



# **Proposal to update CCSBT Scientific Observer Program Standards to incorporate electronic monitoring**

## **New Zealand**

Prepared for the 27<sup>th</sup> Meeting of the Extended Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna

**August 2022**



# 1 Background

During last year's Compliance Committee meeting, it was discussed that there should be allowance made for the use of electronic monitoring systems (EMS) to meet observer requirements in SBT fisheries. The need for further conversation on the issue was identified during discussion on agenda item 7.4, *Standing Agenda Items*, and reported as follows:

**CC16 Report, para 119:** *New Zealand summarised that it is useful to have EMS available as a monitoring tool in situations where it might not be possible to easily deploy human observers such as during the COVID-19 pandemic and on smaller vessels. New Zealand also mentioned that the current Scientific Observer Program Standards (SOPS) had not been drafted to take into account EMS, and that any discussions pertaining to EMS and the SOPS would need to be undertaken in ESC.*

New Zealand has drafted this proposal intersessionally for Members' consideration to suggest how the existing SOPS can be amended to allow for the use of EMS to contribute to meeting observer requirements in CCSBT fisheries.

## 2 Introduction

In drafting this proposal, New Zealand seeks to recognize the value that EMS brings to monitoring of fisheries with the potential to review footage of up to 100% of catch, if required. EMS can also add value in monitoring of ecologically related species. Additionally, EMS has the potential to provide coverage where historically it has been difficult to do so, such as on smaller vessels and during the COVID-19 pandemic. Experience to date indicates significant improvements in catch and protected species reporting from fleets subject to EMS, however, the information available from EMS is dependent on the review of camera footage. A minimum of 10% of footage is proposed to be reviewed for members using EMS in place of observers.

This proposal (and the revised SOPS appended to it) is meant to perform as an intermediary solution that allows Members that are currently, or will soon be, utilising EMS to meet the monitoring requirements of CCSBT. It is anticipated that a full review of monitoring requirements taking into account developments in EMS and the information now available from the catch documentation system would be advantageous in the future.

## 3 Proposal

The proposed amendments to the SOPS can be found in track changes in the Appendix.

In summary, changes include:

1. The addition of an 'Electronic Monitoring Systems (EMS)' section which outlines Members' responsibilities with regard to EMS.
2. Redefining 'observer coverage' to include coverage provided by EMS (e.g. percentage of fleet covered by EMS and percentage of camera footage reviewed).
3. Changes to country report components, including differentiating between data collected by human observers vs. EMS.

The proposed changes to the SOPS are not intended to be exhaustive and cover the diversity of scenarios offered by modern technology. They are simply meant to enable Members to diversify their monitoring options and utilise EMS to contribute to meeting (or exceeding) the observer coverage requirements set out by CCSBT.

## 4 Conclusion

The proposal put forward by New Zealand is meant to be a temporary solution that allows for the use of EMS while Members develop their own systems and procedures around the developing technology. New Zealand fully anticipates there will be additional work required in the future to develop more tailored and detailed standards for the use of EMS in CCSBT fisheries.

New Zealand is now seeking further guidance from the Extended Scientific Committee on approving this interim measure of adapting the existing SOPS to incorporate EMS with a view to recommending adoption by members at this year's meeting of CCSBT.

**APPENDIX 1** – Proposed revisions to the CCSBT Scientific Observer Program Standards to allow for the use of electronic monitoring systems

Commission for the Conservation of  
Southern Bluefin Tuna



みなまぐろ保存委員会

## CCSBT Scientific Observer Program Standards

*(revised at the Twenty-~~Second~~Ninth Annual Meeting: ~~15-10~~15-10 October 20~~22~~21)*

TABLE OF CONTENTS

**1. BACKGROUND**

**2. OBJECTIVES**

**3. RESPONSIBILITY FOR PROGRAM OPERATION**

**4. COVERAGE**

**5. LEVELS OF SCIENTIFIC OBSERVER COVERAGE**

**6. ASSIGNMENT OF SCIENTIFIC OBSERVERS TO VESSELS**

**7. TAGGING PROGRAM**

**8. RECRUITMENT AND TRAINING**

**9. THE OBSERVED VESSEL**

**11.10. ELECTRONIC MONITORING SYSTEMS (EMS)**

**12.11. INFORMATION AND DATA**

**13.12. REPORTING**

**14.13. CONFIDENTIALITY OF DATA AND INFORMATION**

## **LIST OF ATTACHMENTS**

Attachment 1	Type and Format of Scientific Observer Data
Attachment 2	Reporting Requirements



## 1.

## BACKGROUND

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) has adopted a Scientific Research Program (SRP) with an overall objective of improving the quality of the data and information used as input to the stock assessment for Southern Bluefin Tuna (SBT), contributing to the development of reliable indices to monitor future trends in SBT stock size and identifying directions for further scientific research.

