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## Executive summary

Today there are only seven species left in the group of marine turtles. Three of these feed in the waters of the Mediterranean and two certainly use the beaches of this basin (particularly the eastern basin) to reproduce. These three species – the *Caretta caretta* loggerhead turtle, the *Chelonia mydas* green turtle and the *Dermochelys coriacea* leatherback turtle, appear on the Red List of the International Union for the Conservation of Nature (IUCN) as endangered species (the first two) and a critically endangered species (the third). The three also appear in Annex II (the list of endangered or threatened species) to the Protocol on Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 1995).

Marine turtles encounter many threats, mainly linked to fishing activity and the loss of vital habitats at sea (feeding and wintering areas) and on land (egg-laying beaches). The impact of incidental catch on the various populations is today one of the most urgent problems that must be solved if all the species around the world are to survive. In the Mediterranean, too, all the species of marine turtle are concerned by fishing activity, in particular *Caretta caretta* and *Chelonia mydas*, which are the most common and the only ones that reproduce in this sea. Different data bears witness to this: a recent study on this threat shows that this factor causes more than 150,000 incidental catches and a high mortality – over 50,000.

Faced by this situation and as part of implementing the Action Plan for the Conservation of Mediterranean Marine Turtles, the present work has the main aim of defining a standard protocol for collecting pertinent information on by-catch of marine turtles in Mediterranean fisheries. This aim is achieved by defining, for the gear most involved, the main parameters that observers on board fishing boats should note. These parameters concern every aspect of fishing activity, i.e. the trip itself, the fishing gear, the various stages of the fishing operation and the catch recorded.

Although the prepared forms mainly concern marine turtles, some other protected or vulnerable species (cetaceans, sea birds, elasmobranchs) have not been forgotten. A form concerning all these species has been crafted, enabling even a preliminary assessment of their interaction with the various gear studied.

The collection of data on fishing is costly from both the financial and the time point of view. It is thus recommended that the observation forms on fishing operations prepared as part of this work should be correctly filled in so that the data gained is of excellent quality and can be used for the anticipated purposes. This would be an enormous help for implementing the Action Plan for the Conservation of Mediterranean Marine Turtles, particularly Item III-2 on priorities for assessing interactions with fisheries and the deaths that ensue.

## Introduction

Today there are only seven species left in the group of marine turtles. Three of these feed in the waters of the Mediterranean and two use the beaches of this basin (particularly the eastern basin) to reproduce. These three turtles belong to two families, the Cheloniidae and the Dermochelyidae.

There is only one turtle left among the Dermochelyidae, the leatherback turtle *Dermochelys coriacea*, which enters the Mediterranean basin through the Gibraltar Strait to feed. Among the Cheloniidae we find the loggerhead turtle *Caretta caretta*, the commonest turtle, which nests mainly on the beaches of Greece, Turkey, Libya and Cyprus, and the green turtle *Chelonia mydas*, which, for reasons of climate, prefers the eastern shores of the Mediterranean (mainly Turkey and Cyprus).

The Mediterranean populations of the two latter species are found mixed up with those of the Atlantic who enter the basin via the Strait of Gibraltar. However, the threats in the Mediterranean affect the populations of the two regions differently.

Today, human activity-linked threats that can be termed indirect and that are increasingly numerous harm the marine turtles at every stage of their life cycle. Among these threats, the most alarming is by-catch. Although there is no fishing that specifically targets marine turtles in the Mediterranean, they are often caught incidentally. *Longlines*, trawls and mesh nets are traps that are often deadly. Caught in nets or by a hook at the end of a *longline* line, or at the bottom of a trawl bag, the turtles are unable to surface to breathe. They drown the more quickly in that the stress they undergo considerably reduces their ability to survive underwater. Reports by stranding networks show clearly that corpses of marine turtles killed by fishing gear are found regularly; this however is but the tip of the iceberg – many beaches are not monitored and the dead bodies washed ashore are not recorded.

