

# Manual for scientific observers on board EU pelagic trawlers in the Pacific

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Ad Corten

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De Waterdief 52, 1911 JT Uitgeest

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## 1. Introduction

This Manual describes working methods and sampling procedures for scientific observers on board of European pelagic trawlers in the southeastern Pacific.

The observer programme in this region was started at the request of the South Pacific Regional Fisheries Management Organisation (SPRFMO). The aim of the programme is to collect information that will be used for managing the pelagic fishery in the southeastern Pacific.

The observer programme on board PFA (Pelagic Freezertrawler Association) trawlers was originally financed by the Dutch government and later by the Dutch ship owners. In addition to the sampling of PFA vessels, the Polish government organised a sampling programme on board Polish vessels in 2009-2011.

In 2015, the EU decided to co-finance the scientific observer programme under the DCF (Data Collection Framework) programme. This manual presents an updated version of the earlier one used on PFA vessels, and it incorporates the latests requirements by SPRFMO such as specified in SPRFMO Doc. CMM 3.02 "Conservation and Management Measure on Standards for the Collection, Reporting, Verification and Exchange of Data".

Results of the CMR observer programme will be submitted to the SPRFMO secretariat. Data requirements and sampling methods are based on the standards issued by the SPRFMO. The data will be treated by SPRFMO as confidential. SPRFMO will only publish information that cannot be related to a specific vessel.

## 2. Accommodation and other arrangements on board

The observer will be lodged in a single or double cabin on board. He may be asked to share his cabin with a crew member. Bed sheets and towels will be provided by the ship. Food is provided by the vessel. Beverages and cigarettes can be bought on board. In general, living conditions on board for observers (accommodation and food) should be at least at the same level as those for crew members.

The observer may use the internet facilities of the vessel (if available) to send data reports to CMR. The observer should not use the vessel's computer for other activities, and he should in no way hamper the work of the crew. Telephone calls related to the work on board will be reimbursed by CMR.

The observer should try to interfere as little as possible with the work of the crew. This applies particularly to observations made on the fishing deck. Here the observer can go only with the permission of the officers on the bridge. The use of a safety helmet is compulsory on the fishing deck.

Although the observer may occasionally give a helping hand to the crew (if his work permits), this should always happen on a voluntary basis. The observer cannot be obliged by the captain to take over some of the crew's work, nor can he be paid for his voluntary services on board.

A list of all materials that the observer has to bring with him is presented in Annex 1.

## 3. Collecting information on board

### 3.1. Collecting information from the bridge

For each trip, a Vessel and Observer data form has to be completed (Annex 2). The necessary information can be obtained from the captain. This form has to be filled in only once during the trip.

Another form that has to be filled in on the bridge is the Catch and Effort data form (Annex 3). This form contains information on each individual haul. The observer can use the information from crew's logbook to fill in this data form. Catches are recorded in kg, both for the fraction retained on board and for the discards.

In the Catch and Effort data form, each haul has an individual number. This number is used as a reference for other data forms that relate to this particular haul (Trawl Sampling form, Biological Data form, and By- Catch form).

The last column on the Catch and Effort data form refers to by-catches of birds, mammals and turtles. If no by-catches are taken, the value is zero. If no observations are made, the entry is "NO OBS". It is important that this distinction is made, because otherwise the zero catches cannot be distinguished from the hauls on which no observations were made.

### 3.2. Sampling the catch

#### 3.2.1. Sampling for species and length composition

The purpose of this sampling is to estimate the species composition of the catch, and the length composition of each species. This is the main activity for observers. The aim is to sample as many hauls as possible during the period when the observer is standby (normally 16 hours a day).

The catch from each haul is pumped into one or more storage tanks. From here the catch is pumped towards the working deck. The quality master knows from which haul the catch is being processed at any given time. Sometimes, a tank contains a mixture of two catches. Preferably, these tanks should not be sampled, as it is not clear from which haul the catch originates.

The sample should be taken at a point on the processing line where the catch has not yet been sorted. As a rule, a random sample should be taken, containing approximately 100 fish. This corresponds to 2-3 baskets of 30 kg each.