At CCSBT7 in April 2001 the Commission adopted the report of the Fifth Meeting of Scientific Committee, which recommended a SRP incorporating a Scientific Observer Program as one of four priority elements. The Observer Program endorsed by the Commission comprised the following features:-

- an observer coverage of 10% for catch and effort as a target level
- the level of observer coverage for estimation of tag reporting rates will depend on the scale of the tagging program subsequently agreed by the Commission and the tag recapture rate.
- standards for training of observers, operation of observer programs and the data to be collected including the forms to be used will be prepared
- data collected would become part of the CCSBT database as subsequently agreed in CCSBT protocols
- member countries will be responsible for operation of observers in high seas and domestic EEZ fisheries on their flag vessels
- all fleet components should be observed and target levels of observer coverage should be the same for all fleet components
- an exchange of observers between countries on a regular basis should be encouraged to maintain consistency and increase mutual trust in the results of the observer program
- recruitment of some observers from non-member nations would be encouraged

To facilitate implementation, the 6<sup>th</sup> Scientific Committee agreed that:-

- there would be an exchange of data sheets and standards for longline fleets between member countries through the Secretariat
- Australia would develop proposed program standards and data forms for the surface fisheries, taking note of the characteristics of observer programs administered by other fisheries management organizations
- the information gathered would be exchanged through the Secretariat
- proposals on draft CCSBT observer program standards will be presented and finalized at the 7<sup>th</sup> Scientific Committee meeting in 2002

Dr. Ianelli of the Advisory Panel together with the SC chair developed an initial draft of proposed outline of a CCSBT scientific observer program at the 6<sup>th</sup> Scientific Committee to serve as a basis for further discussion (See the Attachment F of the 6<sup>th</sup> SC Report.).

CCSBT8 endorsed the 6<sup>th</sup> Scientific Committee's proposals in October 2001.

Advances in the development of electronic monitoring systems (EMS) presented an opportunity to diversify monitoring options and some Members independently developed systems to provide additional coverage of their fleets both domestically and on the high seas. At CCSBT29 in 2022 the Commission adopted the recommendation of ESC27 to update the Scientific Observer Program Standards to accommodate this development.

The standards set out in this document reflect these decisions of the Commission and were developed in consultation with national observer program coordinators. A target level of observer coverage to meet tag reporting rate objectives has not yet been determined. When determined, the standards will be updated.

In developing the standards, the Secretariat has prepared a generic document for both surface and longline fisheries. Where the nature of the two types of fishery are differentiated in terms of observer activity, this is identified.

The tasks and record keeping requirements have been formulated to gather only that information,

which is relevant to the objectives of the SRP. Consideration was also given to the practical limitations on the ability of observers to complete tasks in the fishing environment they would be operating in.

In order to facilitate implementation of the standards, the term “member” in this document means any Member of the Extended Commission of the CCSBT.

Reference to the acronym CCSBT is inclusive of the Commission and Extended Commission.

## 2. OBJECTIVES

The standards set out below provide the framework for the operation of the CCSBT Scientific Observer Program by members.

The objectives of the standards are:

1. To provide a framework for the alignment of members’ scientific observer programs with the objectives of the SRP.
2. To standardize scientific observer programs across fleets and fisheries among members.
3. To specify minimum standards for the development of a scientific observer program for members without a program.
4. To provide a minimum set of standards for collection of bycatch data, consistent with international recommendations, and where appropriate to assist in harmonization of bycatch data collection across tuna Regional Fisheries Management Organisations.

All members are expected to adapt their respective programs to, at a minimum, meet these standards but noting that members are encouraged to implement further requirements in their respective programs.

## 3. RESPONSIBILITY FOR PROGRAM OPERATION

Responsibility for the operation of the CCSBT Scientific Observer Program on the high seas and in domestic EEZ fisheries will lie with the member whose flag is flown on the vessel.

