive sampling during the sampling periods, it would most likely be the most practical strategy for an observer to follow. A number of practical examples are provided in cases below.

Taking into account that:

- a minimum of *10% of the total net panels set will need to be monitored for catch composition* to ensure meeting IOTC 5% observation coverage requirement as stipulated in Res. 11-04, (*practically this could be at least 25% or more)*;
- '*net hauling observation periods'* and '*biometric sampling periods'* should be randomly selected to cover at least, the beginning, middle and towards the end of the hauling operation to ensure representative sampling of the net-string *(a random sampling table described above can be used to achieve this).*

Clearly categorise in your notebook the information collected during:

a) Strategy 1 – net hauling observation periods

   i) date and time start/end 'net *hauling observation periods' (to be checked during debriefing)*;
   ii) number of retrieved net panels observed for catch composition (to be *recorded in Form 3-GIL*);

iii) species and fate for all specimens caught during line hauling observation periods (to be *recorded per species in Form 4-GIL*);
iv) condition (at catch and at release), only for bycatch species (to be *recorded per specimen in Form 4-GIL*); and
v) gear interaction, handling method, revival (for turtles), and photo (if any), only for SSIs (to be *recorded per specimen in Form 4-GIL*).

b) Strategy 2 - biometric sampling periods (*Systematic Random sampling of a mixed species sample, see page 73*).

i) date and time start/end '*biometric sampling periods* and number of panels hauled in this period *(to be checked during debriefing)*;
ii) species and fate for all specimens brough on-board during biometric sampling periods (to be *recorded in Form 5-GIL*);
iii) condition (at catch and at release), only for bycatch species (*Form 4-GIL*);
iv) gear interaction, handling method, revival (for turtles), and photo (if any), only for SSIs (*Form 4-GIL*; and
v) biometric data and sex (where possible) for all specimens brough on-board during biometric sampling periods (*Form 5-GIL*).

Note: In practice, the catch may not immediately be disentangled from the net, and it may not be possible to follow a statistical sampling method for biometric sampling. In these situations, the observer may have to follow other sampling protocols, selecting fish from a central point before they are processed or passed down into the hold.

c) rest periods
i) date and time start/end '*rest periods', to be used to take lunch breaks and visit the washrooms (to be checked during debriefing)*.

For both **Strategy 1 and 2**, we can distinguish two systematic sampling techniques to use during the hauling periods. For catch composition, determine a *fixed number or batch of net panels during randomly selected periods during hauling* (case 2A), or the monitoring for catch composition of *all net panels hauled during fixed periods of time selected randomly during hauling* (case 2B).

Attention!

The connecting points between net panels may not be clearly defined or numbered. Therefore, systematic sampling using numbers of selected panel sections is unlikely to be practical to implement.

Using randomly selected time periods would in many instances be the only practical method to be followed. Essentially, assuming an average hauling rate, a relatively constant number of panels would also be sampled in a fixed period.

See example Case 2A for random time

Case 2B for random net panels

> Case 2A -– All net panels during a fixed period of time selected randomly

If observing the hauling of all net panels during a fixed period of time selected randomly (no less than 10% of the total hauling time), during the hauling process, you will proceed as follows:

1. Before hauling starts decide:
   - on a fixed period of time to be 'randomly observed/sampled/or not', during net panels hauling observation periods, biometric sampling periods, and rest period; and
   - choose work pattern to follow.
2. Collect start hauling date, time, and position at the hauling of the first dhan buoy and / or radio buoy;
3. Record the above information into FORM 3-GIL;
4. Follow selected random sampling protocol and work pattern, collect and record information as per requested in FORM 4-GIL and FORM 5-GIL.

Example

A pelagic drift gill-netter sets within their EEZ a string of 100 net panels each 100 m long (total net length 10,000 m or 10 km). Vessel skipper estimates that hauling will take 10 hours. Therefore, the observer decides to:

- Monitor the net hauling for a total of 4-hours for catch composition, in 4 random 1-hour periods (i.e.; 40% of the net hauled);
- Then monitor for biometric catch sampling another 2-hours (i.e.; 20% of the line);
- Rest the remaining time;

For Strategy 1 Catch observations

Using an excel table function RANDBETWEEN the observer selects random numbers for 10 1-hour periods. Each random number selected in these periods would be the start observation period for the following hour.

10 hour hauling time			
Start sampling periods hour number			
1	4	7	9

For Strategy 2 biometric sampling

Depending on how the catch is disentangled and processed, the observer could start with strategy 2 for biometric sampling at the end of each observation period for following hour. Note that for SSIs the biometrics must be either estimated or could be collected if the hauling is stopped.

Case 2B -– Fixed number of net panels randomly selected

If it is practically possible to monitoring, for catch composition, the hauling of a fixed number of net panels randomly selected (no less than 10% of the total net panels set), during the hauling process, you will proceed as follows:

1. Before hauling starts decide on the number of net panels to be monitored for catch or sampled for catch biometrics for the entire net, also allowing for rest periods. Divide this into the number of panels

to be sampled at a time (batch). *The section or batch of net panes selected would essentially be exhaustively sampled for that batch.*

2. Collect start hauling date, time and position at the hauling of the first dhan buoy and / or radio buoy;
3. Record the above information into FORM 3-GIL;
4. Follow selected random sampling protocol and work pattern, collect and record information as per requested in FORM 4-GIL and FORM 5-GIL.

Example

A pelagic drift gill-netter sets within their EEZ a string of 100 net panels each 100 m long (total net length 10,000 m or 10 km). Vessel skipper estimates that hauling will take 8 hours. Therefore, the observer decides to:

- Monitor a total of 40 net panels for catch composition, 10 panels at a time in 4 random selected starting points, (i.e.; 40% of the net hauled);
- Monitor for biometric catch sampling another 20 net panels hauled outside of the 'hauling observation period' (i.e.; 20% of the line);
- Rest the remaining time;

For Strategy 1 Catch observations

Using an excel table function RANDBETWEEN the observer selects random numbers for four periods to cover the start middle and end of the net. Therefore, selecting random start points for 10-net panels sections numbered (1 to 25); (26 to 50); (51 to 75); and (76 to 100) Each random number selected in these periods would be the start observation period for the following 10 net panels.

10 Panel sections			
1 to 25	26 to 50	51 to 75	76 to 100
Start sampling section numbers			
16	27	55	88

For Strategy 2 biometric sampling

Practically the observer could start with strategy 2 for biometric sampling at the end of each observation period for following 5 net panels and rest before starting the next observation period.

EXHAUSTIVE WHEN PRESENT

This sampling method can be used when the observer is required to sample everything, but due to the duration of hauling, the observer will need to take lunch breaks and visit the washrooms etc. If the observer has opted for this method, the observer notebook becomes vital as all breaks must be recorded to provide an opportunity to raise up the catch towards the total catch. When selecting this option, the observers will have to ensure that the totality of the hooks are monitored during the observation period you will therefore proceed as detailed for Exhaustive Sampling Strategy.

INSTRUCTIONS ON THE FILLING OF DATA COLLECTION FORMS

>> GENERAL INSTRUCTIONS

> Header details

Observer name

Observers must write their name **on every single form**. Put the last name or family name first (in capitals) and the first name last (in minuscules). Do not abbreviate the name on any of the forms.

Observed trip number

Fill in the *observed trip number* as issued by the observer programme that has authorised the placement, or as determined by the number of trips done by the observer during the year. Observer trip identification numbers are individual trip codes so each observer trip can be uniquely identified. A 3-letter country code and a 3-digit serial number (e.g., FRA001) is assigned to all observers by the IOTC when they are registered into the ROS (IOTC observer registration number). This code identifies the observer in the IOTC databases and is used to generate IOTC ROS observed trip number. IOTC observed trip number, begins with trip's start date (yyyy-mm-dd), followed by IOTC observer registration number and vessel main gear code (e.g.: *2018/01/23-IOTCFRA001-GIL*).

National Observer Programme trip identification number can be also used here. Most national observer programmes use the **personal observer trip ID numbering system**. **Observer ID code**, space, two digits indicating **the year of the trip**, dash, **trip number** (i.e., the current trip number based on the number of trips (1, 2, 3, 4, etc.) completed by the observer during the calendar year).

Page numbering

Data collection forms of the same type should be numbered together. For instance, number all the 3-GIL forms as a group and all the 4-PS forms together as another group. Number each form as it is used. At the end of the trip, go back and fill in the total number of each form type used.

> UTC time and date

Since vessels use a variety of times, observers are asked to collect a standard time, so people reviewing several observer trips can compare the time of day when activities took place. The standard time that observers are asked to collect is UTC time (Coordinated Universal Time). It is an internationally agreed time standard and may also be referred to as GMT time (Greenwich Mean Time).

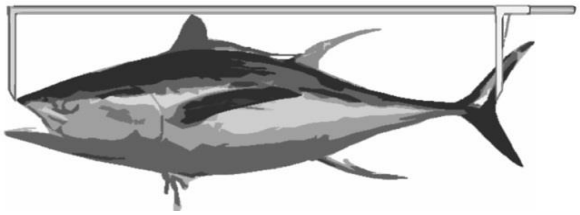
> Measuring lengths

BE CLEAR ON EXACTLY WHAT MEASUREMENTS YOU ARE TAKING AND HOW!

- *Length measurements are always **rounded down** to the nearest whole centimetre.*
  - If the length of the fish is 43.1 cm, note 43 cm.
  - If the length of the fish is 43.8 cm, note also 43 cm.
- *Length measurements are always associated with an IOTC code for **length type***
  - **FL** - Straight fork length taken with a calliper;
  - **FT** - Curved fork length taken with a tape measure.

Callipers

Always aim to measure fish using callipers. Callipers provide the most accurate measurements and are good for measuring small and medium size tuna and by-catch species.



Understand how to use callipers correctly. Callipers are designed so that the groove, on the fixed leg of the calliper, is normally placed on the snout/upper jaw of the fish and not on the fork of the tail.

When a fish is larger than the callipers, measure it by taking two or more measurements. One method is to first measure as much of the fish as possible, make a light mark on the fish at the point where the measurement stops, and then take a second measurement from that point. Adding the two measurements together gives the length of the fish. Another method is to take the first measurement at 100 cm, lightly mark the fish at this point, and then take a second measurement from the point. It is then easy to add the two measurements together to get the full length.

Flexible tape

A flexible tape is a versatile means of measuring large tuna and the larger billfish. However, it must be used correctly to record straight measurements.

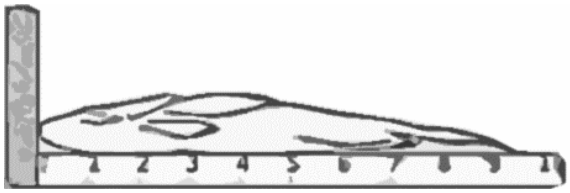


Image adapted from SPC.

Always place the flexible tape up against a straight (90 degrees) vertical object. If this is not done, the fish can easily slip down the deck tape when it is being measured, giving an incorrect measurement.

Pay attention to collect the true measurement when using a flexible tape. The observer's eye must be directly above the tail of the fish to ensure the correct measurement is recorded.

Image adapted from SPC.

If the measurement is taken when the eye is not directly above the tail of the fish, the measurement will be read at an angle, possibly giving an incorrect result.

> Recording weights

BE CLEAR ON EXACTLY WHAT MEASUREMENTS YOU ARE TAKING AND HOW!

- *Weights are recorded to the **nearest kilogram**.*
  - If the weight of the species is 34.2 kg round the value down to 34 kg.
  - If the weight of the species is 34.6 kg round the value up to 35 kg.
- *Weights are always associated with an IOTC code for **processing type** (state) and an IOTC code for **estimation method** (tool).*
  - Headed and tailed weight (HT), taken with a spring balance (SB).
  - Headed and tailed weight (HT), taken with a spring balance (SB).

>> FORM 1-GIL: VESSEL AND TRIP INFORMATION

This is a generic form that is designed to capture all the information regarding a particular vessel, a particular observer and trip. The following instructions outline how Form 1-GIL is used. *Observers must fill in only one Form 1-GIL per fishing trip.*

Fishing trip definition: *A complete fishing trip is defined as 'from one full or partial offloading to the next full or partial offloading'*. If the vessel you are on, arrives in port but does not offload fish, then the trip has not been completed. If the vessel returns to port to offload some or all of its fish, or tranships at-sea, then the trip has been completed.

If you are instructed to return to sea on the same vessel, then you should consider this to be a new fishing trip and you should fill in a new 1-GIL Form and allocate a new trip number. If your trip does not cover a complete fishing trip as defined above, you should state the reason in your report.

To obtain some data requirements you will need to question the captain or other officers. Do not record assumptions. If the information is unclear, verify the answers with the captain. It might be difficult to complete the Form 1-GIL as soon as you get on board, but you should make a start after the first few days. It can be a good way to build up a relationship with a new captain and the officers before the fishing starts. If you cannot collect the information for some of the data fields at the beginning of the trip, you may find them later on as the trip progresses.

Fill in all data fields on the Form 1-GIL, or insert a dash. A dash shows that you tried to get the information, but you were unable to get it (for a variety of reasons such as language barrier). If a dash is inserted in a data field where information is normally expected, then write a comment to explain why. If there is not enough room on the form to write the full comment, record the page number of your notebook where the rest of the comment can be found.

OBSERVER INFORMATION

Observer identification

On the Form 1-GIL the trip details are the header details.

OBSERVER INFORMATION	
Observer identification	
1. Observer IOTC registration number	Observer trip number
IOTCLKA001	2020/02/10 - IOTCLKA001 - GIL
2. Observer full name	3. Observer nationality
Indika UDUGODAGE	LKA

1. Observer IOTC registration number: Scientific observer registration number allocated by the IOTC.

Observer trip number: This is the unique observed trip identifier.

2. Observer name: Full name of the scientific observer that collected the data on-board the fishing vessel. Last name first, first name last.

3. Observer nationality: Scientific observer nationality as it appears in the observer passport. Record FAO ISO_3 country code (page 69).

Observer trip details

The following four data fields ask for information related to the observer, not the vessel.

Observer trip details collect all dates and times in Coordinated Universal Time (UTC)

4. Location of embarkation (country and port or at-sea)

COUNTRY	PORT (name)	AT SEA (√)
LKA	COLOMBO	---

Position of embarkation (dd° mm' ss'') specify quadrant (circle)

LATITUDE			LONGITUDE		
06° 54'57''	S	(N)	079°50'56''	(E)	W

5. Date / time of embarkation (UTC)

DD	MM	YYYY	hh	mm
10	02	2020	14	00

6. Location of disembarkation (country and port or at-sea)

COUNTRY	PORT (name)	AT SEA (√)
LKA	COLOMBO	---

Position of disembarkation (dd° mm' ss'') specify quadrant (circle)

LATITUDE			LONGITUDE		
06° 54'57''	S	(N)	079°50'56''	(E)	W

7. Date / time of disembarkation (UTC)

DD	MM	YYYY	hh	mm
19	02	2020	19	00

4. Location of embarkation: *Country code* (page 69), *port name* and / *or geographical coordinates* of the port where the observer boarded the vessel. If the observer embarked at sea outside port limits via a vessel transfer record "at sea", and record the position in latitude and longitude.