A recent study on incidental catch of marine turtles in the Mediterranean (Casale, 2008) asserts that over 150,000 turtles are caught every year (all species, sizes and origins) in the basin (including over 50,000 by surface *longline*, 40,000 by trawls and 30,000 by fixed nets) and that over 50,000 die.

Assessing interactions with fisheries and the deaths that ensue, reducing incidental catch to a minimum and eliminating deliberate massacres are among the priority actions of the Action Plan for the Conservation of Mediterranean Marine Turtles (UNEP MAP RAC/SPA, 2007) and many other conventions and conservation tools.

As a result of the recommendations made by the Transversal Workshop on Selectivity Improvement and Bycatch Reduction (SCMEE/SCSA/SCESS) held in Tunis, Tunisia, on 23-25 September 2009 for data collection on species that are 'at risk' or are of conservation interest (marine turtles, marine mammals, elasmobranchs and sea birds) and the need to craft a common protocol in the Mediterranean based on existing data, the Regional Activity Centre for Specially Protected Areas (RAC/SPA) – aware of this problem in the Mediterranean and its impact on the marine ecosystem and thus on fishing activities – offers this document, one that defines a standard protocol whose aim is to collect pertinent information on by-catch of marine turtles in Mediterranean fisheries. The protocol defines, for each gear, the main parameters to be noted by qualified, well-trained on-board observers to enable the interaction and the ensuing mortality to be assessed.

The fishing gear considered is *longlines*, trawls and mesh nets; these are the most concerned by interaction with turtles and engender most by-catch and thus mortality on a Mediterranean scale and elsewhere. This document provides forms that have to be filled in during work on fishing boats, some of which concern the biological data to be gathered at each turtle capture, enabling the impact of each gear on the marine turtle population in the study region to be assessed.



Although this document mainly considers marine turtles, the forms contain sections that concern other species that are protected or at risk (marine mammals, sea birds, sharks, fishes) and this enables their interactions with the gear studied to be assessed.

The forms that concern fishing trips are the same for all the gear considered. Thus, the 'Fishing trip' form and its description will only be dealt with in the first chapter as far as it concerns *longlines*; it is the same for the other gear.

## **I. Need for a standardised protocol for data collection and assessment of by-catch**

World fishing production of sea catch reached an average of 84 million tonnes between 1993 and 2003, 8% of which was incidental catch, or by-catch (FAO, 2004). Although the amounts of sea fish fished and then thrown back dropped by several million tonnes, due to the improvements made in several fields (selectivity of fishing gear and improved fishing practices, fisheries management that restricted access to certain stocks, anti-throw back policies implemented in some countries, etc.), and although the incidental catch of marine turtles, marine mammals and sea birds only represents a tiny part of the biomass fished, it has been shown that this catch has a negative impact on the populations of these threatened animals (Rojas-Bracho, 1999; Spotila *et al.*, 2000). Although fishing is not the only danger confronting these animals, studying it with a view to regulating it to reduce incidental catch and mortality could have a positive effect.

Several workshops held in many places focusing mainly on the reduction of incidental catch of marine turtles, marine mammals and sea birds have argued the need to collect data via standardised protocols used by observers on fishing boats, especially *palangriers* (FAO 1998/1999a/1999b; FAO and Birdlife International, 2004). However, the reports from these workshops lack sufficient detail on what the norms and best practices should be. It should also be noted that other protocols are sufficiently exhaustive and set a very good example to follow (e.g. NOAA Fisheries Pacific Islands Region Longline Observer Data System).

In this report we are trying to present the necessary parameters to be collected to be able to assess by-catch as exhaustively as possible without the data collection losing its simplicity.

This collection will be done by well trained observers who work on board fishing boats.