Each member’s Scientific Observer Program will be managed taking into account these standards.

Where there is an external observer exchanged under agreements concluded between members or an observer recruited from a non-member nation, that observer shall comply with the laws and regulations of the member which exercises jurisdiction over the vessel to which the observer is assigned.

## 4. COVERAGE

The CCSBT Scientific Observer Program, including electronic monitoring systems (EMS), will cover the fishing activity of CCSBT members and cooperating non-members wherever southern bluefin tuna are targeted or are a significant bycatch.

## 5. LEVELS OF SCIENTIFIC OBSERVER COVERAGE

The Program will have a target observer coverage of 10% for catch and effort monitoring for each fishery. For the purposes of this document, ‘observer coverage’ is defined as monitoring by either human observers deployed physically onboard vessels, as well as reviewed catch and effort data from EMS.

Observer coverage, including the selection of EMS data for review, should therefore be representative

of different vessel-types in distinct areas and times<sup>1</sup>.

In order to approach 10% coverage in some strata (e.g., specific vessel-types in certain areas and times) it may be necessary to have higher than 10% coverage in other strata<sup>2</sup>.

The exact level of observer placement or EMS data review will require periodic assessment to determine if the target level of coverage is achieved.

Consideration should also be given to higher levels of coverage in some strata from time to time to address specific fisheries management questions (e.g. to better quantify non-fish and protected species bycatch where this is identified as a risk). Review of historically gathered EMS data may also be used for this purpose.

## **6. ASSIGNMENT OF SCIENTIFIC OBSERVERS TO VESSELS AND SELECTION OF EMS DATA FOR REVIEW**

From the scientific perspective, it is important to ensure that the data collected through the scientific observer programs and EMS provide representative information and sampling for the entire fleet. Ideally, each individual operation should have an equal and independent probability of being physically observed or having EMS data from the vessel reviewed. In practice, this ideal may not be possible to achieve. Nevertheless, the basic principle of representative sampling should underlie the assignment of scientific observers to vessels and/or the selection of EMS data for review.

It is the responsibility of each member when implementing an observer program, to assign observers or EMS to its vessels and cruises based on a carefully considered and appropriately designed sampling scheme that has a high likelihood of ensuring reasonably representative coverage. The program should ensure that, within the main fishing areas and seasons and to the extent possible, all representative vessels, areas, and time periods have an approximately equal probability of being sampled.<sup>3</sup>

Each member should evaluate and analyse the sampling scheme used for the assignment of observers against the principles outlined above. Each member should document the scheme used for the observer assignments or selection of EMS footage for review that is ~~actually~~ implemented and make this information and data collected available to the Commission in the manner described in Section 11 to enable review within the Commission of whether or not the standards are being met.

The placement of observers and EMS should also encompass arrangements to ensure the independence and scientific integrity of the data.

## **7. TAGGING PROGRAM**

Observer programs make a very valuable contribution to the direct recording of recaptured tags, and to the estimation of non-reporting rates. Failure to adequately quantify the uncertainty associated with estimates of tag reporting rates will substantially degrade the value of any resultant mortality estimates for use in stock assessments.

Observer plans and training programs should include specific provision for the role and

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<sup>1</sup> For the purpose of this standard, it is recognized that there are many ways in which catch and effort can be stratified including vessels, areas and times. This level of coverage is relative to actual fishing operations, which, if randomly distributed, should result in about 10% of the catch.

<sup>2</sup> While it might be possible to observe 10% of the catch from a single vessel (if a hypothetical fleet consisted of 10 vessels with equal catch allocations), this would not achieve the objective of sampling fishing operations with approximately equal probability, particularly if the vessels fish in different areas using different techniques. Clearly there are logistical difficulties in achieving random observations of fishing operations.

<sup>3</sup> To achieve a desired target coverage level may require a higher observer placement level. For example, it may take 150 observed vessel days out of a hypothetical 1,000 vessel-day year to achieve a target of 10% coverage for all important strata. In part, this may be due to the fact that the ability of observers to transfer among vessels on the fishing grounds is limited. The factors affecting this include the heterogeneity of the fleet and fishing behaviour.

responsibilities of observers for tag recapture reporting. A supplemental level of observer coverage may be required to take into account the results of the CCSBT tagging program.