5. Date and time of embarkation: Date and time that the observer boarded the vessel. Note that the observer embarkation date/time may not coincide with the date/time that the vessel sailed.

6. Location of disembarkation: Country code (page 69), port name and/or geographical coordinates of the port where the observer disembarked. If the observer disembarked at sea outside port limits via a vessel transfer, record "at sea" and record the position in latitude and longitude.

7. Date and time of disembarkation: Date and time that the observer disembarked from the vessel. Note that observers' disembarkation date/ time may not coincide with the date/time that the vessel landed.

VESSEL INFORMATION

Accurate vessel information is best obtained by requesting a copy of the vessel's registration certificate, a copy of the safety certificate, and a copy of its fishing permit issued by its flag state, or any coastal State. Vessel details can also be obtained from the IOTC website.

Vessel identification

VESSEL INFORMATION

Vessel identification

8. Vessel name	9. Vessel flag/chartering state	10. Vessel IOTC number
IMULA1597MTR	LKA	17619
11. Vessel IMO or Lloyds number	**12. International radio call (IRCS)**	**13. Vessel port/country of registration**
UNK	4SF5476	UNK/LKA
14. Vessel registration number	**15.Vessel phone(s)**	**16. Vessel fax(es)**
UNK	UNK	UNK
17.Vessel email(s)	**18. Licensed target species (FAO codes)**	**19. Main fishing gear**
UNK	TUX	Gillnet (GIL)

8. Vessel name: Vessel full name with no abbreviations, as recorded on vessel official documents, and crosschecked with the name recorded on the vessel itself. Record vessel name with the correct spelling and character spacing including any corresponding numbers.

9. Vessel flag / chartering state: Country (page 69) and port name where vessel is registered as shown on its registration documents. Do not be confused by the nationality of the captain or crew onboard the vessel. Their nationality may not be the same as the flag of the vessel. Where chartering occurs, name of chartering country.

Note that the vessel flag state (or chartering flag) may not be the same as the nationality from which the vessel originates.

10. Vessel IOTC number: Vessel IOTC number as per the IOTC Record of Authorized Vessels, crosschecked with the number recorded on vessel certificates (*any discrepancies to be reported to the IOTC*).

11. Vessel IMO or Lloyd's number: A seven-digit number allocated to the vessel by the International Maritime Organization of the United Nations (*e.g.: IMO8814275*).

12. International radio call sign (IRCS): Vessel radio call sign if available. The radio call sign should be displayed on the vessel's licence and clearly on the sides of the vessel (port and starboard). The IRCS must be in either black letters on a white background or white letters on a black background.

13. Vessel port / country of registration: Vessel country code (page 69) and port of registry shown on its registration documents and on the stern of the ship's hull.

14. Vessel registration number: Number issued by country (Flag State) in which the vessel is registered, shown on its registration documents and written on the hull of the vessel. This may be a combination of characters and numbers; record them all (*e.g.: CBG303*).

15. Vessel phone / 16. Vessel Fax / 17. Vessel e-mail: A vessel may have several contact numbers and email addresses depending on the satellite communications systems installed onboard; record them all. Make sure to take note of the ocean region code.

18. Licensed target species: Target species that are caught by the vessel, as specified in vessel licences or permit conditions. use FAO spp. 3-alpha codes marked in the 'IOTC species identification guides' and the species lists provided in page 67. *If unable to find the code for a particular species fill in the species scientific name. If unsure of the correct species use the FAO three-letter species group code, and provide further description of the species (e.g.: TUS for tuna).*

Attention: Do not write local names for species in the data field. If the FAO species code is not known, record the code 'UNS' (unspecified) in the data field and make a comment in your notebook with the local name. During debriefing, at the end of the trip to try to determine the correct species code and correct it on all the forms before submitting them.

19. Main fishing gear: Vessel main fishing gear. In this case pelagic drifting gill-net (GIL).

Vessel owner and personnel

Vessel owner and personnel

Registered owner		Charter operator	
20. Full name: MPMS PRIYANKARA	21. Nationality: LKA	23. Full name: MPMS PRIYANKAR	24. Nationality: LKA
22. Contact details: SHANTHA, BADUGODA, MIRISSA		25. Contact details: SHANTHA, BADUGODA, MIRISSA	
Fishing master		**Skipper (Captain)**	
26. Full name: H.W.G.C.G.Chandrasiri	27. Nationality: LKA	28. Full name: H.W.G.C.G.Chandrasiri	29. Nationality: LKA 30. Crew n°: 12

Registered owner

20. Full name / 21. Nationality / 22. Contact details: Name of Company or Person who owns the vessel, nationality and contact details in full. This should be in the Vessel Registration Papers.

Charter operator

23. Full name / 24. Nationality / 25. Contact details: Where the vessel has been chartered and is operated and managed by a company other than the owner, record the operator's full name (company or individual as appropriate), nationality (page 69) and contact details (mobile and fix phone, email).

Fishing master

26.Full name / 27. Nationality: Fishing master name and nationality (page 69) in full. There may be a vessel skipper (captain) and a fishing master on larger gill-net vessels. The fishing master may not have a formal qualification but will usually be in control of the vessel during fishing operations. On smaller vessels, the vessel captain is also the fishing master. in this case, observers can insert *"N/A" for not applicable* in the vessel skipper data field and fill in the name and nationality of the fishing master.

Skipper

28.Full name / 29. Nationality: Skipper name and nationality (page 69) in full. *In some instances, the fishing master and skipper (captain) may be the same person. In these cases, record here "N/A" for not applicable.*

30. Crew number: Number of crew, cross checked against the vessels crew list.

Vessel trip details

FORM 1-GIL (pg. 2)

Vessel trip details

31. Port of departure *(country and port or at-sea)*			33. Port of return *(country and port or at-sea)*		
COUNTRY	PORT (name)	AT SEA (√)	COUNTRY	PORT (name)	AT SEA (√)
LKA	COLOMBO	---	LKA	COLOMBO	---
Position of embarkation *(dd° mm' ss") specify quadrant (circle)*			Position of disembarkation *(dd° mm' ss") specify quadrant (circle)*		
LATITUDE		LONGITUDE	LATITUDE		LONGITUDE
06° 54'57" S (N)		079°50'56" (E) W	06° 54'57" S (N)		079°50'56" E W
32. Date / time vessel sailed *(use UTC)*			34. Date / time vessel returned to port *(use UTC)*		
DD / MM / YYYY	hh / mm		DD / MM / YYYY	hh / mm	
11 / 02 / 2020	14 / 00		19 / 02 / 2020	15 / 00	

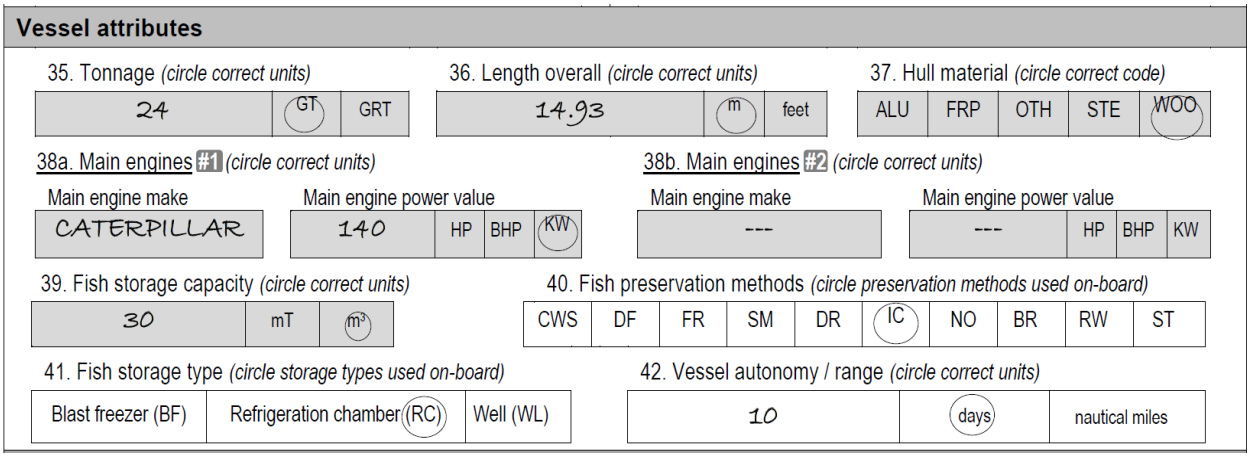
31. Port of departure: Country code (page 69), port name and/or geographical coordinates of the port from where the vessel sailed. If the vessel started a new trip at sea following transhipment, record 'at-sea' plus the geographical coordinates corresponding to the location the trip started.

32. Date and time the vessel sailed: Date and time the vessel departed from port or from a transhipment location. *Note that* the *date / time the vessel sails may not coincide with observer's embarkation date / time.*

33. Port of return: Country code (page 69), port name and/or geographical coordinates of the port where the vessel returned. If the vessel arrived at a transhipment location record 'at-sea' plus the geographical coordinates corresponding to the location the transhipment started. *If the observer disembarked before the vessel returned then record the 'expected port' of return as provided by the vessel.*

34. Date and time the vessel returned: Date and time the fishing vessel finishes its fishing campaign. I.e., returns to port or to a transhipment location for offloading. *If the observer disembarks before the vessel returns then record the expected date and time of arrival (ETA) as provided by the vessel.*

Vessel attributes



35. Tonnage: Vessel tonnage (mT) as specified in vessel registration papers. Vessel tonnage can be registered in Gross Tonnage (GT) or Gross Registered Tonnage (GRT). *Make sure you circle the correct type of tonnage used.*

36. Length overall (LOA): Vessel overall length as specified in vessel registration papers. *Make sure that you circle the correct units used (meter or feet).*

37. Hull material: Vessel hull material(s) as specified in the vessel registration papers. *Make sure you circle the correct hull material code (page 70).*

38a and 38b. Main engine make and power: The make (brand) and the power of the main engine(s) if more than one (HP, KW, or BHP). *Make sure you circle the correct power units used.*

39. Fish storage capacity: Vessel total maximum capacity to store catches in metric Tons (mT) or cubic metres (m3). This should include blast freezer(s) capacity. *Make sure you circle the correct units used.*

40. Fish preservation methods: Method or methods used by the vessel to preserve the catch. *Make sure you circle the correct fish preservation method code(s) (page 70).*

On a gill-netter these will normally include:

- Ice (IC). Vessels doing shorter trips, smaller gill-netters (less than15 meters), often use flake ice for storage. Ice is often taken onboard the vessel before it leaves port. The fish are often first chilled by putting them into an ice slurry until their core temperature is brought down. They are then stacked in the hold with ice;
- Freezing (FR). Fish frozen and stored between 0° and -30°C. Freezing is mostly done on board larger gill-net vessels (more than 15 meters).

41. Fish storage type: Type of structure(s) present on-board used by the vessel to store the catch. On a gill-netter this will normally be a '*Refrigeration Chamber*'. *Record fish storage type code (page 70).*

42. Vessel autonomy / range: Vessel autonomy, expressed in the time (days) a vessel can spend at sea without refuelling. If this information is not available, record vessel range expressed in cruising distance (nautical miles -nm). *Make sure you circle the correct units used (days or nm).*

Vessel electronics

Most of the vessel's electronic equipment will be found in the bridge or in a room (cabin) off the bridge. Indicate if each unit of electronic equipment listed is onboard by first circling either 'Yes' or 'No. Remember 'No' must also be circled if no new piece of electronic equipment is observed onboard. The following section will help observers identify the electronic equipment requested on the 1-GIL form and outlines how it is used.

Vessel electronics circle the correct answer

43. GPS	44. VMS	45. Radars	46. Track plotter	47. Depth sounder
(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO
48. Sonar	**49. Doppler current meter**	**50. Expendable bathythermographs**	**51. VHF radios**	**52. HF radios**
YES (NO)	YES (NO)	YES (NO)	(YES) NO	YES (NO)
53. Satellite com. system	**54. SST gauge**	**55. Weather facsimile**	**56. Fisheries information services**	
YES (NO)	YES (NO)	YES (NO)	YES (NO)	

43. Global Positioning System (GPS): The GPS displays the vessel's exact position in latitude and longitude. GPS positions incorporated into track plotters and acoustic systems shouldn't be considered here.

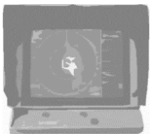
44. Vessel Monitoring Systems (VMS): The VMS tracks the vessel's position using satellite technology and relays the position to a monitoring station on shore. Observers should be able to identify the mobile transponder unit box or 'black box' in the bridge.

45. Radars: Also, circle "Y" if a high frequency radar is used to search for seabird activity or activity on the sea surface is present on-board. A bird radar is equipped with a large coloured screen. It displays the presence of small items that cannot normally be seen with the navigational radar. This includes flocks of birds, which may be a sign that there is a school of tuna present.

46. Track Plotter: The track plotter shows a continuous track of the vessel's movements. Important positions (i.e.: fishing positions, anchored FAD locations) can be logged into the track plotter, allowing the vessel to return to these exact positions. It is usually linked to the GPS and can be used with the auto-pilot to guide the vessel to a specific position.

47. Depth Sounder: The depth sounder searches for and displays objects below the vessel. It may show the presence of fish and can be used to help with navigation, especially when travelling in shallow waters or entering harbour areas.

48. Sonar: The sonar displays solid objects in the water column below or to the side of the vessel. It can display the presence and movements of fish close to the vessel. This includes bait fish and rainbow runners, as well as tuna.



49. Doppler current meter: The Doppler current meter displays the direction (in units of degrees) and strength (in units of knots) of the current at various depths. Only circle "Y" if and independent current meter is on-board as other devices can be used to ascertain the current speed.

50. Expendable bathythermographs (XBT): XBT can be handheld or automatic (mounted on the bridge wings). XTBs are periodically used to determine the depth of the thermocline. Only circle "Y" if and independent XBT is present on-board, as other devices can be used to determine the depth of the thermocline.

51. Very high frequency radios (VHF): VHF radios are used for local communications up to approximately 25 miles.

52. High frequency radios: HF radios are used for communication over longer distances over 1000 miles.

53. Satellite communication systems: The vessel may have access to a variety of communication services, such as telephone, telex and email, via satellite technology. Inmarsat A and B that provide telephone, telex, fax and data transmission or Inmarsat C that provides telex (fax), data transmission and internet. *Note that the satellite monitor that display weather reports and maps may look like a computer screen.*

54. Sea Surface Temperature (SST) gauge: Mechanical or electronic thermometer measuring the sea surface temperature. Only circle "Y" if and independent SST gauge is present on-board, as other devices can be used to determine sea surface temperature. SST gauge is usually mounted on the bridge.