The sample is sorted by species, and each species is split into a category that is conserved on board, and a category that is discarded (the latter component is estimated from watching the crew sorting the fish). The weight of each species and each category (conserved and discarded) is measured. Then

the length composition for each species and each category is recorded. If fish in the category "discards" are badly damaged, their length is estimated by comparing them with whole fish. The measurements are recorded on a paper version of the Trawl Sampling Form (Annex 4). Later these data are entered on the computer in the "trip summary" form. From the ratio between sample weight and estimated total catch, the total weight of each category is estimated. For example, if the sample composition is as follows:

species	category	weight in sample
tmur	conserved	40
tmur	discarded	10
sjap	conserved	8
sjap	discarded	2
total		60

and the total catch weight estimated by the captain is 100,000 kg, the estimated total quantities are:

species	category	weight in sample	weight in catch
tmur	conserved	40	66667
tmur	discarded	10	16667
sjap	conserved	8	13333
sjap	discarded	2	3333
total		60	100000

On the trip summary form, the species are indicated by a 4-letter code, consisting of the first letter of the genus, and the first 3 letters of the species. For instance, *Trachurus murphyi* is "tmur".

### 3.2.2. Sampling of rare species

Sometimes interesting species that occur in small numbers in the catch are not encountered in the random sample of 2-3 baskets taken from the unsorted catch. This is the case for instance with small tuna, small jack mackerel, swordfish, etc. It is important that these species are also sampled, and that quantitative estimates of their catches can be made. To achieve this, such rare species or individuals are collected from a larger proportion of the catch. For instance, if small jack mackerel occur sporadically in the catch, they may be collected from the conveyor line during a 10 minute period. The total weight in the catch is then estimated by multiplying the weight of the sample by the factor  $T/t$ , in which

$T$  = total duration of the processing of the catch

$t$  = period during which all fish have been taken from the conveyor line

the case of very large fish such as tuna and swordfish, all individuals in the catch will be sampled. The ratio between sample weight and total weight is than 1:1.

The trip summary form includes length classes up till 100 cm. If fish are larger than 100 cm, they are recorded on the trip summary form as 100+. The actual length of these fish (or birds, turtles or dolphins) is recorded separately on the "by-catch registration form".

### 3.2.3. Sampling of small fish that is separated by the sorting machine

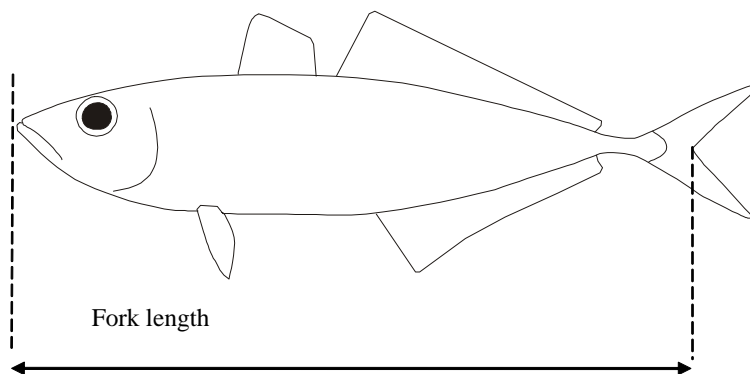
The smallest fishes are already separated by the sorting machine, and they do not appear on the conveyor line. If this category contains commercially important species (undersized jack mackerel or chub mackerel), it is important to sample this fraction also. This can be done by collecting a sample that is separated during a certain period (say one or 5 minutes), and estimating the total amount from the time taken to process the whole catch.

### 3.2.4. Giant squid

Giant squid are normally too much damaged to estimate their number or length with any precision. The only reliable information that can be collected, is their presence or absence in the catch. This information is recorded on the "trawl station list".

### 3.2.5. Measuring the fish

The length of all individuals of each species is measured. This length is measured as fork length to the whole centimeter below. For instance: all fish between 20.0 and 20.9 cm are recorded as 20 cm.



### 3.2.6. Sampling for biological characteristics

Biological sampling is conducted primarily for jack mackerel. If time permits, also biological samples of chub mackerel (*Scomber japonicus*) can be taken.