## **8. RECRUITMENT AND TRAINING**

Each member is responsible for the recruitment and training of observers for placement on their flagged vessels. Details of the processes maintained for this responsibility are for members to manage consistent with the domestic environment in which they operate.

Training schemes should be constructed to impart the skills necessary to adequately collect the scientific data and should take account of the following principles.

### Qualifications of Observers

Scientific Observers for the program should have the following attributes:

- Technically trained or experienced personnel for the fleets concerned, with interests related to fisheries.
- Ability to work at sea in difficult conditions.
- Ability to work under stressful psychological and physical situations.
- Ability to work with a boat's crew on a cooperative and team basis over long and continuous periods at sea.
- Soundness of mind and body.

### Independence / Integrity

Observers should not have current financial or beneficial interests in the fisheries in which they will be required to operate as observers.

Observers should not have been found guilty of a serious criminal offence for five years prior to appointment as an observer.

### Scientific Observer Training

Members should establish and maintain a structured training program for the CCSBT Scientific Observer Program. Manuals should be developed for this purpose and courses operated, which would allow for observers to exchange approaches and experiences to improve the data collection process.

A Scientific Observer Training program of each Member should include, at least, the following items.

- Briefing on the CCSBT SRP, particularly the CCSBT Scientific Observer and Tagging Program elements to promote a full understanding of the rationale for the Programs.
- Fishery management and biological field collection programs including species identification, data collection and sampling procedures. This should also include identification of bycatch species, such as seabirds, sharks, marine reptiles, other ERS and knowledge of current mitigation measures that are used in the CCSBT.
- Monitoring tag recovery.
- Training on safety at sea and first aid.
- Protocols for dealing with difficult situations (personal conflicts and physical hazards).
- Preparation of cruise/trip reports
- De-briefing with observers to provide feedback on improvement.
- Any additional technical training required for special project such as tagging fish, when necessary

### Recruitment of Observers

Scientific observers could be recruited from a variety of related fishery sectors to widen the knowledge and experience base of the observer cohort.

Exchange of observers between members and recruiting some observers from non-members should be encouraged to improve consistency and transparency in the program. Responsibility for

implementing observer exchanges would reside with members and the exchanges would be organised between relevant members and non-members as appropriate

## 9. THE OBSERVED VESSEL

Any vessel selected for an observation should be capable of meeting the minimum requirements for accommodation, sanitary facilities, meals, equipment and communication systems equivalent to those of the crew (junior officer when possible) so that the observer's duties are not compromised.

A selected vessel should be advised of its responsibility for the observer while they are on board.

## 10. ELECTRONIC MONITORING SYSTEMS (EMS)

Each member is responsible for the evaluation and contracting of EMS for placement aboard their flagged vessels. Details of the proportion of the fleet that is covered by EMS, as well as the proportion and diversity of footage that is reviewed, is for members to manage consistent with the domestic environment in which they operate.

EMS should be designed and installed to adequately collect relevant scientific information and data, and reporting provided to the Secretariat per section 12 of this document.

## 10.11. INFORMATION AND DATA

Scientific data to be collected by observers and, where relevant, by EMS, should include the following categories of information:

- A. Details of the observed vessel, including its size, capacity and equipment.
- B. Summary of the observed trip, which will include information such as the observer name and identification number, degree of experience, dates of embarkation and disembarkation.
- C. Comprehensive catch, effort and environmental information for each set that occurred while the observer was on-board the vessel, regardless of whether the set/haul was actually observed. This includes the target species, location fished and quantity of gear used.
- D. Fishing methods and gear, including mitigation measures in use while fishing. The observer should record/describe mitigation measures, including the configurations that were in use during the observed period. This includes the details of mitigation measures and their use as described in Attachment 1. Where applicable, the absence of mitigation equipment should also be noted.
- E. Observed catch information for each period of observation, including the time at start and end of observation, the number of hooks observed, the observed catch in number and weight for SBT and all other species caught to the extent possible.
- F. Biological measurements taken of individual SBT, as much as possible, including its condition, length, weight, sex and details of samples (otoliths, scales, gonads, etc.) that were taken from the SBT for later analysis.
- G. Information on SBT and ERS not retained should include counts by species and their life status (using the relevant codes as detailed in Attachment 1).
- H. SBT tag recovery information, including, both tag numbers (actual tags also to be provided), date, location, length, weight, sex, details of samples taken (e.g. otoliths), and whether or not the tags were spotted during a period of fishing that was being observed.