55. Weather facsimile: Supplies vessels with weather information. Only circle "Y" if and independent weather facsimile is on-board, as other devices can be used to receive weather information.

56. Fishery information services (FIS): Only circle "Y" if the vessel as a FIS installed on-board. Note that vessels may access fishery information services for instant information on weather and oceanographic features (SST, phytoplankton densities or sea height).

WASTE MANAGEMENT (MARPOL agreement, annex 5)

"Waste" or "Garbage" means all kinds of victual (food), domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically.

Note "Y" (yes) or "N" (no), in the table below, to indicate one or more waste storage/disposal method used by the vessel per waste category.

WASTE MANAGEMENT (MARPOL AGREEMENT, ANNEX 5) fill in at the end of the trip						
57. WASTE CATEGORY	58. STORAGE / DISPOSAL METHOD *indicate with a "X" how waste is stored/disposed of*					
	At sea	Incinerated	Land disposal	Other (detail)	Retained	Unknown
Cardboard and paper	X					
Kitchen waste	X					
Metal and glass	X					
Non-biodegradable fishing gear		X				
Oil and fuels		X				
Other						
Plastic					X	

57. Waste category: Category of the waste produced by the vessel (*cardboard and paper, kitchen waste, metal and glass, non-biodegradable fishing gear, oil and fuels, plastic*).

58. Storage / disposal method: How the waste was disposed of (*disposed at-sea, incinerated, disposed on land, retained, other, unknown*).

OBSERVED TRIP SUMMARY

OBSERVED TRIP SUMMARY [fill in at the end of the trip] [collect all dates and times in Coordinated Universal Time (UTC)]			
59. No. fishing events/sets conducted with observer onboard	60. Number of fishing events/sets observed	61. Number of days searching	62. No. active fishing days
8	8	0	8
63. Number of days lost	64. Reason for days lost (circle)	65. No. days in fishing area	66. No. of days transiting
0	Bad weather / Breakdown / Other	8	2

59. Number of fishing events/sets: Total number of fishing events/sets conducted by the vessel while the observer was on-board, independently of their success and of being sampled or not by the observer.

60. Number of fishing events/sets observed: Number of fishing events/sets monitored by the observer.

61. Number of days searching: Number of days that the vessel was engaged in actively searching for fish (this includes active fishing days).

62. Number of active fishing days: Number of days that the vessel actually fished (i.e.: when the vessel had gear in the water). *For some events/sets this may be for only a few hours of the day. Alternatively, a single event/set may span over parts of two days.*

63. Number of days lost: Number of days where a vessel was unable to fish due to factors such as adverse weather conditions, mechanical failure or other unforeseen events.

64. Reason(s) for days lost: Reason(s) why a vessel was unable to fish: (i) adverse weather conditions, (ii) mechanical breakdown or inoperative gear or (iii) other unforeseen events (to be specified).

65. Number of days in the fishing area: Number of days the vessel spent in the fishing area while the observer was onboard. This does not include transit time even if the area being transited is within the fishing area.

66. Number of days transiting: Number of days the vessel spent steaming or transiting to / between / from fishing areas while the observer was onboard.

Observations / Comments on Other Gear / Unusual Use of Gear

Write brief notes on anything special regarding the vessel, the equipment or crew in your notebook. Pay special attention to any new electronic equipment or new fishing gear, as well as any new or unusual techniques for using fishing gear or electronics.

New technology or fishing practices may result in higher catches for a vessel, or a fleet of vessels, so it is important to learn about them straight away.

>> FORM 2-GIL: PELAGIC DRIFT GILL-NET GEAR

This form contains detailed questions about the fishing gear. Most fishing gear is kept on the deck of the vessel. The following instructions help observers to identify each piece of fishing gear as listed on Form 2-GLL and outlines how it is used.

Header details

The header details *should be fully completed on every form* (for information on observer name, observed trip number and page number, see page 29).

IOTC REGIONAL OBSERVER SCHEME GILLNET GEAR SPECIFICATIONS		FORM 2-GIL Page 1 of 4
Revised September 2021		
Observer Name: Indika UDUGODAGE	Observed trip No: 2020/02/10 - IOTCLKA001 - GIL	Gillnet sequential number: 001

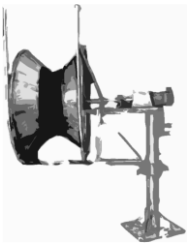
Gill-net sequential number: A unique sequential number is to be allocated to link each individual gill-net to its specifications. Any changes to individual gill-net specifications are to be considered a change of gill-net and the "new" gill-net will need to be characterised accordingly. *Complete a new form 2-GIL for each unique pelagic drift gill-net used during the observed trip.*

The vessel may have skeins of net in storage and may make up nets during a voyage to replace lost or damaged nets. If the vessel makes up additional gill-nets (string of nets) or replaces lost or damage nets in an existing string, the observer should fill in a new form 2-GIL to record new string / string new specifications.

Special equipment or machinery

Special equipment or machinery circle either "Y" or the "N" to indicate presence or absence of a device on-board		
1. Net drum/hauler present on-board?	(Yes)	No

1. Net drum /hauler: On small boats, gill-nets are hauled by hand. On larger vessels they are retrieved with the help of special equipment and machinery such as hydraulic net haulers and / or net drums. Large drums can also be used to haul and store nets. Nets can be hauled from the side (normally starboard), from the stern or the bow depending on the vessel layout.



Net hauler

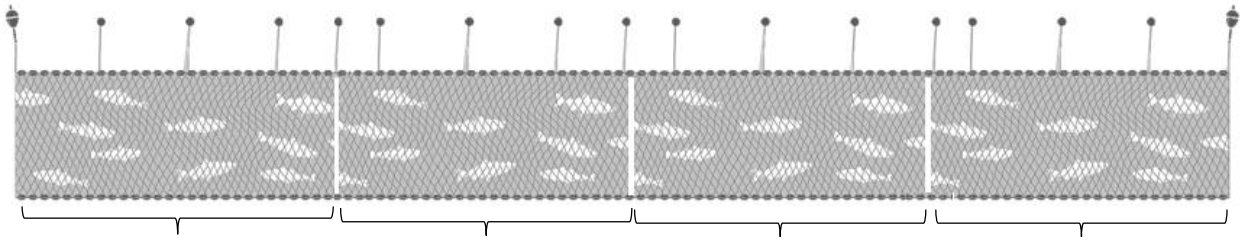
Net drum

General gear attributes

Gillnet attributes detail the specifications of each gillnet present on-board during the observed trip. Circle units used.											
2. Total number of panels	83		3. Panels stacked?	Yes	(No)						
4. Net length	2.49	(Km) nm	5. Net depth	15	meters	6. Net material	BR	(MO)	MU	OTH	UNK
7. Mesh Av. stretched length	14	cm	8. Mesh max. length	17	cm	9. Mesh min. length	13	cm			
10. Mesh count vertical (#)	100		11. Hanging ratio	0.4	%	12. Net web colour	CLA				
13. Float types	(FLF)	HDP	OTH	14. Float number	0		15. Distance between floats	NA	meters		
	PVC	FOA	UNK	16. Droplines used?	Yes	(No)	17. Droplines length	NA	meters		

18. Sinker type	Cement	Lead	Stones	Weighted footrope	Other	Unknown
Number	---	---	---	1	---	---
Average weight (Kg)	---	---	---	30 (1.2 kg/100m)	---	---

2. Total number of panels: A gill-net is generally made up out of a series of vertical net panels. A net panel being a large mesh netting stretched between a float line at the top (or top rope) and a lead line at the bottom (also called weight line), and supported by vertical end lines, or up and down lines on each end. Panels of netting may be separated by a space or escape panel. *Record the number of panels making up the gill-net.* Request this information from the Captain or Fishing Master and cross-check it during setting and hauling operations.

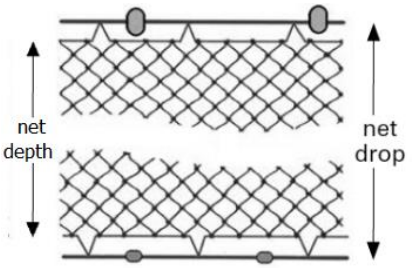


Panel 1 Panel 2 Panel 3 Panel 4

3. Panels stacked? Indicate if there are any panels stacked. I.e., if two or more panels of netting sewn together vertically, one on top of the other, to intentionally fish "double deep".

4. Net length: Record gill-net length to the decimals of kilometres. I.e., the horizontal distance of the string of nets (or fleet of nets) that composes the gill-net, as measured along the float line (or top rope). This information may be obtained from the captain. *If spaces or escape panels are included in the net string, do not include this distance in the net length.*

5. Net depth: Record net vertical height (depth) to the decimals of metres. This value is obtained by measuring the length of the end line, or up and down line, on the end of a net where the meshes are attached. This information can be crosschecked with the captain. *The net depth should not be confused with the net drop, which is the vertical distance between the headrope (headline, float line) and the footrope (lead-line).*



©GFCM/Alberto Gennari

6. Net material: Record the material of the net webbing. Use codes provided in the page 71.

7. Stretched mesh size: Record the mesh average stretched lengths. The size of the mesh is determined by stretching the mesh and measuring the distance from knot to knot in either centimetres or millimetres

- Measure 10 stretched mesh lengths (knot to knot) as shown, from 5 panels in different areas of the net, and calculate the average.
- Pull the net's diamond mesh lengthways so that it reaches its greatest width. Measure this width preferably to the decimals of centimetres.
- Request mesh size values from captain or officers;
- If values differ, record measured average mesh size and report this on your trip report.

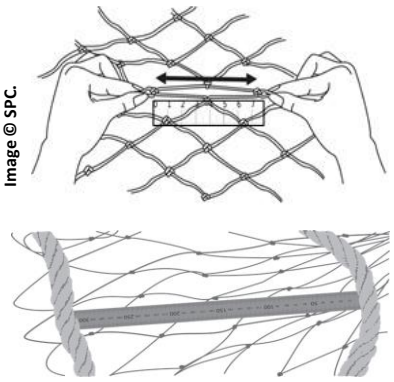


Image © SPC.

8. Mesh maximum length: Record the maximum stretched mesh length measured.

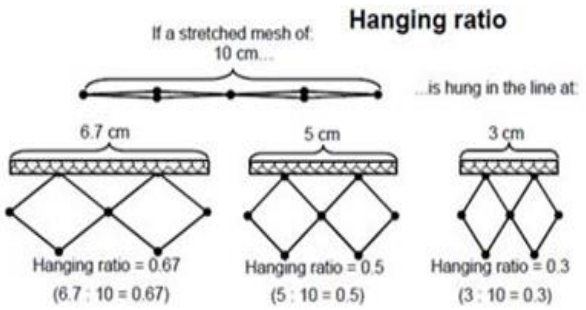
9. Mesh minimum length: Record the minimum stretched mesh length measured.

10. Mesh count, vertical (#): Record the number of net vertical meshes. Usually obtained by counting the number of meshes of the end-line, or up and down line, on the end of a net where the meshes are attached.

- Count the number of meshes of the end-line, or up and down line, on the end of a net where the meshes are attached.
- This information may be used to cross check information provided by the crew.
- If values differ, record your mesh count and report this on your trip report.

11. Hanging ratio (%): The *hanging ratio* of a gill-net is one of the most important factors affecting catches. The horizontal hanging ratio is the ratio between the length of the float line and the length of the stretched mesh hanging on the float line. *Calculate and record gill-net hanging ratio by following the instructions provided below:*

- Count 10 or 12 meshes horizontally,
- Multiply the number of counted meshes by average stretched mesh length;
- Measure the length of the floatline they are attached to;
- Divide the length of the floatline the meshes are attached to (L) by the length of the stretched meshes counted.



- This information may be used to cross check information provided by the crew.
- If values differ, record your mesh count and report this on your trip report.

12. Net web colour/s: Record the colour(s) of the net webbing. Use codes provided in the page 71. *Note that different net colours can have an impact on cetacean and turtle bycatch as some colours are more visible than others [Consistent with SC16.24 (para. 53)].*

13. Float type/s: Indicate the type of buoyancy aid that is attached to the gear head-rope. Use codes provided in the page 71

14. Float number: Record the approximate number of floats used. Include the floats across a space that may occur at the bridle at the end of the net. This information may be obtained from the crew.

15. Distance between floats: Record the average distance (measured along the head-rope) between the floats used on this gill-net, in meters and decimals of meters.

16. Droplines used? Droplines are lines that connect the gill-net float line to the floats that stay at the water surface. Record whether droplines are used in this gill-net.

17. Droplines length: If droplines are used in this gill-net, record the length of the droplines to the decimals of meters. Calculated by measuring the distance, in meters, from the floats (at the water's surface) to the float-line. This information may be used to cross check information provided by the crew.

16. Sinker type, number and weight: For each sinker type (codes in page 71), record approximate number of sinkers attached to the footrope and their average weight in Kilograms and decimals of Kg. This information can be requested from the crew and crosschecked by the observer.

>> FORM 3-GIL: GILL-NET FISHING EVENT

This form contains detailed questions about the fishing event (set). It is to be completed each time the net-string is deployed. The following instructions outline how to fill Form 3-GIL.

Header details

The header details *should be fully completed on every form* (for information on observer name, observed trip number and page number, see page 29).

SETTING OPERATIONS

The time and position for the start and end of every set must always be observed directly and recorded by observers, even for blank sets (i.e.: set with zero catches).

IOTC REGIONAL OBSERVER SCHEME — **FORM 3– GIL**

GILLNET FISHING EVENT — Page 1 of 8.

Revised September 2021

Observer Name: Indika UDUGODAGE	Observed Trip No: 2020/02/10 - IOTCLKA001 - GIL
Fishing event number: 001	1. Gillnet sequential number: 001

SETTING OPERATIONS collect all dates and times UTC and positions as dd°mm'ss". Circle units used.

2. Setting start date and time					3. Setting start position specify quadrant (circle)				
DD	MM	YYYY	hh	mm	LATITUDE	S	(N)	LONGITUDE	(E) W
13	02	2021	14	00	08° 12' 12"			079° 08' 19"	

4. Setting end date and time					5. Setting end position specify quadrant (circle)				
DD	MM	YYYY	hh	mm	LATITUDE	S	(N)	LONGITUDE	(E) W
13	02	2021	16	33	08° 12' 13"			079° 10' 03"	

6. Vessel speed (Av)	5.8	Knots						
7. Vertical set	(Surface)	Sub-surface	8. Setting strategy	NDR	9. Setting shape	(1)	2	3	4	5

Set / fishing event number: Set numbers are recorded in the order that they happen while the observer is on-board the vessel. The observer should allocate a unique set number each time the net is deployed. This should be a three-digit numerical code. Set numbers should be consecutive from the start to the end of the observed trip. Start at Set "001", "002", etc., throughout a trip.