It is not necessary to collect biological samples from all trawl hauls, but as a rule one biological sample is collected every day (preferably from a large catch).

A biological sample consists of 25 fish. These fish are taken at random from the catch (or from the length sample). The standard biological parameters to be recorded are listed on the “Biological Data Form” (Annex 5).

Maturity stage, stomach fullness, and accumulated fat are rated according to the scales given on the Biological Data Form.

Otoliths are collected from each fish in the biological sample. This means that 25 pair of otoliths are collected per sample. This procedure is different from earlier years when we collected a fixed number of otoliths per cm group per month)

In addition to the standard measurements listed on the Biological Data Form, special requests may be made for particular measurements are samples (genetic samples, morphometric measurements). These special requirements will be specified before the start of each mission.

### 3.2.7. Sampling of Sea birds, mammals and turtles

Before starting the sampling for catch composition on the working deck, the observer has to check whether there are incidental by-catches of large animals (sharks, turtles, dolphins) that are not pumped into the tanks. If this is the case, the observer has to record these catches. However, the observer can go out on the deck only with permission from the officers on the bridge.

Observations on by-catches are recorded on the By-catch Registration Form (Annex 6). In case no observations have been made, this is also indicated on the form. It is important to distinguish hauls with zero by-catches from hauls on which no observations were made

### 3.2.8. Recording tagged fish

The chance of finding a tagged fish is very small. However, in case a tagged fish is encountered, its characteristics are to be recorded on the Tagged Fish Form (Annex 7)

## **4. Cruise report and data exchange**

During the trip, all data recorded have to be transferred to the standard record forms (annexes 2-7). Within 2 weeks after the end of the trip, the observer has to send his data sheets in electronic form to CMR.



In addition, he should send in a cruise report that should contain a day-to-day narrative of relevant events during the trip. A format for this report is given in Annex 8.

## 5. Annexes

### Annex 1. List of material for observer missions

#### Items to take along with personal baggage

Passport  
 Seaman's book  
 Rubber boots  
 Warm clothes for working deck (1°C)  
 Observer's manual  
 Digital camera  
 Laptop computer  
 Fish identification guide (electronic version)

#### Items in material boxes on board the vessel

Measuring board 60 cm	1
Large knives	2
scalpels	2 cartons
Plastic bags for freezing small fish	2 cartons
Gloves	2 pair
Alcohol for preserving specimen	2 liter
Plastic jar 1 liter	1
Plastic jar 0.5 liter	10
scissors	2
Measuring tape 3 m	1
Steel ruler 50 cm	1
Plastic ruler 40 cm	1
Case with pencils, forceps etc.	2
Small adhesive labels	1 set
Clipper board for paper sheets	2
Trawl sampling forms	100
Biological sampling forms	60
Catch and effort data forms	20
Vessel and Observer data forms	2
Small forceps to take out otoliths	2
Plates for mounting otoliths	60 plates for 25 otoliths
Magnifying glass	1

## Annex 2. Vessel and Observer Data Form

Data to be collected for Each Observer Trip (recorded only once for each trip)

Current Vessel Flag		Vessel Name	
Name of the Captain		Name of the Fishing Master	
Registration number of vessel		International Radio Call Sign (if any)	
Lloyd's/IMO number (if allocated)		Previous Names (if known)	
Port of registry		Previous flag (if any)	
Type of vessel		Type of fishing methods	
Length (m)		Length type (e.g. <i>LOA</i> , <i>LBP</i> )	
Beam (m)		GT	
Power of main engine(s) (kW)		Hold capacity (cubic metres)	
Record of the equipment on board which may affect fishing power factors, where practical			
Total number of crew (all staff, excluding observers)			
Observer's name			
Observer's organisation			
Date observer embarked (UTC date)		Port of embarkation	
Date observer disembarked (UTC date)		Port of disembarkation	





### Annex 4. Trawl sampling form

Trawl sampling form						sheet .... of .....	
Vessel	Date	N° Haul	GMT start	GMT end	estimated total catch	Latitude	Longitude
					kg		
Species							
cons/disc*							
fork length	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
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	48						
49							
50							
51							
52							
53							
54							
number measured							
weight sample (kg)							
weight catch (kg)							
*) conserved or discarded							