Most of the above categories of information are related to each other in a hierarchical relationship. So, the biological details of a fish (F) relates to a particular observed period (E) from a specific set (C) for a trip (B) on a particular vessel (A).

A detailed description of the proposed information to be collected for each of the above categories

is provided in Attachment 1. Hierarchies for prioritising the collection of data by species caught and SBT data are at Annex 1. In severe weather conditions, data collection should only be conducted to the extent that is it safe for the observer to do so.

#### **11.12.** **REPORTING**

Each member shall provide a report to the Extended Scientific Committee and the Ecologically Related Species Working Group on the sampling scheme and arrangements for collecting data of its observer program as a separate section in the member's annual fishery report. Attachment 2 documents the information that should be provided.

Each member shall include in National Reports to the Compliance Committee and Commission, a summary of the levels of compliance in relation to the implementation of mandatory mitigation measures.

#### **12.13.** **CONFIDENTIALITY OF DATA AND INFORMATION**

All data and information obtained through an observer program belongs to the flag country of the observed vessel. An observer should not disclose any information without the permission of the flag country.

## Type and Format of Scientific Observer Data

*For observer coverage provided by EMS, not all of the information below will be readily available; therefore, as much detail as possible should be provided based on the below descriptions of data type/format*

**A) Details of the observed vessel and gear**

The vessel details are recorded only once for an entire trip

All fishing:

- Vessel's Name
- Vessel's Call-sign
- Vessel's Flag Country
- Name of the Captain
- Name of the fishing master
- Year vessel built
- Engine brake power (kw/hp)
- Overall length (metres)
- Gross tonnage (tonnes)
- Number of people in crew (all staff, excluding observers)
- Total freezer capacity (cubic metres)
- Fuel capacity (tonnes)
- Instrumentation and electronic fishing equipment

Instrumentation	Yes/No (or code)
GPS	
Radio direction finder	
Radar	
Weather Fax	
Track plotter	
NOAA receiver	
Sounder (1=colour monitor, 2=monochrome monitor, 3=printer)	
Sonar (1=scanning, 2=PPI)	
Doppler current monitor	
Sea surface temperature recorder	
Bathy-thermograph	
Bird radar	

Longliners only:

- Material of mainlines (Nylon, Cotton thread, Other)
- Material of branchlines (Nylon, Cotton thread, Type of trace, Other)
- Material of buoylines (Nylon, Cotton thread, Other)

Purse seiners only:

- Capacity of power block
- Capacity of purse winch
- Lengths and depths of all nets on board including expanded figure
- Mesh sizes of nets on board
- Number of net skiffs on board

**B) Summary of the observed trip**

- Observer's name
- Observer's organisation
- Date observer embarked (translatable to 24 hour clock, UTC to the day)
- Date observer disembarked (translatable to 24 hour clock, UTC to the day)

### C) Comprehensive catch, effort and environmental information for each set

This information is recorded for each set while the observer is on-board a vessel, regardless of whether the set/haul was actually observed.

#### All fishing:

- Date and time at start of Set (translatable to 24 hour clock, UTC)
- Date and time at end of Set (translatable to 24 hour clock, UTC)
- Date and time at start of Retrieval (translatable to 24 hour clock, UTC)
- Date and time at end of Retrieval (translatable to 24 hour clock, UTC)
- Location at start of Set (latitude+N/S and longitude+E/W to a minute of accuracy)
- Wind speed (with unit) and direction (N, NNE, NE, etc.) of the operation
- Time of wind measurement for operation (e.g. Noon, start of set etc.)
- Sea surface temperature (degrees Celsius, to 1 decimal place) at start of Set<sup>4</sup>
- Intended target species<sup>5</sup>