1. Gill-net sequential number: Specify gill-net used on this set by recording its sequential number, that links the gill-net to its specifications, detailed in the 2-GIL Form.

2. Start setting date and time: This is the date and time when the first component of the pelagic drift gill-net is deployed, *recorded in UTC time*.

3. Start setting position: The vessel position in latitude and longitude at the start of the setting operation, *recorded in DMS format*.

4. End setting date and time: This is the date and the time when the pelagic drift gill-net is secured to the vessel, to an anchoring device, or completely deployed, *recorded in UTC time*. *Gill-net vessels often set dusk and the setting operation may continue beyond midnight and into the following day.*

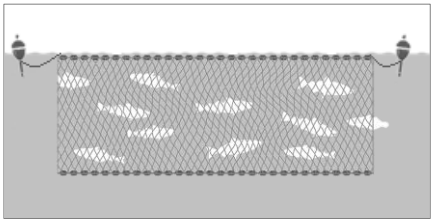
5. End setting position: This is the vessel position in latitude and longitude at the end of the net setting operation, *recorded in DMS format*.

6. Vessel speed: The vessel average speed during setting (*in knots*). Collect vessel speed from the GPS several times during the operation and take the average.

- The recorded value can include up to one decimal place. If the value calculated has more than one decimal place, then round the value off to the nearest one decimal place.

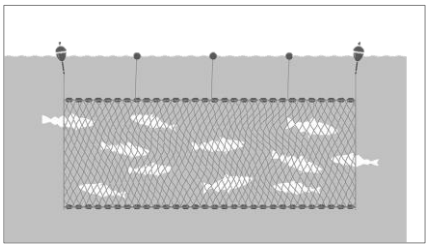
7. Vertical set: Indicate the level the gill-net is set at vertically in the water column. I.e., if the net is set at the '*surface'* or '*sub-surface'*. *The level at which the net is set at vertically in the water column impacts levels of bycatch of ETP species.*

- During '*surface sets'*, the gill-net is maintained on the surface of the sea with the help of floats placed closely together along the float line (e.g., around every 4.5 meters), while weights are loosely spaced along the footrope (e.g., around every 60 m). This arrangement enables the net to remain at surface.



Gillnet set at the surface

- During '*sub-surface sets'*, droplines of 1.5 to 2 meters long are attached to the gill-net headline at regular intervals (e.g., around every 8 meters), while weights are more tightly spaced along the footrope (e.g., around every 35 m). This arrangement enables the gill-net to remain 2 meters below the surface during the fishing operation.



Gillnet set at the sub-surface

8. Setting strategy: Indicate how the gill-net was set. *Nets can be s anchored (attached to the boat or other), left drifting or actively used to encircle the target school using codes provided in page 72.*

9. Setting shape: Indicate the spatial configuration in which the gill-net was set using codes provided in page 72. *Nets can be set in a range of configurations such as pulled straight, in a semi-circle or V-shape as well as many others.*

MITIGATION MEASURES

While gill-nets are highly selective in terms of size, they offer limited interspecies selectivity and can catch seabirds, cetaceans, sea turtles and sharks (He, 2006a). Among all fishing techniques, gill-netting represents a particular concern because it is known to be associated with relatively high bycatch mortality of all of the above taxa (Northridge et al., 2016).

MITIGATION MEASURES circle the correct answer(s) where needed														
10. Mitigation measures?	Yes	(No)	11. Mitigation device	AAD	ACD	AWM	LIS	LIG	NON	NTS	PAD	OTH	OVM	UNK	VID

10. Mitigation measures? Indicate Yes or No if any bycatch mitigation devices were used during the set.

11. Mitigation device: Record any mitigation device(s) used during the set, using codes provided (page 72). Provide details (and photos) on mitigation device(s) used on your notebook and final trip report.

DETAILS ON MITIGATION DEVICES

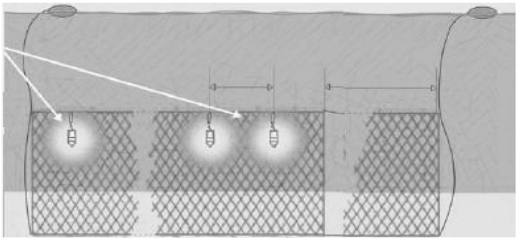
- Active acoustic deterrents (AAD), also called '*pingers*', are acoustic devices that alert or warn marine mammals, turtles and sea-birds about the presence of fishing activity, in this particular case the presence of nets.

- Passive acoustic deterrents (PAD), use air-filled or metallic components incorporated into fishing gear to alert a marine cetacean to fishing gear presence by increasing their detection by echolocating cetaceans (e.g., rubber tubes, thick polyester rope, and chains attached to fishing nets).

- Acoustic decoys (ACD), use recorded sounds as a potential means to scare or attract animals away, from locations of actual fishing.

- Light-sticks (LIS): By lighting up the layers of submerged nets, light sticks help turtles as well as sea-birds to avoid entanglement.

- Lights of different colour (LIG): By lighting up the layers of submerged nets, light-emitting diode lamps (LEDs) of different colours help turtles as well as sea-birds avoid entanglement.



- Visual decoys or deterrents (VID): Are visual 'scarecrows' that trigger avoidance behaviours in bycatch species such as seabirds (floating buoy that displays large, obvious 'looming eyes'), cetaceans, and sea turtles (e.g., shark shapes).

- Other visual methods (OVM): other than those described above. Example, the use of *warning net panels*, consisting in replacing 10 to 25 percent of the monofilament panels of the upper part of the net with a section of more visible white braided nylon twine can offer a sufficiently dissuasive obstacle to prevent birds from getting entangled in nets as they dive.

- Above water methods (AWM): For example, bird curtain, tori lines, underwater setting, branch line hauler, line shooter, laser beams, etc.

- Net type/setting (sub-surface nets) (NTS): Any changes done to the net type and / or setting with the objective of mitigating the levels of bycatch of ETP species.
  - Possible changes to net type: buoy rope modification, weak links; increase rope visibility, mesh colour; etc.
  - Possible changes to net setting: increasing net-setting depth, decreasing net slackness, reduce net buoyancy, etc.

- Other: Other mitigation devices than those described above (electrical barriers attached to nets, which could repel sharks, rays and skates, thus preventing entanglement).

>> FORM 4-GIL: GILL-NET FISHING EVENT (SET)- CATCH DETAILS

This form contains questions about catch details including target and non-target catches together with SSIs and it is to be completed each time the gillnet is hauled. The following instructions outline how observers should complete Form 4-GIL.

Header details

The header details *should be fully completed on every form* (for information on observer name, observed trip number and page number, see page 29).

IOTC REGIONAL OBSERVER SCHEME GILLNET FISHING EVENT - CATCH DETAILS	FORM 4–GIL Page 1 of 8 .
Revised October 2021	

Observer name:	Observed trip no:	Fishing event number:
Indika UDUGODAGE	2020/02/10 - IOTCLKA001 - GIL	001

Fishing event number: The observer should record the number corresponding to the fishing event observed. You should refer to the parent set number as specified in the 3-GIL form (e.g.: 001, 002, …).

CATCH DETAILS

Complete the catch details table for all specimens observed including depredated, non-target and SSI specimens. An example on how to fill in the catch details table is provided

CATCH DETAILS to be recorded per species for all spp. Use codes provided in form notes to fill in data collection fields.

Catch #	1. Species	2. Fate	3. Sampling method	4. Number	5. Processing type	6. Weight value (circle unit used)			7. Weight estimation method
001	YFT	DPQ	SPS	NA	RD	3	mT	(Kg)	CA
002	BET	DPQ	SPS	NA	RD	6	mT	(Kg)	CA
003	YFT	RFL	VES	NA	RD	60	mT	(Kg)	CA
004	BET	RFL	VES	NA	RD	10	mT	(Kg)	CA
005	SKJ	RFL	VES	NA	RD	100	mT	(Kg)	CA
006	TTH	DUD	EXS	1	RD	10	mT	(Kg)	CA
007	BLM	RCC	EXS	1	RD	100	mT	(Kg)	CA
008	FAL	DUS	EXS	3	RD	60	mT	(Kg)	CA
009	FAL	DUS	EXS	2	RD	24	mT	(Kg)	CA

Catch detail number (#): This should be a three-digit numerical code beginning with 001. Catch numbers should be consecutive within the same set of the observed trip. Use as many 4-GIL forms as needed to record all specimens observed during the set.

1. Species: Use the Food and Agriculture Organization (FAO) three-letter species codes to record all species caught during the observed set. These codes are marked in the 'IOTC species identification guides' and provided in page 67.

- If you are unable to find FAO species 3-alpha code for a particular species, fill in the species scientific name.
- If you are unsure of the correct species use FAO three-letter species group code, and provide further description of the species.
- If the species or group is not known, use the three-letter code ('UNS' - Unspecified), and provide further description of the species.

- If more than one unknown species, use your own numbering system to separate out the different species (i.e.: UNS #1, UNS #2). Take notes in your journal to help re-coding these species later, take photos, make drawings and descriptions.
- *Further descriptions for all UNS codes must be supplied (see box below).*

How to provide further descriptions for unspecified (UNS) or group codes

1) Take photographs of the specimen.

2) Bring the specimen back to shore for further identification (if possible).

3) Draw the species and write a full description in the written report. When drawing or describing unidentified species, pay special attention to:

- Ø overall body shape
- Ø colour of the fish
- Ø where the fins are attached to the body and their relative position
- Ø size of the fins, and number of fin spines and rays
- Ø height of the dorsal fins (especially for marlins)
- Ø presence or absence of the lateral line and its shape
- Ø scales or skin of the fish
- Ø any other distinctive features

2. Fate: The fate of every species caught in the set. Use fate codes provided in page 73. Ensure that you fill in a new 'catch detail number' row for every different fate for a given species. *E.g.: Catch 009 refers to YFT whose fate was discarded, while catch 012 refers to YFT retained - for landing / sold. Therefore, a new catch detail number has been filled in.*

CATCH DETAILS to be recorded per species for all spp. Use codes provided in form notes to fill in data collection fields.

Catch #	1. Species	2. Fate	3. Sampling method	4. Number	5. Processing type	6. Weight value (circle unit used)			7. Weight estimation method
001	YFT	DPQ	SPS	NA	RD	3	mT	(Kg)	CA
002	BET	DPQ	SPS	NA	RD	6	mT	(Kg)	CA
003	YFT	RFL	VES	NA	RD	60	mT	(Kg)	CA

3. Sampling method: Sampling method used to estimate catch per species. Use codes provided in page 73. Ensure that you fill in a new 'catch detail number' row for every different sampling method for a given species. *E.g.: Catch 008 and 017 refers to "FAL" that shared the same fate but were collected using different sampling methods (systematic proportional and exhaustive sampling). Therefore, a new catch detail number has been filled in.*

4. Number: Number of individuals per species for each specified fate. If the observers only collect weight per species / fate they should be recorded here as NA (not applicable).

5. Processing type: Processed state for each specified species / fate pair. U*se the codes listed in page 74.*

6. Weight value: Species weight corresponding to the specified '*processing type'. Make sure you indicate units used by circling kilograms (Kg) or metric tonnes(mT).*

7. Weight estimation method: Estimation method used to obtain the weight. Use codes listed on page 74.

SPECIMEN DETAILS

Complete the specimen details table for all depredated, non-target and SSI specimens. An example on how to fill in the catch details table is provided here.

SPECIMEN DETAILS

		Depredation details on depredated fish		Additional details on non-target specimens		Additional details on SSIs						
Catch # see above	Specimen #	8. Depredation source	9. Predator observed	10. Condition at capture	11. Condition at release	12. Gear interaction	13. Brought on board?		14. Landing method	15.Turtle revival?		16.Photo ID
001	0001	SH	UNK	--	--	--	--	--	--	--	--	--
002	0001	SH	UNK	--	--	--	--	--	--	--	--	--
006	0001	NA	NA	D	D	EN	(Y)	N	GR	Y	(N)	0001
007	0001	NA	NA	A3	D	UK	(Y)	N	GR	Y	N	--

Catch detail number (#): Catch number allocated to the non-target species in the parent '*catch details*' table previously completed (see example below).

CATCH DETAILS to be recorded per species for all spp. Use codes provided in form notes to fill in data collection fields.

Catch #	1. Species	2. Fate	3. Sampling method	4. Number	5. Processing type	6. Weight value (circle unit used)			7. Weight estimation method
001	YFT	DPQ	SPS	NA	RD	3	mT	(Kg)	CA
002	BET	DPQ	SPS	NA	RD	6	mT	(Kg)	CA

SPECIMEN DETAILS

		Depredation details on depredated fish		Additional details on non-target specimens		Additional details on SSIs						
Catch # see above	Specimen #	8. Depredation source	9. Predator observed	10. Condition at capture	11. Condition at release	12. Gear interaction	13. Brought on board?		14. Landing method	15.Turtle revival?		16.Photo ID
001	0001	SH	UNK	--	--	--	--	--	--	--	--	--
002	0001	SH	UNK	--	--	--	--	--	--	--	--	--
006	0001	NA	NA	D	D	EN	(Y)	N	GR	Y	(N)	0001
007	0001	NA	NA	A3	D	UK	(Y)	N	GR	Y	N	--

Specimen number (#): Numerical code beginning '0001'. Specimen numbers should be consecutive within the same catch detail section, within the same set. *In the example provided above, the observer correctly recorded the first specimen ('Specimen #': 0001) of a Yellowfin tuna (FAO 3-alpha species code: YFT), inscribed as 'Catch #': 001 in the Catch detail table.*

Depredation details on depredated specimens

'Depredation' is the term used when unwanted species such as cetaceans, sharks, squids, birds consume bait or catch.

8. Depredation source: Toothed whales sometimes attack and eat tuna and swordfish that are caught on gill-nets. Squid and sharks can also sometimes eat fish caught on gill-nets but the damage they provoke is quite small compared to toothed whales. Based on the damaged provoked to the catch, select the depredation source(s) using codes given in page 74.

9. Predator observed: The predator species directly observed and identified (FAO spp. 3-alpha code). If not observed record UNK (unknown). *Species observed in the area may not necessarily be associated with predation unless directly observed.*

How to identify predators based on the damaged provoked

Ø **Depredation by marine mammals.** Identified by bite marks of irregular contours often accompanied by long pieces of skin and tendons; often only the head or mouth parts remain attached to the hook, being usually the result of a single bite; The fish looks crushed and shredded. Damage usually recorded to several fish in a single set.

Ø **Depredation by large sharks:** Identified by clean bite marks with few if any large piece of flesh attached, shark bite marks are more like cuts and lacerations than perforations, the cut of each tooth is sometimes visible on the surface of the wound, abrasion and superficial cuts often the result of several bites.