## **II. What is an on-board observer?**

An observer on board a fishing boat is a technician (preferably a biologist by training) who works independently at gathering biological information on board fishing boats. This information is used for scientific or regulating and management ends. The observers are recruited by private or public bodies for a limited period.

Observers of fishing operations gather precious information that can be obtained in no other way. They provide a good part of the information needed to better understand and better manage fishing, and make sure the regulations are respected. This data collection is costly, in terms of both money and time required. It is thus important that the fishing operation observation forms should be correctly filled in so that the data gathered is of excellent quality and can be used for the anticipated purposes (Brogan *et al.*, 2009).

Working conditions are hazardous, sometimes dangerous, and sea conditions can be harsh. And

yet this work can also be adventurous. Once the observer is on the fishing boat, s/he enters a work environment that is also a home. It is a place where the members of the crew have already established a system of communication and responsibility. Sleep and feeding habits will thus be disturbed. The ability of the observer to face up to the situation in which he finds himself demonstrates his flexibility and resilience. The environment can thus be solitary, irritating, intrusive and hostile but it can also be agreeable; a good working relationship with the crew on board the ship ensures a good trip.

### Aims

To shoulder their responsibilities, the following aims are established for observers on board fishing ships:

- Obtain reliable information on the interaction of marine turtles with fishing gear
- Obtain information on the fishing effort
- Record the interaction with other 'at risk' species (mammals and sea birds)
- Gather information on target species and throw-back species
- Gather biological information on the species studied (size, sex, etc.)
- Take biological samples.

Once on board, observers must also gather information of a general kind, needed for correct interpretation of the results. This information concerns:

- Features of the ship and fishing gear
- Specific composition of the catch
- Gather data on the boat's activity and the fishing operations
- Identify protected species, target species and species deemed to be by-catch
- Record the number and position of the various species (protected, target or by-catch) caught during the fishing operations or observed during the trip
- Gather biological data (size, sex, sex ratio etc.) on the protected species and captured species.

### **III. Data collection**

The information requested will be recorded on forms that have been prepared beforehand. If the information requested on the data collection form is not available or is irrelevant, the box should be left empty and the situation should be described in the 'Comments' box. Make sure that any additional information that might be interesting is recorded. The writing must be legible and the information and events must be immediately recorded, not committed to memory.

Marine turtles and protected species generally have priority in data collection. Never let secondary information interfere with the priority information. During the data collection or the sampling of protected species, if the observer is unable to take down data on fishes or other species of secondary priority, just make a simple note. However, the observer must always watch what is happening during the rest of the fishing operation so that he does not miss protected species.

The data collection mainly concerns:

- All incidental catch and interactions with protected species. Marine turtles have highest priority. Marine mammals, sea birds and elasmobranchs come second
- Composition of catch
- Fishing grounds and features of the fishing gear
- Measurements of fishes and other species of zoological groups
- All the tags applied, observed or samples taken on the captured animals.

Concerning the taking of samples, the observer may take small portions of the skin or other organs according to need for laboratory studies or keep the whole animal. For other species, it would be better to consult specific protocols.

#### IV. Necessary parameters for assessing interaction with fishery activity

##### Average rate of catch of marine turtles

The average rate of catch of marine turtles is  $R$ .

$R$  is estimated as follows:  $R = T$   
---

$FE$

- $T$  is the number of turtles caught during the operations studied
- $FE$  is the fishing effort during the operations studied

It should be noted that the fishing effort and thus the rate of catch may vary from one region to the next and one season to another. No extrapolation is therefore allowed.

Particular attention must be paid to any difference between gear classified under the same heading. Bottom *longlines* and pelagic *longlines*, and benthic trawls and pelagic trawls, are gear that use different techniques and must therefore be handled separately.