#### Longlining:

- Location at end of Set (latitude+N/S and longitude+E/W to a minute of accuracy)
- Direction of line set (eg straight, curved)<sup>6</sup>
- Direction of line set (straight,curved)
- Actually used mainline length (km)
- Actually used branchline length (m)
- Actually used buoyline length (m)
- Intended depth of the shallowest hook (m)
- Intended depth of the deepest hook (m)
- Type of hooks
- Number of hooks
- Number of baskets
- Seabird mitigation measure used:
  - Line weights used (Y/N)
  - Mass of added line weight (where applicable)
  - Distance between weight and hook (where applicable)
  - Number of tori lines used (where applicable)
  - Estimate of the aerial coverage achieved by tori lines (m)
  - Night setting with minimal deck lighting (Y/N)
  - Bait thrower/line shooter used (Y/N)
  - Dyed Bait (Y/N)
  - Details about management of offal
  - Underwater setting chute (Y/N)
  - Side setting (Y/N)
  - Haul mitigation (Y/N)
    - Branch line/snood haulers
    - Brickle curtain
    - Water cannon
  - Other mitigation measures used
- Distance between baskets, beacons, buoys, or floats as is appropriate to the operation (m)
- Percentage of bait by bait categories that were Fish, Squid, Artificial, and Other
- Bait status (live or dead)
- Total number by species<sup>5</sup> of SBT, and other tuna and tuna-like species caught, retained or discarded.
- Total processed weight (kg) and Processed State<sup>7</sup> by species<sup>5</sup> of SBT, and all other species caught.

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<sup>4</sup> It is sufficient to collect the temperature at the start of a set – i.e. at the time the location and wind are measured (e.g. Noon, start of set, etc.).

<sup>5</sup> All species should be reported with FAO species codes, or using National codes and providing a translation to FAO species codes. Individuals should be identified as far as possible to species level.

<sup>6</sup> Codes will be used to describe the type of line set, e.g. S=straight, C=curved, U=u-shaped.

<sup>7</sup> As per processing codes identified in the CCSBT CDS Resolution.



### Purse Seining:

- Spotter plane used (Y/N). If used:
  - Time (translatable to 24 hour clock, UTC) and location aircraft began search
  - Time (translatable to 24 hour clock, UTC) and location aircraft ended search
  - Number, location of schools spotted by aircraft
  - Estimated size of each school spotted by the aircraft
  - Total searched distance
- Bird Radar used (Y/N)
- Logbook number and type
- Start and end Time spent for searching (from xx:xx to yy:yy translatable to 24 hour clock, UTC), location and total searched distance
- School finder (plane/vessel)
- Chumming boat used (yes/no)
- Chum status (Alive/Dead)
- Amount of chum used
- Start and end time for chumming (translatable to 24 hour clock, UTC)
- Start and end time for net shooting (translatable to 24 hour clock, UTC)
- Start and end time for net hauling (translatable to 24 hour clock, UTC)
- Start and end location for net shooting
- Start and end location for net hauling
- Light attraction used (yes/no)
- Total of wattage of lights used
- Start and end time for light attraction
- School type (e.g., shoaling/surface, FAD/debris associated)
- Length (m) of net set
- Height (m) of the net
- Number of net skiffs used
- Date and time that transfer to tow cage commenced
- Identification number of the tow cage to which the SBT were transferred
- Name of Carrier Boat that received the fish
- Estimated catch per set, species composition
- Estimated weight (kg) and/or number by species of SBT and other species caught
- Estimated weight of SBT caught alive
- Estimated weight and/or number of SBT dead during operation

### Cage Towing:

- Name of carrier boat
- Tow cage identification number
- Cage depth (metres)
- Cage ring diameter (metres)
- Cage mesh size (in centimetres)
- Cage has second or predator net (Y/N)
- Number of divers used
- Chute fitted in cage (Y/N)
- Effective tow speed (km/hour)
- If the catch was received from fishing operations, then for each catcher boat from which SBT were transferred, record:
  - Name of catcher boat
  - Call sign of catcher boat
  - Date and time (translatable to 24 hour clock , UTC) transfer started
  - Estimated weight of SBT transferred (tonnes)/dead SBT before transfer
- If the catch was received from another tow cage, then, record:
  - Name of the carrier boat from which the SBT came
  - Identification number of the tow cage from which the SBT came
  - Date and time (translatable to 24 hour clock, UTC) transfer started.
  - Estimated weight of SBT transferred (tonnes)/dead SBT before transfer
- Date and time (translatable to 24 hour clock, UTC) and place that tow finished
- Total weight of SBT mortalities per day from commencement of towing to end of transfer to farm

- Total number of SBT mortalities per day from commencement of towing to end of transfer to farm

#### **D) Observed catch information**

This relates to that part of the catch that was actually observed by the observer during the hauling process. All information recorded here relates only to the period(s) that were observed. Annex 1 provides hierarchies for the collection of data. Observers should use these hierarchies to prioritise data collection as circumstances prevail on the observed vessel.