Ø **Depredation by squid:** identified by injuries of irregular sizes and irregular edges, with significant traces of suction on the skin at the wound edge and the fish's body; Fish vertebrae and column, when visible, are pretty clean. Injuries provoked by squid predation can be found any were on the fish body.

Ø **Depredation by *Isistius brasiliensis*** (IBR: cookie shark): Identified by circular or oval injuries with sharp edges and a very concave shape. Injuries can be located anywhere on the body but most often on its lower part.

Additional details on non-target species

Observers are to observe and record the state of health of non-target species that are caught by the vessel.

10. Condition at capture: The health condition at capture of non-target specimens (including SSIs) caught during the observed set (brought onboard or not). Use condition codes listed in page 74. Use the condition code 'U' (condition unknown) if there was no opportunity to assess the condition.

11. Condition at release: The health condition at release of non-target specimens (including SSIs) caught during the observed set (brought onboard or not). Use condition codes listed in page 74. Use the condition code 'U' (condition unknown) if there was no opportunity to assess the condition.

Additional details on SSIs

The following species have been considered by the IOTC as Species of Special Interest (SSI): marine mammals and turtles, seabirds, whale sharks, oceanic white tip sharks, thresher sharks, striped, black, blue marlin and Indo-Pacific sailfish). Observers are therefore required to collect catch details on these species at specimen level. Fill in the additional details on non-target species and additional catch details for every SSI specimen caught.

12. Gear interaction: The type of interaction of the SSI specimen with vessel primary gear or the vessel itself. *Make sure to use the code(s) that best describe the situation (page 74).*

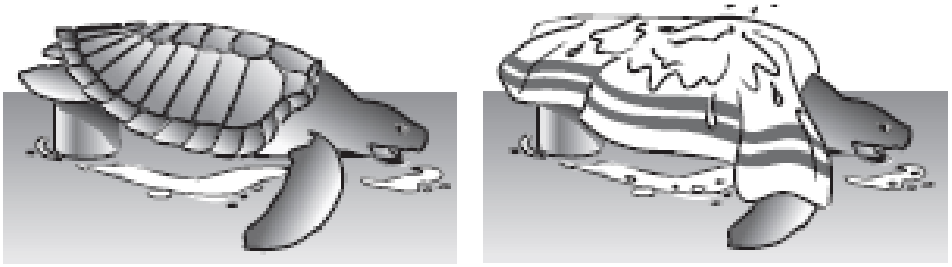
13. Brought on board? Indicate if the SSI specimen caught was brought on board the vessel.

14. Landing method: How the SSI caught was hauled on-board. *Make sure to use the code that best describes the situation (page 74).*

15. Revival: FOR TURTLES ONLY indicate if the release took place following the application of turtle revival procedures. *A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot. Otherwise, the turtle is considered comatose or inactive and resuscitation attempts are necessary.*

TURTLE REVIVAL PROCEDURES

1. Place the turtle on deck and elevate hindquarters.
2. Keep the sea turtle shaded and damp or moist but under no circumstance place in a container holding water.
3. Periodically, gently rock the turtle side to side
4. Gently touch the eyes and pinch the tail periodically to see if it reacts
5. Continue resuscitation attempts for at least 4h and up to 24h.



16. Photo ID: If a photo is taken, record photo number / code. Make sure to follow basic rules for the photographing of specimens.

BASIC RULES FOR THE PHOTOGRAPHING OF SPECIMENS

1) Photograph whole animals individually;
2) Place a piece of paper with the observer's name, vessel name and date on the side of the animal's body before photographing it;
3) Include an object in the photograph to indicate the scale;
4) Photograph unusual marks;
5) Photograph the location of the interaction (preferably with the fishing gear still attached) and identification characteristics.
6) For sea-mammals photograph the head for species confirmation;
7) For sea-birds photograph the beak, the paws and the colour of the plumage (both dorsal and ventral);
8) For sharks photograph the shape of the head, the mouth, the underside of the muzzle, the gill slits and the position of all the fins.
9) For sea-turtles photograph the carapace, the plastron; the shape of the head (top view); and the head left and right profiles.

TAG DETAILS

The 'Tag details' data-fields are to be completed for each and every tag recovery, if the tag is recovered by the observer or by a crew member during the observed trip or during previous trips. Tags found on the vessel are also to be reported with the maximum information possible.

TAG DETAILS					
Catch # see above	015	Specimen #:	0001	Catch # see above	Specimen #:
17. Tag release?	N	22. Finder name & contact:		17. Tag release?	22. Finder name & contact:
18. Tag recovery?	Y	The Observer		18. Tag recovery?	
19. Tag type	MT			19. Tag type	
20. Tag # 1:	A2045			20. Tag # 1:	
21. Tag # 2:	A2046			21. Tag # 2:	

Catch detail number (#): Record catch number allocated to tagged specimen. Refer to the parent 'Catch #' as specified in the 'Catch details' table previously filled in.

Specimen number (#): Numerical code beginning '0001'. Specimen numbers should be consecutive within the same catch detail section within the same set. In the example provided above, the observer correctly recorded a tagged Hawksbill turtle *(FAO 3-alpha species code: TTH),* inscribed as *'Catch #: 015'* in the *'Catch details' table* and as *'Specimen 1'* in the *'Specimen details' table.*

17. Tag release: Indicate whether this individual was re-released with the tag(s) still attached.

18. Tag recovery: Indicate whether a tag was recovered from this individual.

19. Tag type: Specify the type of tag observed, using codes provided in page 75.

20. TAG # 1 and **21. TAG # 2**: Provide the tag number(s). If a turtle, provide both tag numbers (right and left flipper).

22. Tag Finder Name: Record the full name of the person who recovered the tag.

23. Tag Finder Contact Details: Record the contact details of the person who found the tag, including physical address, phone number and email address.

Attention: Tagged specimens should be sampled for length. Elasmobranchs and turtles are also to be sexed and ascertained for maturity.

>> FORM 5-GIL: GILL-NET FISHING EVENT - BIOMETRIC INFORMATION

This form is to be completed when conducting standard biometric sampling (i.e., length-frequency, weight and sex) for every positive set where there is catch to be sampled. When collecting detailed biological information (i.e., length(s)/weight, sex/ and maturity) and/or biological samples, the observer should use Form 6-GIL.

Header details

The header details *should be fully completed on every form* (for information on observer name, observed trip number and page number, see page 29).

IOTC REGIONAL OBSERVER SCHEME
GILLNET – CATCH DETAILS & Biometric information

FORM 5–GIL
Page 001 of 20

Revised September 2021

Observer name:	Observed trip no:

CATCH DETAILS to be recorded for all specimens sampled, including SSIs. Use codes provided in form notes to fill in data collection fields.

				BIOMETRIC INFORMATION						
Set #	Spp.	Fate	Specimen #	1. Sampling method biological information	2. Length 1 Type	3. Length 1 value (cm)	4. Fish processing type	5. Weight Value (kg)	6. Weight estimation method	7. Sex
001	BET	RET	0002	SPS	FL	141	RD	50	MB	M
001	YFT	RET	0002	SPS	FL	142	RD	55	MB	M

Set number (#): Record here the number corresponding to the fishing event / set observed. Refer to the parent set number as specified in Form 4-GIL.

Species and fate: Record the species and fate allocated in Form 4-GIL to the specimen sampled for biometric data.

Specimen number (#): Consecutive specimen number. Before allocating a new specimen number in Form 5-GIL ensure that you haven't yet allocated any specimens numbers to the species/fate pair, for the specific set, under Form 4-GIL.

1. Sampling method for the collection of biological information: The sampling method used for the collection of the biological sub-sample. Use codes listed on page 73. *Observers should sample catches according to IOTC standard* sampling priorities*, listed in these guidelines.*

2. Length 1 type: The length measurement taken. Use codes listed on page 75. *Remember to give priority to species reference length measurement and only record here another length measurements for processed fish*

3. Length 1 value: The length corresponding to the length type taken rounded down to the lowest centimetre.

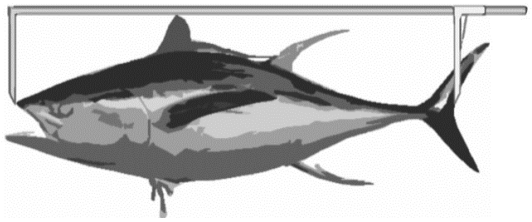
4. Fish processing type: Processed state of the specimen when it was weighted. *Record this information using the codes listed on page 74.*

5. Weight value (kg): The specimen's weight corresponding to the specified processing type *in kilograms rounded off to one decimal place*. If the fish has not been processed, record the unprocessed (or round) weight.

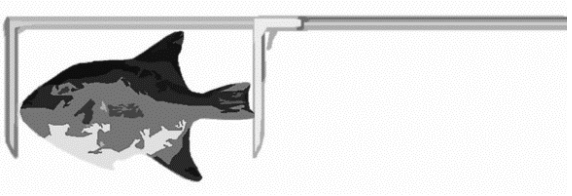
6. Weight estimation method: The estimation method used to obtain specimen weight. *Record this information using the codes listed on page 74.*

SPECIES REFERENCE LENGTH MEASUREMENT

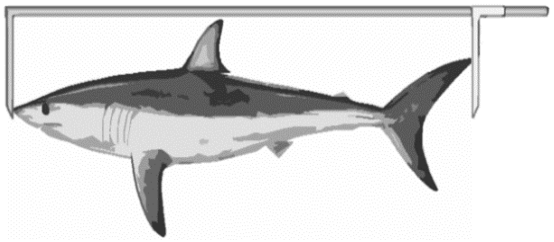
Tuna – UJFL length measured as a straight line from the tip of the upper jaw to the fork of tail.



Other fish without a fork in the tail – TL length measured as a straight line from the tip of the snout to the end of the tail.

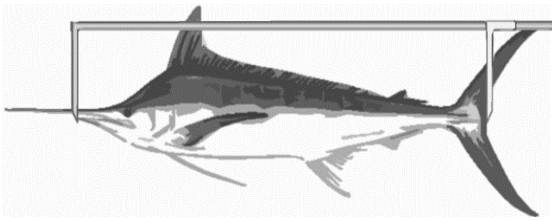


Sharks – TL length measured as a straight line from the tip of the snout to the extreme end of the tail.

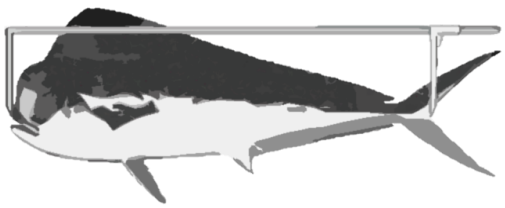


Rays – TW length measured as a straight line from one wing tip to another to obtain the total disk width.

Billfish – LJFL length measured as a straight line from the tip of the lower jaw to the fork of tail.

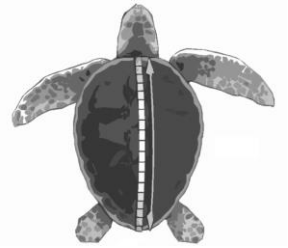


Other fish with forked tails – FL length measured as straight line from the tip of the snout to the fork of the tail.



Turtles – CL length measured as a straight line from notch to notch to obtain the total carapace length. *Note: If you don't have callipers than measure curved carapace length (CT) with a flexible tape.*

Straight carapace length (CL)

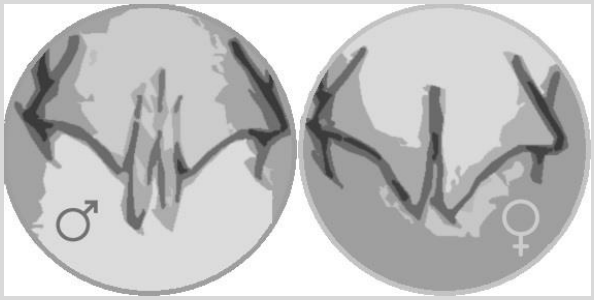


Curve carapace length (CT)

7. Sex: Ascertain the sex of landed fish by checking their gonads (if allowed) and of sharks, turtles, marine mammals (etc.) by looking at external features. *Record specimen sex using the codes listed in page 74.*

MARINE SPECIES THAT CAN BE SEXED FROM EXTERNAL FEATURES

Sharks and rays

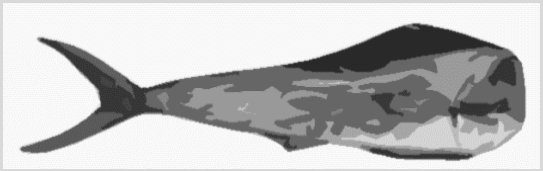


Male have claspers Female have no claspers

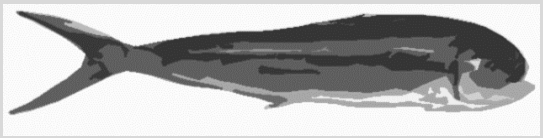
Turtles

The female's tail is shorter and thinner. The cloaca is located at the base of the tail & almost disappears into the shell.	
The male's tail is longer and thicker than a female is and the cloaca is located in the last third of the tail, towards the tip.	

Dolphinfish -DOL (*C. hippurus*)



Male: Straight blunt head

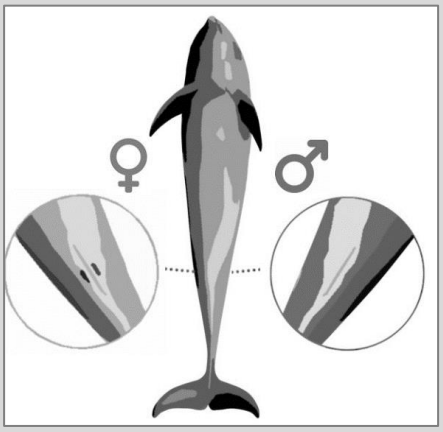


Female: Curved backward head

Marine mammals (whales and dolphins)

Cetaceans have their reproductive organs and mammary glands hidden inside "slits" near their abdomen.

- In males, the genital "slit" and the anus are vertically separated.
- In females, the genital "slit" is connected to the anus, and they also have a pair of shorter "slits" called the mammary slits.



SEXING LANDED FISH BY CHECKING THEIR GONADS

Gonads from different species have the same basic design.