### Annex 5. Biological Data Form

Biological Sampling Form											Stage of sexual maturity			1	Not developed					
vessel		haul nr	observer		Start			End			2	Gonads till half body cavity								
date		species			Time	latitude	longitude	Time	Latitude	Longitude	3	Gonades till 66 % body cavity								
											4	Spawning								
											5	Spent								
											Stomach contents									
Fish number	Weight	Length	Sex M/F	Maturity stage1-5	Fat	Stomach fullness	Identified food composition					bile/ green colour of stomach			scales Yes ? No	finrays Yes / No	number otoliths	K .factor ( W/L <sup>3</sup> )	remarks	
							Sh	Fi	Sq	Sa	Pk	no	greeny	intense						
1																				
2																				
3																				
4																				
5																				
6																				
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	Σ																			
<b>Stomach fullness</b>	A	Empty			<b>Accumulated fat</b>	A	No fat					<b>Identified food composition</b>			Sh	Shrimps				
	B	Half filled				B	Some fat							Fi	Fish					
	C	Filled				C	Fat							Sq	Squids					
	D	Overfilled				D	Plenty of fat							Sa	Salpen					
																Pk	Plankton			

## Annex 5. Biological Data Form (continued)

**Biological data form: Description of units and classification of stages**

<b>Total catch</b>	Catch of the species, recorded in tonnes
<b>Length</b>	Fork length in cm to the nearest cm
<b>Weight</b>	Measured in grams
<b>Sex</b>	Recorded as M (male), F (female) or I (immature)
<b>Maturity</b>	Recorded on a scale of 1 - 5 according to the following criteria. Only for females. 1            Immature    Ovary and testis about 1/3 length body cavity. Ovaries pinkish, translucent. Eggs not visible to the naked eye 2            maturing virgin and recovering spent    Ovary and testis about 1/2 length body cavity. Ovaries pinkish, translucent. Eggs not visible to the naked eye 3            ripening        Ovary and testis about 2/3 length body cavity. Ovaries pinkish yellow with granular appearance. No transparent or translucent eggs visible to the naked eye 4            ripening        Ovary and testis from 2/3 to full length of body cavity. Ovaries orange-pink in colour with conspicuous superficial blood vessels. Large transparent ripe eggs visible 5            spent            Ovary and testis shrunken to about 1/2 length of body cavity. Walls loose. Ovary main contain remnants of disintegrating opaque and ripe eggs, darkened or translucent
<b>Stomach fullness</b>	Recorded on a scale of 1 - 4 according to the following criteria: 1            empty 2            25% filled 3            50% filled 4            full
<b>Stomach contents</b>	Classified in one of the following types: sh            shrimps fi            fish sq            squid ot            others
<b>fat in body cavity</b>	Classified in one of the following types: 1            no fat 2            some fat 3            fat 4            very fat





### Annex 7. Tagged Fish form

Observer name	
Vessel name	
Vessel call sign	
Vessel flag	
Tag collected with all details	
Species	
Tag colour and type	
Tag numbers of all tags	
Signs of missing tags	
Haul number	
Date and Time ( UTC )	
Location of capture	
Animal length / size	
Weight ( if possible )	
Sex F : Female	
M : Male	
I : Indeterminate	
D : Not examined	
Tags found in survey period ( yes / no )	
Reward information	

## Annex 8. Observer's report

### 1. Details Observer

Name observer		
Vessel		
Start mission on board of vessel	Date:	Time:
End mission on board of vessel	Date:	Time

### 2. Narrative

Date	Number of hauls sampled	Remarks about the fishery, weather conditions, special events, number and type of other fishing vessels nearby

### 3. General Observations

#### 3. Working conditions on board

#### 4. Cooperation of captain and crew

#### 5. Suggestions for improving working procedures

#### 6. List of data forms submitted

Type of form	Number of forms completed
Vessel and observer data form	
Catch and effort data form	
Trawl sampling form	
Biological data form	
By-catch registration form	
Tagged fish form	
Number of fish sampled for otoliths	