##### Longlining:

- Date and time at the start of the observation period (translatable to 24 hour clock, UTC)
- Date and time at the end of the observation period (translatable to 24 hour clock, UTC)
- Number of hooks observed
- Total number by species<sup>5</sup> of all species caught and retained during the observed period<sup>8</sup>
- Total processed weight (kg) by species<sup>5</sup> and Processed State<sup>7</sup> of all species caught and retained during the observed period
- Total number and weight when possible (whole weight, in kilograms) by species<sup>5</sup> of all species caught but discarded during the observed period and life status<sup>8,9</sup>.

##### Purse Seining:

###### The entire purse seining shooting and hauling operation should be observed

- Date and time at the start of the observation period (translatable to 24 hour clock, UTC)
- Date and time at the end of the observation period (translatable to 24 hour clock, UTC)
- Estimated % of school caught
- Estimated weight (tonnes for SBT, kg for all other species<sup>5</sup>) and/or number by species of SBT, and all other species caught, retained or discarded including life status<sup>8,9</sup>
- Weight of SBT mortalities from commencement of fishing to end of transfer to cage
- Number of SBT mortalities from commencement of fishing to end of transfer to cage
- Number of species identified as escaped from commencement of fishing to end of transfer to cage
- Number by species identified as discarded from commencement of fishing to end of net hauling

##### Cage Towing:

###### The observer must observe or conduct each mortality count during the period of the tow.

- Date and time at the start of the observation period (translatable to 24 hour clock, UTC)
- Date and time at the end of the observation period (translatable to 24 hour clock, UTC)
- Total weight of SBT mortalities per day from commencement of towing to end of transfer to farm
- Total number of SBT mortalities per day from commencement of towing to end of transfer to farm

#### **E) Biological measurements of individual fish. Biological measurements are only required for SBT, but where possible, effort should be made to measure other species.**

For the purposes of SBT analyses, accurate size measurements of SBT are required. SBT should be selected in a manner to ensure within strata randomness. For example, for large numbers of fish caught in a single operation (e.g., a purse seine vessel) a systematic sampling may be appropriate.

The actual number of fish should be spread throughout as many separate fishing operations as possible. For example, it is nearly always the case that sampling 20 fish (randomly) from 10 operations is much better than sampling 200 fish from every 10<sup>th</sup> operation. The required actual number of samples should be re-evaluated from time to time and as needs change.

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<sup>8</sup> This includes target species (such as SBT) and all bycatch species such as seabirds, sharks, marine reptiles etc.

<sup>9</sup> Individuals that are discarded with significant injuries and are not considered likely to survive should be included in the number of dead individuals.

- Species<sup>5</sup>
- Life status category<sup>10</sup>
- Length (for SBT, fork length measured on straight length, rounded up to the centimetre<sup>11</sup>)
- Length unit
- Length code (fork length, eye fork, etc.)
- Length, lower jaw-fork length
- Whole weight (kg), if possible. This is the measured weight before processing as opposed to a calculated whole weight.
- Processed weight (kg)
- Processed State<sup>7</sup>
- Sex (F=female, M=male, I=indeterminate, D= not examined)
- Samples taken, specifying:
  - A unique identification number given to the sample
  - The type of samples taking, including: whole specimen, or samples of otoliths, scales, vertebrae, stomach, muscle, tissue, gonads, feathers, bird bands etc.)
  - Any additional details that may explain the capture of the sample (e.g. for seabirds the specific mitigation at the time of capture)

#### **F) SBT Tag recovery information**

Some of the data recorded here duplicates data that already exists in the previous categories of information. This is necessary because tag recovery information may be sent separately to other observer data.