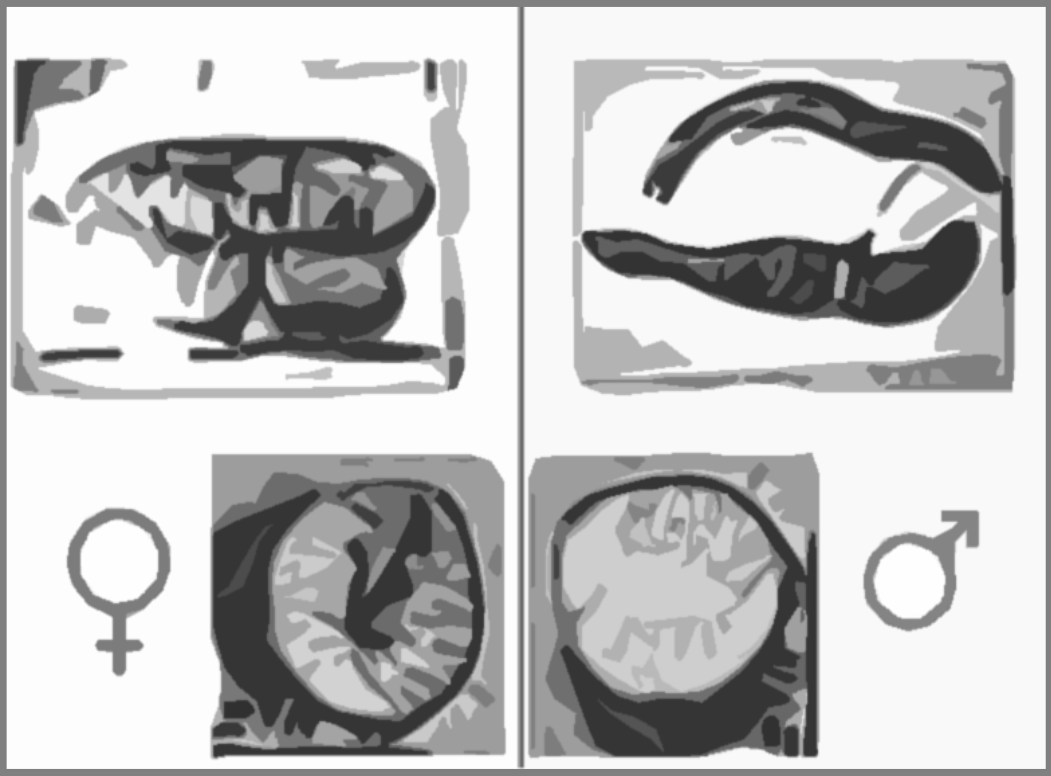


Image adapted from FREMER photos on swordfish gonads.

Male – 'M'- A cross-section of the male gonad looks ovoid. It contains no lumen (small hole) that runs the full length of the gonad. Male gonads are likely to be white but there may be a red tinge, depending on the maturity of the gonad. If the gonad is lightly squeezed, a white liquid (semen) may emerge. No granules can be seen when looking closely at the tissue of male gonads.

Female – 'F' - A cross-section of the female gonad looks mostly circular. It also contains a small lumen (hole) that is somewhat rough at the edges and runs the full length of the gonad. Female gonads usually, but not always, have a yellow to orange tinge. The colour may be deeper, depending on the maturity of the gonad. When looking closely at female gonad tissue, small granules (eggs) can be seen. These are more obvious in more mature gonads.

Immature or indeterminate - 'I' - If the gonad is checked but is too immature to determine the sex, the observer can record I – (indeterminate). Both immature male and female gonads are likely to be string-like and thin and some of the features outlined above may not be obvious when the gonad is examined.

Unknown – 'U' - Use the sex code 'U' – (unknown) when unable to check the sex of the marine species. Note the difference between the sex codes 'I' and 'U'.

>> FORM 6-GIL: FISHING EVENT –CATCH DETAILS – BIOLOGICAL SAMPLE COLLECTION

This form is to be completed when collecting detailed biological information (i.e., length(s)/weight, sex and maturity) and/or biological samples (e.g., otoliths, stomachs, genetic samples, etc.).

Header details

The header details *should be fully completed on every form* (for information on observer name, observed trip number and page number, see page 29).

IOTC REGIONAL OBSERVER SCHEME — **FORM 6–GIL**

FISHING EVENT – CATCH DETAILS – Biological data and sample collection — Page 001 of 001

Revised October 2021

Observer name: Indika UDUGODAGE | Observed trip number: 2020/02/10 - IOTCLKA001 - GIL

					Length 1		Length 2		Weight			Gender and maturity		Sample collected	
Set #	Spp.	Fate	Specimen #	1. Sampling method	2. Type	3. Value (cm)	4. Type	5. Value (cm)	6. Type of processing	7. Value (Kg)	8. Estimation method	9. Sex	10. Maturity stage level	11. Type	12. Method preservation
001	YFT	RFL	0001	SRP	FL	61	---	---	---	---	---	M	---	muscle	frozen
001	YFT	RFL	0002	SRP	FL	60	---	---	---	---	---	M	---	muscle	frozen
001	YFT	RFL	0003	SRP	FL	59	---	---	---	---	---	F	---	muscle	frozen
001	YFT	RFL	0004	SRP	FL	63	---	---	---	---	---	M	---	muscle	frozen
001	YFT	RFL	0005	SRP	FL	61	---	---	---	---	---	F	---	muscle	frozen
001	YFT	RFL	0006	SRP	FL	60	---	---	---	---	---	M	---	muscle	frozen

Set (#): Record here the number corresponding to the fishing event / set observed. Refer to the parent set number as specified in Form 4-GIL.

Species and Fate: Record the catch detail number, the species and fate allocated in Form 4-GIL to the specimen sampled for biological data and / or sample collection.

Specimen number (#): Record specimen consecutive number. Four-digit numerical code beginning 0001. Before allocating a new specimen number in Form 6-GIL ensure that you haven't yet allocated any specimens numbers to the species/fate pair, for the specific set, under Form 4-GIL and 5-GIL. If you did, then record the following consecutive number for the pair species/fate in question.

1. Sampling method for the collection of biological information: Indicate the sampling method used for the collection of the biological sub-sample. Use codes listed on page 73.

Length 1

2. Type: The species reference length measurement. Use codes listed on page 75.

3. Value: Record the length rounded down to the lowest centimetre.

Length 2

4. Type: When an additional measurement is taken, the corresponding measurement type should be recorded under length 2. Use codes listed on page 73.

5. Value: When an additional length measurement is taken, the corresponding length should also be recorded rounded down to the lowest centimetre.

Weight

Only record weights if supplied with a scale and if instructed to collect fish or other specimen weights. If no weight data has been collected the observer should mark in NM (not measured) at the top and bottom of the weight related columns and then draw a line down through all the data fields.

6. Type of processing: Processed state of the specimen when it was weighted. Record this information using the codes listed on page 74.

7. Value (kg): The specimen's weight corresponding to the specified processing type *in kilograms, rounded off to one decimal place*. If the fish has not been processed, record the unprocessed (or round) weight.

8. Estimation method: The estimation method used to obtain specimen weight. Record this information using the codes listed on page 74.

Gender and maturity

9. Sex: Record the sex of sharks, turtles, marine mammals, and other species whose sex can be easily determined by looking at external features. Ascertain the sex of other landed fish by checking their gonads (if permitted). *Sex codes: Male (M), Female (F), Immature or indeterminate (I), Juvenile (J).*

10. Maturity stage level: The level of maturity of the specimen according to standard maturity scales approved by the IOTC or another if no IOTC approved scale. If unknown record UNK.
*If the observer uses a maturity stage level scale other than the one(s) approved by the IOTC he should **record the scale used in the COMMENTS section** (e.g., IFREMER swordfish maturity scale developed in 2012 for the IOSSS project: "IOSSS-IFREMER, 2012").*

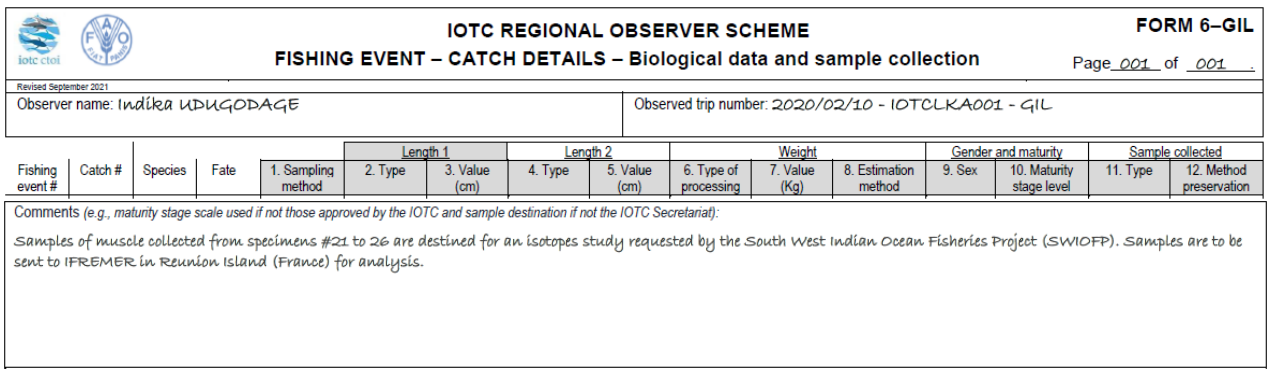
Sample collected

11. Type: Record the type of sample collected (otoliths, spine clippings, stomach, muscle, etc).

12. Preservation method: Record the method used to preserve the collected sample (alcohol, frozen, stored on otolith envelops, etc).
*If the sample will be sent / stored in / on a destination other than the IOTC Secretariat the observer should **record sample destination in the COMMENTS section.** This is the name and email address of the person and organisation responsible for analysing / storing the collected sample (e.g., Institut Français Recherche pour Exploitation de La Mer (Ifremer), Rue de la Glacière, 97420 Le Port, Reunion Island, FRANCE).*

Comments

Record here any information of importance such as macroscopic maturity stage scale used, sample purpose and destination, if there were photographs taken, or any other information of interest.



IOTC REGIONAL OBSERVER SCHEME — **FORM 6–GIL**

FISHING EVENT – CATCH DETAILS – Biological data and sample collection — Page 001 of 001

Revised September 2021

Observer name: Indika UDUGODAGE | Observed trip number: 2020/02/10 - IOTCLKA001 - GIL

Fishing event #	Catch #	Species	Fate	Length 1: 1. Sampling method	Length 1: 2. Type	Length 1: 3. Value (cm)	Length 2: 4. Type	Length 2: 5. Value (cm)	Weight: 6. Type of processing	Weight: 7. Value (Kg)	Weight: 8. Estimation method	Gender and maturity: 9. Sex	Gender and maturity: 10. Maturity stage level	Sample collected: 11. Type	Sample collected: 12. Method preservation

Comments *(e.g., maturity stage scale used if not those approved by the IOTC and sample destination if not the IOTC Secretariat):*

Samples of muscle collected from specimens #21 to 26 are destined for an isotopes study requested by the South West Indian Ocean Fisheries Project (SWIOFP). Samples are to be sent to IFREMER in Reunion Island (France) for analysis.

>> FORM 7-GIL: VESSEL OFFLOADING / TRANSHIPMENT

In case that an at-sea transhipment to a carrier / fishing vessel takes place during the trip the Observer should complete this form, except if an 'IOTC REGIONAL OBSERVER PROGRAMME' Observer is present on the carrier vessel monitoring the transhipment. The following instructions outlines how observers are to fill Form 7-GIL.

Header details

The header details *should be fully completed on every form* (for information on observer name, observed trip number and page number, see page 29).

IOTC REGIONAL OBSERVER SCHEME
VESSEL TRANSHIPMENTS

FORM 7-GIL (pg. 1)
Page 001 of 001.

Revised September 2021

Observer Name:	Observed Trip No:
Indika UDUGODAGE	2020/02/10 - IOTCLKA001 - GIL

Vessel transhipment #: 001

1. Start date and time (UTC):

DD	MM	YYYY	hh	mm
17	02	2021	01	00

2. End date and time (UTC:

DD	MM	YYYY	hh	mm
17	02	2021	03	00

3. Position (dd° mm' ss'') specify quadrant (circle)

LATITUDE		LONGITUDE	
07° 41' 01"	(S) N	079° 42' 50"	(E) W

4. Category (tick the correct option):

TRANSHIP FROM:		TRANSHIP TO:	X
NET LOAD:		NET OFFLOAD:	

Product transhipped

#	5. Spp.	6. Processing type	7. Quantity (encircle unit used)			
1	YFT	GT	200	Mt	Kg	(No)
2	YFT	PD	100	Mt	Kg	(No)
3	~~BET~~	GT	50	Mt	Kg	(No)
4				Mt	Kg	No
5				Mt	Kg	No
6				Mt	Kg	No
7				Mt	Kg	No
8				Mt	Kg	No
9				Mt	Kg	No
10				Mt	Kg	No
11				Mt	Kg	No
12				Mt	Kg	No
13				Mt	Kg	No
14				Mt	Kg	No

7. Name of carrier / fishing vessel:	ASIAN MARINE REEFER	8. Flag:	THAILAND
9. Call sign:	HSB2993	10. Port of registry:	BANGKOK Port THAILAND Country
11. Registration number	UNK (IMO: 7637589)		

Vessel transhipment number: Transhipment numbers are recorded in the order that they occur. Allocate a unique consecutive transhipment number each time there's a transhipment. These should be consecutive from the start to the end of the observed trip. Start at "001", "002", etc., all through a trip.

1. Start date and time: Date and time the transhipment starts (recorded in UTC time).

2. End date and time: Date and time the transhipment ends (recorded in UTC time).

3. Position: The GPS position of your vessel, at the start of transhipment collected in the DMS format.

4. Category: Record if your vessel is transhipping to or transhipping from, (i.e., receiving fish from) another vessel (carrier/fishing vessel).

> **Attention:** Stores, bait or fuel may also be transhipped. The date, time and details of this must not be confused with the time that fish or fish products are being transhipped.

Product transhipped

Record the quantity of fish products transhipped (per species and product type) using FAO spp.3-Alpha codes and IOTC processing type codes.

5. Species: The species code for fish products transhipped *(page* 67*)*. If species FAO code is not available, the species scientific name.

6. Processing code: The code corresponding to the type of processing the specimen underwent according to IOTC categories *(page 74)*.

7. Quantity: The quantity of fish products transhipped, per species and processing / product type (preferably metric tonnes). Make sure you specify the units used to account for fish products transhipped, per species and processing/product type (*Mt = metric tonnes; Kg = kilogram; or # = numbers*). *Request this information from captain and / or bridge officers.*

8. Name of carrier / fishing vessel: Full name with no abbreviations, correctly spelled and including any corresponding numbers, as recorded on vessel official documents, and crosschecked with the name recorded on the vessel itself (*E.g., "Agnes 83"),* any discrepancies to be reported to the IOTC.

9. Registration #: Number issued by country (Flag State) in which the vessel is registered, shown on its registration documents and written on the hull of the vessel. This may be a combination of characters and numbers; record them all (*e.g.: CBG303*).

10. Port of registry: Country and port of registry as shown on vessel's registration documents and lettered on the stern of the ship's hull.

11. Flag: Country where vessel is registered as shown on its registration documents. Where chartering occurs, name of chartering country. Note that vessel flag state (or chartering flag) may not be the same as the nationality from which the vessel originates.