##### Total number of turtles caught

The total number of catches  $C$  is obtained by multiplying the rate of catch  $R$  by the total fishing effort  $H$  in a studied region.

$$C = H \times R$$

Getting a reliable estimate of the fishing effort in a region is extremely difficult. It can only happen if the fishermen accept: (i) to voluntarily record on their log books any catch of a marine turtle and to mention the fishing effort made, or (ii) to agree to observers on board their ships for each sea trip. Now these two conditions are very difficult to achieve for problems of liabilities, insurance...etc.

The best solution for this calculation in the total absence of reliable data would be to use data available in fisheries administrations, such as number of trips for the entire fleet using a given gear and operating in a given area. It should also be noted that the **total catch** parameter does not automatically correspond to the number of individuals caught. A turtle may be caught on several occasions if it is released alive each time.

##### Mortality

Halieutic mortality caused by *longlines* is mainly due to the forced apnoea to which the captured specimens are subjected. There are naturally fewer deaths with surface *longlines*, for example, since the animal is still able to swim and reach the surface to breathe, although it is hampered by the hook, unlike the bottom *longline* where the weights attached to the main line often prevent this and the animal ends up drowned (Jribi *et al.*, 2008).

The rate of direct mortality  $p$  is the proportion of turtles found dead during fishing operations when the catch is brought on deck. This proportion is estimated from the number of the total catch.

Total mortality is estimated as follows:  $TM = C \times p = H \times R \times p$

Specimens can be found alive, dead (direct mortality) or comatose. In the last case, if by ignorance the marine turtles are not recognised as being comatose and are considered as dead, and thrown back into the sea, they will die. Without handling procedures to bring the turtles out of it, the state of coma is deemed to be potential death (Laurent *et al.*, 2001).

Furthermore, it really is impossible to follow a freed turtle or anticipate what will happen to it. As fishermen usually: (i) cut the line in various ways, leaving pieces of differing lengths, and/or (ii) let specimens go without a true knowledge of their state of health, it is very difficult to check the idea that a specimen freed with a hook and part of a line within its body, or in a bad physical state, is able to survive. Anyway, the mortality caused by the various fishing gear is still far from being assessed with certainty. The study done by Casale *et al.* (2007) in the care centre shows that mortality caused by *longlines*, for example, is high (much more than 30%) and may happen in the short or long term.

## V. Longlines

Use of *longlines* is deemed to be one of the oldest fishing techniques (it seems to have been known since 177 BC in Sicily (Camiñas and de la Serna, 1995)). It is based on the very old way of fishing using hooks and bait.

A *longline* usually consists of a main line (mother line) on which a series of baited hooks is fixed with secondary lines (*avançons*) distributed at regular intervals along it, sufficiently far apart to prevent them getting tangled up when the lines are drawn in.

This technique, which can be adapted to different boats, including sailing boats or row boats for coastal fishing, does not require particularly expensive equipment. Upkeep merely involves replacing the damaged or lost hooks and renewing material lost when fishing.

According to the species sought, the *longline* may be fixed at various depths: bottom *longline* (Fig. 1) or near bottom (demersal) *longline*, and open sea (pelagic) *longline* (Fig. 2). Its total length can vary from a few dozen metres to several kilometres and the number of hooks may be several thousand. Basically the differences concern the size of the hook, the length of the main line and, thus, the number of hooks, and the time the line is set and drawn up. Usually the floating *longline* is longer and its hooks are bigger.

The bait set on the hook is chosen according to the target species and also according to its availability, resistance and cost.

During a fishing trip, there can be one or several fishing operations. A fishing operation starts with the dropping of the line and ends when it is drawn in.