- Observer's name
- Vessel's name
- Vessel's call sign
- Vessel flag
- Collect and provide the actual tags
- Tag colour
- Tag numbers (The tag number is to be provided for all tags when multiple tags were attached to one fish. If only one tag was recorded, a statement is required that specifies whether or not the other tag was missing)
- Date and time of capture (UTC)
- Location of capture (latitude+N/S and longitude+E/W to 1 minute of accuracy)
- Length (fork length, rounded up to the nearest centimetre<sup>11</sup>)
- Processed Weight (kg.)
- Processed State<sup>7</sup>
- Details of samples taken, specifying:
  - A unique identification number given to the sample,
  - The type of samples taking, including: whole specimen, or samples of otoliths, scales, vertebrae, stomach, muscle, tissue, gonads, etc.)
- Sex (F=female, M=male, I=indeterminate, D=not examined)
- Condition of recaptured fish and their life status
- Whether the tags were found during a period of fishing that was being observed (Y/N)
- Reward information (e.g., name and address where to send reward)

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<sup>10</sup> The observer program will, as a minimum, distinguish the following life status categories: dead and damaged; dead and undamaged; alive and vigorous; and unknown.

<sup>11</sup> Length should be rounded (not truncated) to the nearest centimeter. For example, 62.4cm becomes 63cm and 62.5cm becomes 63cm (63 cm for both cases).

## HIERARCHIES FOR DATA COLLECTED BY SPECIES AND SBT DATA

This annex provides a guideline for the collection of data by observers to enable prioritising of observer activities.

The flow of the main data collection activities are:

*Fishing operation information*

- All vessel and shot information

*Monitoring of hauls*

- Record time and species caught
- Record whether the specimen was retained or discarded (with lifestatus)

*Monitoring of sets*

- To collect counts of seabird abundance around the vessel when setting (using standard counting practices)

*Biological sampling*

- Collect data on length and whole and/or processed weight (including processed state)
- Check for presence of tags
- Record sex
- Collect biological samples
- Take photos, in particular to facilitate the identification of ERS

Both the monitoring of hauls and the biological sampling procedures should be prioritised among species groups as follows:

Species	Priority (1 is the highest)
SBT	1
Other tunas, billfishes, Gasterochisma, and sharks	2
All other species	3

“other tunas” means all *Thunnus* species except SBT

The allocation of observer effort among these activities will depend on the type of operation and setting. The size of sub-samples relative to unobserved quantities (e.g., number of hooks examined for species composition relative to the number of hooks set) should be explicitly recorded under the guidance of member country observer programs.

## FORMAT OF NATIONAL REPORT SECTIONS ON DEVELOPMENT AND IMPLEMENTATION OF SCIENTIFIC OBSERVER PROGRAMS

### REPORT COMPONENTS

The observer program implementation report should form a component of the annual National Reports submitted by members to the Scientific Committee. This report should provide a brief overview of observer programs for SBT fisheries, and is not intended to replace submitted papers containing proper analyses of collected observer data. This observer program report should include the following sections:

#### A. Observer Training

An overview of observer training conducted, including:

- Overview of training program provided to scientific observers.
- Number of observers trained.
- Summary of qualifications / training and years of experience of the observers deployed in SBT fisheries during the past year.
- A copy of the latest version of relevant manuals in their original language for reference

#### B. Scientific Observer Program Design and Coverage

Details of the design of the observer program, including:

- Which fleets, fleet components or fishery components were covered by the program.
- How vessels were selected to carry observers within the above fleets or components.
- How was observer coverage stratified: By fleets, fisheries components, vessel types, vessel sizes, vessel ages, fishing areas and seasons.
- The proportion of coverage provided by observers vs. EMS.

Details of observer coverage of the above fleets, including:

- Components, areas, seasons and proportion of total SBT catch, specifying units used to determine coverage.
- Total number of observer employment days, and number of actual days deployed on observation work.
- Total number of vessels with EMS systems deployed onboard, as well as the proportion of data returned to agencies that was analysed.

#### C. Observer Data Collected

List of observer data collected against the agreed range of data set out in Attachment 1. In broad structure this would include:-

- Effort data: Amount of effort observed (vessel days, sets, hooks, etc), by area and season and % observed out of total by area and seasons
- Catch data: Amount of catch observed of SBT and other species (if collected), by area and season, and % observed out of total estimated SBT catch by area and seasons
- Length frequency data: Number of fish measured per species, by area and season.
- Biological data: Type and quantity of other biological data or samples (otoliths, sex, maturity, Gonosomatic index, etc) collected per species.
- The size of sub-samples relative to unobserved quantities.

**D. Tag Return Monitoring**

Number of tags returns observed, by fish size class and area.

**E. Problems Experienced**

- Summary of problems encountered by observers and observer managers that could affect the CCSBT Observer Program Standards and/or each member's national observer program developed in the light of the Standards.