12. Call sign: Vessel international radio call sign if available. Series of numbers and letters painted on vessel's side or superstructure, either in black lettering on a white background or white on black.

ANNEXES

ANNEX 1 - VESSEL PRE-SEA SAFETY CHECK FORM

VESSEL PRE-SEA SAFETY CHECK FORM

Observer / Observer Coordinator / NOP designated officer		Date		Signature	
Vessel Agent		Date		Signature	
Port / Position					

Vessel Details:

Vessel Name		
Captain/Fishing Master Name		
Call Sign		
Flag		
Size GRT		
Length Over All (LOA)		
Vessels Compliment		
Vessel contact Number	Telephone	
	Fax	
	Inmarsat (A/C/M) & No.	
Vessel Owners / Charter's	Name	
	Telephone	
	Fax	
	Mobile	

Safety Equipment:

Safety Certificate In-date (Y/N)		Issuing Authority	
Flares: Location		If checked No./Exp Date	
First Aid Materials: Location		Name of Medical Officer	

Life Rafts				
Type	Number	Capacity	Hydrostatic release (Y/ N)	Date Next Service Due

Life Jackets			
Type Inflatable / Packed	Number on-board	Location Cabin /Muster Station/ Both	SOLAS Approved (Y/N)

Fire Extinguishers			
Positioned in main corridor's (Y/N)		Charge seals intact (Y/N)	
Positioned on bridge (Y/N)		Charge seals intact (Y/N)	

Life Buoys	Number on-board	Free Release (Y/N)	Light/SART Attached (Y/N)

Immersion Suits *(only required by vessels operation south of 30o S)*			
Type	Number on-board	Location Cabin /Muster Station/ Both	SOLAS Approved (Y/N)

Flares: Location		If checked No. / Exp Date	
First Aid Materials: Location		Certified Medical Officer (Y/N)	

GMDSS Requirements

Radio Equipment	HF Operational yes or no	MF Operational yes or no	VHF Operational yes or no	INMARSAT Operational yes or no	NAVTEX Operational yes or no

EPIRB			
Type / Manufacturer	Number of units on board	Location	Release method manual / float free

SART's			
Type / Manufacturer	Number of units on board	Location	Release method manual / float free

Accommodation:

Vessel Emergency Evacuation and Muster Stations Lists – Displayed (Y/N)	
Cabin - Single or Sharing	

General Comments:

Minimum safety requirements before an observer will be permitted to embark

Safety Certificate (Safety Management Certificate)

The vessel must have on-board a current and valid Safety Certificate that does not expire for a period of at least four months from the date of embarkation of the observer. The total crew compliment on board the vessel INCLUDING THE OBSERVER must not exceed the maximum specified number of crew listed in the safety certificate.

Life Rafts

The Life rafts capacity must have the capacity to accommodate the full crew compliment, including the observer. (In other words, the total life raft capacity must be equal to or exceed 100% of the vessels compliment). Life Rafts must be within their serviceable date, which must cover the expected maximum duration of observer deployment. All Life Rafts must be fitted with a serviceable Hydrostatic Release mechanism.

Life Jackets

There must be a total number of life jackets onboard, readily available at the emergency muster stations to accommodate each of the compliment onboard the vessel. All Life Jackets must comply with IMO – SOLAS LSA standards.

GMDSS Requirements

The vessel must be GMDSS compliant in accordance to its tonnage and its area of operation. Any component of the GMDSS requirement that is out of date or unserviceable will render the vessel as NOT being GMDSS compliant. These items shall include inter alia EPIRP's, SART's and distress flares and rockets.

ANNEX 2 - OBSERVER DEPLOYMENT REPORT FORM

OBSERVER DEPLOYMENT REPORT FORM

(Complete and send within 24 hours to National Observer Programme Coordinator)

Date		
Observer name		
Vessel name/Call sign		
Vessel company		
Captain name		
Fishing Master		
Vessel contact details	Email	
	Phone Number	

Deployment details

Briefing date	
Contract start date	
Flight no.	
Departure date from home	
Departure time from home	
Landing date at deployment destination	
Landing time at deployment destination	
Safety inspection completed (Yes/No)	
Embarkation Date	
Port of embarkation	
Sailing date	
Comments	

ANNEX 3 - OBSERVER WEEKLY REPORT FORM

OBSERVER WEEKLY REPORT FORM

(Complete and send every week to Observer Programme Coordinator)

Vessel Name / Call sign	
Observer name	
Date / Report Period	
Location at time of report	

SET DETAILS	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
Set No.							
Date							
Latitude							
Longitude							
No. fish sampled							
No. PET caught							
Compliance							

Spp.	**Monday**		**Tuesday**		**Wednesday**		**Thursday**		**Friday**		**Saturday**		**Sunday**	
	No.	Kg	No.	Kg	No.	Kg	No.	Kg	No.	Kg	No.	Kg	No.	Kg
YFT														
BET														
SKJ														
BSH														
SWO														
BLM														
MAK														

Comments *(comment on any items considered important for immediate attention)*

ANNEX 4 - INSTRUCTIONS TO OBSERVERS TO WRITE THE OBSERVER TRIP REPORT

INSTRUCTIONS TO OBSERVERS TO WRITE THE OBSERVER TRIP REPORT

Basic outline and headings

The basic outline and headings of the report shall include:

- Formal cover page that includes trip reference number, vessel name, observer's name and trip start and end dates.
- Trip summary, *[observers are only to compiled it after they have written the report]*
- Observer and vessel details
- Cruise itinerary
- Fishing operations
    - Fishing strategy
    - Gear details
    - Lost gear
    - Catch
    - Processing
- Observer Sampling and Biological Data Collected
    - Sampling methodologies
    - Samples taken and storage location
- Summary of weather and oceanographic conditions
- Environmental interactions with vulnerable marine fauna
- Waste management
- Vessel sightings
- General report back

General style

- Strive for logic and precision and avoid ambiguity, especially with pronouns and sequences
- ONLY use the International Metric System of measurement and abbreviate measurements without periods (i.e., cm and kg)

	International Metric System
Length	millimetre (mm) centimetre (cm) metre (m)
Area	square metre (m2)
Volume	litre (l) cubic metre (m3)
Weight	gramme (g) kilogramme (kg) ton (t)

- Spell out all numbers beginning sentences or less than 10 (i.e. "two explanations of six factors").
- Write numbers as numerals when greater than ten (i.e. 156) or associated with measurements (i.e. 6 mm or 2 g)

Within the report, the exact format of items is less important than consistency of application. For example, if you indent paragraphs, be sure to indent them all; use a consistent style of headings throughout (e.g. major headings in bold with initial capitals, minor headings in italics, etc.); write "%" or "percent" but do not mix them, and so on. In other words, establish a template and stick to it. Have a neutral person review and critique your report before submission

Trip Summary

The trip summary should give a concise and clear summary of the report.

Write this section of the report last, once the other sections have been completed.

It should not be longer than a single page and should provide the reader with the most important information for a trip. Follow the headings of the report when writing the trip summary and use the following guidelines:

- The 1st paragraph should give details on the vessel, the flag state, the name of the observer(s), his/her nationality, the target species, the areas fished and the period(s) when fishing occurred.
- The 2nd paragraph should give a short summary of the cruise itinerary (dates and ports of departure and return etc.)
- The 3rd paragraph should give a short summary of fishing operations – the number of days fished & days lost, the number of sets/trawls, the number of hooks/pots set, the fishing depth, bait types used and the number of hooks/hauls observed.
- The 4th paragraph should give details on catches (weights and products). Mention the catch by weight and/or number of the target species and details on by-catches. Mention the conversion factors if any were used (observer and vessel).
- The 5th paragraph should give a short summary of biological sampling undertaken by the observer (e.g. length, weight, maturity, otoliths, tagging etc.)
- The 6th paragraph should give details on bird mortalities, entanglements, mitigation measures, marine mammal entanglements and interactions etc.
- The 7th paragraph should mention any fishing vessel sightings (important for IUU vessels) and any difficulties encountered (with operational issues and observer tasks).
- Keep your writing impersonal, in the third person (the observer) and avoid the use of the first person (i.e. I or we).
- Use the past tense and be consistent within the report - do not change between past and present tense.

Guide to some specific formats in Observer Reports

Date format: Only use the following format: *dd/mm/yyyy* (eg. 25/12/2010 for the 25th December 2010)

Species names: The Latin names for individual species are written using a system termed "binomial nomenclature". Each species is identified by a combination of "two names": its genus name and its specific epithet. A familiar example is that of human beings, Homo sapiens.

Simple Rules for Writing Latin Names in Papers

- The first time a species is mentioned in the title and in the text, it should be written out in full, e.g. *Thunnus albacares*
- The genus name (1st of the two names) should always start with a capital letter
- The specific epithet (2nd of the two names) should always be with a small letter
- The species names should always be in *italics*
- Avoid using species codes in the text of the report instead of species names or common names
- After the species name has been written out in full the first time, it must be abbreviated as follow: *T. albacares*, i.e. the genus has been abbreviated to the first capital letter and a full stop.
- Always write the species name after the common name when mentioning a fish, bird or mammal for the 1st time, e.g. Five wandering albatross, *Diomedea exulans*, were observed (…).
- If you need to mention the species name many times in your report you may find it better to use the common name, but the species name should always be included when mentioning an organism for the first time.
- Common names should be written in small letters, e.g. giant petrels and not Giant Petrels

Text format: Body text should use the following font: Times New Roman, regular, size 12. Paragraphs should be aligned to the left and line spacing should be single.

ANNEX 5 - CODE TABLES OF INTEREST FOR OBSERVERS ONBOARD GILL-NET VESSELS

FAO species codes

Tuna and tuna-like species under the IOTC mandate

ALB	Albacore
BET	Bigeye tuna
BLM	Black Marlin
BUM	Blue Marlin
BLT	Bullet tuna
FRI	Frigate tuna
GUT	Indo-Pacific king mackerel
SFA	Indo-Pacific sailfish
KAW	Kawakawa
LOT	Longtail tuna
BIL	Marlins,sailfishes,etc. nei

COM	Narrow-barred Spanish mackerel
SSP	Short-billed spearfish
SKJ	Skipjack tuna
SBF	Southern bluefin tuna
MLS	Striped marlin
SWO	Swordfish
TUS	True tunas nei
TUX	Tuna-like fishes nei
TUN	Tunas nei
YFT	Yellowfin tuna

Other bony fish species that may be caught incidentally in IOTC fisheries

BAU	Australian bonito
BAR	Barracudas nei
LEC	Black escolar
MAA	Blue mackerel
BUK	Butterfly kingfish
DOL	Common dolphinfish
DOT	Dogtooth tuna
DBM	Double-lined mackerel
AMB	Greater amberjack
RAG	Indian mackerel
KAK	Kanadi kingfish
KOS	Korean seerfish

SPF	Longbill spearfish
OIL	Oilfish
LAG	Opah
MZZ	Other marine bony fishes NEI
SAP	Pacific saury
BRA	Pomfrets nei
CFW	Pompano dolphinfish
RRU	Rainbow runner
STS	Streaked seerfish
BIP	Striped bonito
WAH	Wahoo

Sharks and rays common species in the Indian Ocean Pelagic Fisheries

Sharks

BSK	Basking shark
ODH	Bigeye sand tiger shark
BTH	Bigeye thresher
CCA	Bignose shark
BLR	Blacktip reef shark
CCL	Blacktip shark
BSH	Blue shark
CCE	Bull shark
ISB	Cookie cutter shark
BRO	Copper shark
PSK	Crocodile shark
DUS	Dusky shark

CCG	Galapagos shark
SPK	Great hammerhead
AML	Grey Reef Shark
LMA	Longfin mako
OCS	Oceanic whitetip shark
PTH	Pelagic Thresher Shark
POR	Porbeagle
LMD	Salmon shark
CCP	Sandbar shark
SPL	Scalloped hammerhead
SMA	Shortfin mako
FAL	Silky shark
ALS	Silvertip shark

SPZ	Smooth hammerhead
ALV	Thresher Shark
TIG	Tiger shark

RHN	Whale shark
TRB	Whitetip reef shark
EUB	Winghead shark

Rays

MRJ	Javanese cownose ray (Flapnose ray)
RMA	Alfred manta
RMT	Chilean devilray/sicklefin deveilday
RMM	Devil fish
RMB	Giant manta

WSH	Great White shark
RME	Longhorned mobula
PSL	Pelagic stingray
RMO	Smoothtail mobula
RMJ	Spinetail mobula

Sharks, other species that may be caught incidentally in IOTC fisheries

AGN	Angel shark
OXY	Angular rough shark
MTM	Arabian smooth-hound
SUU	Australian angelshark
SHBC	Banded cat shark
HXN	Bigeyed sixgill shark
SBL	Bluntnose sixgill shark
NTC	Broadnose sevengill shark
OQX	Brownbanded bambooshark
CWZ	Carcharhinus sharks nei
HAY	Cow Shark
CCY	Graceful shark
ORR	Grey bambooshark
CCM	Hardnose shark
HCM	Hooktooth shark
SCK	Kitefin shark
GUQ	Leafscale gulper shark
NGB	Lemon shark
CPU	Little gulper shark

RHA	Milk shark
CYT	Ornate dogfish
HXT	Sharpnose sevengill shark
DOP	Shortnose spurdog
ORI	Slender bambooshark
CLD	Sliteye shark
CEM	Smallfin gulper shark
SMD	Smooth-hound
SLA	Spadenose shark
CCB	Spinner Shark
CCQ	Spot-tail shark
ORZ	Tawny nurse shark
GAG	Tope shark
SSQ	Velvet dogfish
CCD	Whitecheek shark
RHA	White-eyed shark
OSF	Zebra shark
SKH	Sharks various NEI

Marine turtles that may be caught incidentally in IOTC fisheries

FBT	Flatback turtle
TUG	Green turtle
TTH	Hawksbill turtle
DKK	Leatherback turtle

TTL	Loggerhead turtle
LKV	Olive ridley turtle
TTX	Marine turtles NEI

Seabirds that may be caught incidentally by IOTC fisheries

DAM	Amsterdam Albatross
DQS	Antipodean Albatross
DCR	Atlantic Yellow-nosed Albatross
DIM	Black-browed Albatross
DIB	Buller's Albatross
TQW	Campbell Albatross

MWE	Cape Gannet
DAC	Cape/Pintado petrel
DER	Chatham Albatross
PCF	Flesh-footed shearwater
PDM	Great-winged petrel
PCI	Grey petrel

DIC	Grey-headed Albatross
TQH	Indian Yellow-nosed Albatross
PHE	Light-mantled Albatross
MAH	Northern Giant Petrel
DIQ	Northern Royal Albatross
DKS	Salvin's Albatross
PFT	Short-tailed Shearwater
DCU	Shy Albatross
PHU	Sooty Albatross
PFG	Sooty Shearwater
MAI	Southern Giant Petrel

DIP	Southern Royal Albatross
DBN	Tristan Albatross
DIX	Wandering Albatross
PCW	Westland Petrel
TWD	White-capped Albatross
PRO	White-chinned Petrel
ALZ	Albatrosses NEI
PTZ	Petrels NEI
SZV	Boobies and gannets NEI
PQW	Shearwaters NEI
LHX	Seagulls NEI

Sea mammals that occur within the IOTC Area of Competence

BDW	Andrews' beaked whale
BAW	Arnoux's beaked whale
BBW	Blainville's beaked whale
BLW	Blue whale
DBO	Bottlenose dolphin
BRW	Bryde's whale
CMD	Commerson's dolphin
DCO	Common dolphin
BCW	Cuvier's beaked whale
DDU	Dusky dolphin
DWW	Dwarf sperm whale
FAW	False killer whale
FIW	Fin whale
PFI	Finless porpoise
FRD	Fraser's dolphin
TGW	Ginkgo-toothed beaked whale
BYW	Gray's beaked whale
BHW	Hector's beaked whale
HRD	Hourglass dolphin
HUW	Humpback whale
DHI	Indo-Pacific hump-backed dolphin
IRD	Irrawaddy dolphin
KIW	Killer whale

PIW	Long-finned pilot whale
BNW	Longman's beaked whale
MIW	Minke whale
DPN	Pantropical spotted dolphin
KPW	Pygmy killer whale
CPM	Pygmy right whale
PYW	Pygmy sperm whale
DRR	Risso's dolphin
RTD	Rough-toothed dolphin
BSW	Sherpherd's beaked whale
SHW	Short-finned pilot whale
SRW	Southern bottlenose whale
EUA	Southern right whale
RSW	Southern right whale dolphin
SPP	Spectacled porpoise
SPW	Sperm whale
DSI	Spinner dolphin
TSW	Strap-toothed whale
DST	Striped dolphin
DLP	Dolphins NEI
ODN	Toothed whales NEI
MYS	Baleen whales NEI

Country codes/names (FAO ISO_3)

AUS	Australia
BLZ	Belize
CHN	China
COM	Comoros
ERI	Eritrea
FRA	European Union
GIN	France (EU)
IND	Guinea
IDN	India

IRN	Indonesia
ITA	Iran
JPN	Italy (EU)
KEN	Japan
KIR	Kenya
KOR	Kiribati
AUS	Korea, Republic
LBR	Liberia
MDG	Madagascar

MYS	Malaysia
MDV	Maldives
MUS	Mauritius
MOZ	Mozambique
NLD	Netherlands (EU)
OMN	Oman
PAK	Pakistan
PAN	Panama
PHL	Philippines
PRT	Portugal (EU)
SYC	Seychelles

SLE	Sierra Leone
SGP	Singapore
SOM	Somalia
ZAF	South Africa
ESP	Spain (EU)
LKA	Sri Lanka
SDN	Sudan
TZA	Tanzania
THA	Thailand
GBR	United Kingdom (EU)
YEM	Yemen

Vessel and gear codes

Gear types

GIL	Gill-net
DLL	Drifting longline

TPL	Pole and line
TPS	Tuna purse seine

Vessel hull material

STE	Steel
FRP	Fibre glass reinforced plastic
WOO	Wood

ALU	Aluminium
OTH	Other

Preservation methods

NO	None
ST	Salt
DR	Dried
SM	Smoked
IC	Ice
CWS	Chilled with sea water

RW	Refrigerated sea water
BR	Refrigerated brine (cooler than RW)
FR	Cold storage between 0 and -30 degrees
DF	Cold storage below -30 degrees

Storage type

WL	Well
BF	Blast Freezer

RC	Refrigeration chamber

Waste category

PL	Plastic
CP	Cardboard & paper
KW	Kitchen waste
OF	Oil and fuel

MG	Metal and glass
NB	None biodegradable fishing gear
OT	Other (specify)

Storage/disposal method

AS	At sea disposal
IN	Incinerated
RO	Retained on board

LD	Land disposal
UK	Unknown
OT	Other (specify)

Gill-net web material

MON	Monofilament nylon
BR	Braided
MU	Multifilament
UNK	Unknown
OTH	Other (to be detailed)

Gill-net web colour

GRE	Green
CLA	Clear
WHI	White
PIN	Pink
BLA	Black
GRY	Grey
BLU	Blue.
MUL	Multi-colour
RED	Red
OTH	Other

Floats type / material gill-net

FLF	Floatline with foam core
HDP	HDPE plastic
PVC	PVC plastic
FOA	Styrofoam (Polystyrene)
OTH	Other (detail e.g., plastic bottles)
UNK	Unknown

Sinker materials

WLL	Weighted footrope
LEA	Lead
CEM	Cement
STO	Stones
OTH	Other, record on comments
UNK	Unknown

Operation codes

Gill-net condition at hauling

NGD	No gear damage or very few small, scattered holes.
005	Less than 5% of the net torn
025	Between 5% and 25% of the net torn.
050	Between 25% and 50% of the net torn.
075	Greater than 50% of the net torn.
100	Net totally rolled up.
OTH	Other, specify in comments
UNK	Unknown

Depth of gill-net deployment

SRF	Surface
SSF	Sub-surface

Net setting shape

1	Set pulled straight
2	Set in a semi-circle
3	Set in a circle
4	Set in Pi-shape
5	Set in N-shape
6	Set in v-shape

Net setting strategy

NAN	Net anchored (attached to boat or another anchoring method)
NDR	Net is left drifting
GEN	Encircling
DOL	Dolphin associated
NTA	No tuna associated (blank set)
SM	Seamount (common for P&L)
UNK	Unknown
OTH	Other, record on comments

Mitigation devices to reduce bycatch and depredation

SPD	"Spiders" or "Socks", physically protects hooked fish from depredation by cetaceans.
VID	Visual decoys or deterrents (e.g., dummy buoys)
ACD	Acoustic decoys, transmits acoustic cues to attract animals away from true fishing activity (e.g., hauling noises broadcasted from moored buoys).
AAD	Active Acoustic Deterrents transmits sounds that deter animals from the vessels. These can be sounds that provoke physical discomfort (e.g., pingers), an avoidance response (e.g., transient killer whale sounds), or "jam" the biosonar of a species.
PAD	Passive Acoustic Deterrents, use sonar reflective systems on the fishing gear, such as streamers with reflective spheres, cones, and cylinders.
LIS	Light-sticks can be used to illuminate portions of the nets to reduce sea turtle bycatch.
LIG	Lights of different colour (LEDs or UV) are attached to the net headline every 5 m to 10 m. Can be placed on nets to reduce sea turtle and sea-bird bycatch.
OVM	Other Visual Methods used to increase net visibility reduce sea-turtles, cetaceans and sea-birds bycatch. • Reflective material • Solid, high visibility panels • Making the net itself more visible, by using high visibility webbing, weaving colours through nets, using high visibility monofilament (entire net), high contrast rope in mesh, etc. • Streamers
AWM	Above Water Methods can be used to reduce sea-turtles, cetaceans and sea-birds bycatch. • Tori lines above water over the net • Kites or drones flown over net • Raptor silhouettes
NTS	Net Type and Setting: the use of sub-surface nets can help to reduce sea-turtles, cetaceans and seabird bycatch.
OTH	Other (specify)
UNK	Unknown
NON	None

Catch and sampling codes

Sampling protocol for catch estimation on longlines, gill-nets and pole and line

EX	Exhaustive Sampling: The totality of the hooks or net panels hauled were observed.
MRS	Random sampling: hooks or panels were sampled randomly (e.g. Batch of 10 hooks selected at random along the line, or all hooks sampled for a period of 10 minutes selected at random during the hauling time).
SPS	Systematic sampling: a proportion (%) of the line or net was observed (e.g. Batch of 10 hooks selected at every 100 hooks along the line or all hooks sampled for a period of 10 minutes every hour).
EWP	Exhaustive When Present: the observer monitors the totality of hooks or net panels except when, for practical reasons, the observer is not present (e.g. breaking for meals/rest).

Sampling methods for the collection of biological information

EXS	Exhaustive Sampling: the totality of the catch or all individuals caught for this species has been subsampled.
SPS	Systematic Proportional Sampling: a proportion (%) of the catch or of the individuals caught and brought on-board for this species has been subsampled in a systematic way. (E.g., every 10^{th} fish is sub-sampled).
SSS	Stratified Sampling of a sample taken via "Spill method". The observer tipped the fish from a pile/receptacle/conveyer belt into a bin to avoid hand selection of individual fish, divided fish into homogeneous subgroups before subsampling. (e.g.: observer sub-sampled 50 fish for large fish (≥15 kg))
SSG	Stratified Sampling of a sample taken via "Grab method". The observer pulls by hand a selected number of fish from a pile/ receptacle/ conveyer belt and divided fish into homogeneous subgroups before subsampling (e.g.: observer sub-sampled 50 yellowfin tuna).
SRF	Systematic Random sampling of a Fixed number of each species: of the random sample taken, the fish are identified to species level. Once the main species have been determined, a pre-determined number of fish of each species is subsampled.
SRM	Systematic Random sampling of a mixed species sample: of the random sample taken, a small random subsample is taken and biological information extracted.
SRP	Systematic Random sampling of Priority species: of the random sample taken, priority species are selected and biological information extracted.
OTH	Other. Provide details in comments

Fate

DTS	Discarded - too small. Fish of no commercial value due to being of small size
DUS	Discarded - unwanted species (e.g., with no commercial value or other than target species)
DRB	Discarded - retention ban on the species due to flag state measures
DFL	Discarded - vessel fully loaded
DUD	Discarded – due to IOTC retention ban
DPQ	Discarded – unfit for human consumption
DDL	Discarded - too difficult to land
DFR	Discarded - trunk - fins retained (shark only)
DTR	Discarded - trunk retained, fins discarded (shark only)

RCC	Retained - crew consumption
RFL	Retained - for landing / sold
RFR	Retained trunk - fins retained (shark only)
RFT	Retained for at-sea-transhipment
ESC	Escaped
UNK	Unknown fate

Weight estimation method

EB	Electronic balance
SB	Spring balance
MB	Mechanical balance
EM	Eye measurement (observer)
LO	Vessel logbook (eye measurement crew)
LW	Length weight relationship

Processing/product type

RD	Unprocessed; Round (whole, live)
GG	Gilled-and-gutted (bill-off)
HD	Headed-and-gutted
PD	Headed and caudal peduncle-off
HT	Headed and tailed
HG	Headed, gutted and tailed
FL	Fish loins
GT	Gilled, gutted and tailed
GO	Gutted only (gills left)
FW	Fillet
FT	Fins and trunk (shark)
SF	Fins (shark)

Depredation source

SH	Shark
TW	Toothed whales
SW	Sharks/toothed whales
MM	Marine mammal
CC	Cookie-cutter shark
BA	Depredation on bait
SQ	Squid
SB	Birds
OT	Other (specify)
UNK	Unknown

Condition

A0	Alive - condition unknown
A1	Alive - active, healthy
A2	Alive - injured, distressed
A3	Alive - very weak, dying
D	Dead
U	Condition unknown

Gear interaction

EN	Entangled in the net
EL	Entangled in the line
EF	Entangled with FAD
EG	Entangled in ghost fishing gear
OT	Other (describe)
UK	Unknown

Hauling methods

HD	By hand
GR	Using the gear
GF	Using a gaff
BR	Using a brailler
SN	Using a scoop net
ON	Using another net
OT	Using another method (describe)

Line cutting device

LC	Line cutter
WC	Rebar wire cutter
KN	Knife

Sex

M	Male
F	Female
J	Juvenile
UNK	Not determined

Tag type

TC	Conventional (plastic spaghetti tags inserted through fish first dorsal fin)
TR	Rototags (a two-piece plastic tag inserted through fish first dorsal fin)
TS	Sonic tags (implanted in the body cavity).
TP	Pop-up tags (inserted into the dorsal musculature).
TI	Internal archival tags (implanted in the body cavity).
TT	Smart Position/ Temperature Transmitting tags (attached to the dorsal fin)
MB	Metal legband tag (seabirds)
MT	Metal tag (turtles - a different tag number for each flipper).
ST	External satellite tag (placed in turtle / bird back).
TO	Other (specify)

Length measurement descriptions[2][3][4]

Straight measurements to be taken with a calliper or a measuring board

FL	Fork length	Tip of the snout to the fork of the tail
EF	Eye fork length	Caudal margin of eye to the fork of the tail
PF	Pectoral fork length	Anterior insertion of the pectoral fin to the fork of the tail
DF	Dorsal fork length	Anterior insertion of the dorsal fin to the fork of the tail
CK	Cleithrum-keel length	Posterior point of cleithrum to the anterior point of the caudal keel
CF	Cleithrum-fork length	Posterior point of cleithrum to the fork of the tail
PAL	Pectoral-anal length	Anterior insertion of pectoral fin to the posterior rim of the anal fin
	BILLFISH	
LJFL	Lower Jaw Fork Length	Tip of the lower jaw to the fork of the tail
	SHARKS	
PCL	Precaudal Length	Tip of the head to the anterior portion of the caudal keel
	RAYS	
TW	Total width	Total disc width
	TURTLES	
CL	Carapace Length	Total carapace length - notch to notch
	BIRDS	

[2] IOTC-2013-WPDCS09-13 Rev_1

[3] Collette, B.B. and C.E. Nauen, 1983. FAO species, catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. Fish.Synop. (125) Vol.2: 137 p.

[4] Nakamura, I., 1985. FAO species catalogue. Vo1.5. Billfishes of the World. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. FAO Fish. Synop., (125) Vo1.5:65 p.

TL	Total length	Tip of bill to tip of tail
WL	Wing length	Bend of the wing to the tip of the longest primary feathers

Curved measurements to be taken with a flexible tape

FT	Curved fork length	Tip of the snout to the fork of the tail
ET	Curved eye fork length	Caudal margin of eye to the fork of the tail
PT	Curved pectoral fork length	Anterior insertion of the pectoral fin to the fork of the tail
DT	Curved dorsal fork length	Anterior insertion of the dorsal fin to the fork of the tail
KT	Curved cleithrum keel length	Posterior point of cleithrum to anterior point of caudal keel
CT	Cleithrum-fork length	Posterior point of cleithrum to the fork of the tail
PAT	Curved pectoral anal length	Anterior insertion of pectoral to posterior rim of the anal fin
	BILLFISH	
LJFT	Curved Lower Jaw Fork Length	Tip of the lower jaw to the fork of the tail
	SHARKS	
PCT	Curved Precaudal Length	Tip of the head to the anterior portion of the caudal keel
	RAYS	
TT	Curved Total width	Total disc width
	TURTLES	
CT	Curved Carapace Length	Total carapace length - notch to notch