The bottom *longlines* used in the Mediterranean are usually small, bearing about 1,500-2,000 hooks almost always baited with sardines (Sacchi, 2007). The target species are bottom fishes like grouper, dentex and gilthead sea bream. For surface *longlines*, 3 main kinds are used: the swordfish *longline* (*Xiphias gladius*), the longfin tuna *longline* (*Thunnus alalunga*), and the tuna *longline*. A feature is sequences of small numbers of very long *avançons* with buoys between them to keep them on the surface. The three types of *longline* are very long (50 to 100 km.) but differ as to the size and depth of immersion of their hooks. The bait used is usually either sardine (longfin tuna), mackerel or squid (swordfish, red tuna) (Sacchi, 2007). Over-fishing of the swordfish stock, markedly reducing the probability of catch and the average size of specimens caught, has led fishermen to other species of fish. This is so in the south of Tunisia where the shark *Carcharhinus plumbeus* is a target species for this fishing gear (Echwikhi *et al.*, 2010).

In most cases *longline* catch arrives on deck alive and is treated suitably (evisceration and conservation in ice); it appears on the market as a high quality product, superior to that from other fishing techniques.

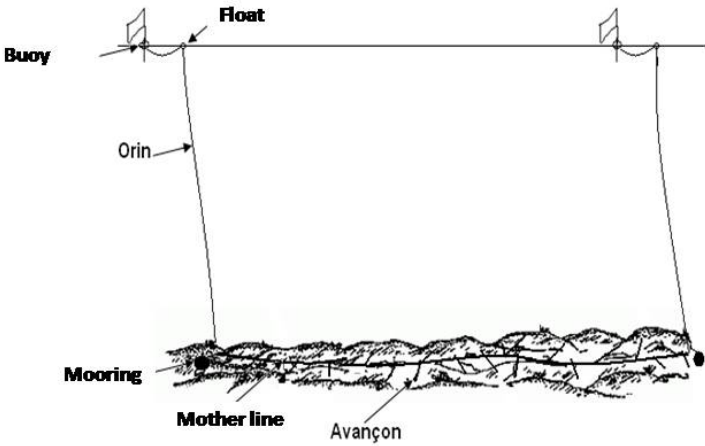


Figure 1 : Bottom *palangre*

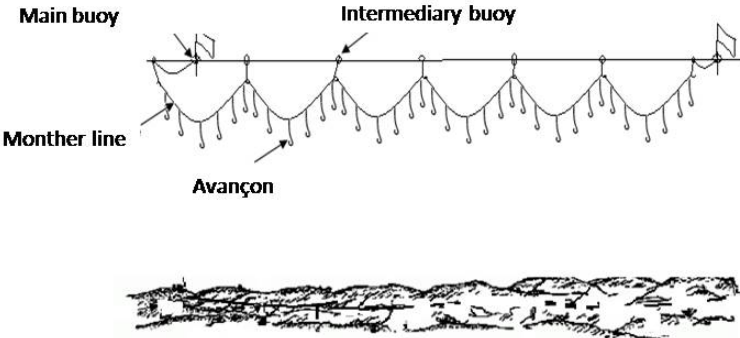


Figure 2 : Surface *Palangre*

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## V.1 Impact on the environment and threatened species

Except for the risks of dredging by the mooring weights or of the hooks catching on the bottom, use of *longlines* presents no risk of degrading the substratum or even fixed flora or fauna. But there are great risks to elasmobranchs, sea birds, marine mammals and marine turtles. The blue shark (*Prionace glauca*) is the species most often caught by Mediterranean *longline* fisheries (De Metro *et al.*, 2000; Orsi Relini *et al.*, 1998; Raymakers and Lynham, 1999). In the south of Tunisia, the grey shark (*Carcharhinus plumbeus*) is the main species targeted by surface *longlines* now that the swordfish (*Xiphias gladius*) has become scarce. The weaver shark (*Carcharhinus brevipinna*) is also fished in large quantities (Echwikhi *et al.*, 2010).

*Longline* fishing seems to be the main cause of deaths of sea birds, especially when the gear is fixed near areas where sea birds concentrate, like nesting areas. Most incidental catch happens when the *longlines* pay out their lines, for the birds try to seize the bait on the hooks. Once the hook is swallowed, or sometimes when the bird gets entangled in the lines, it is pulled under the water and drowned (Valeiras and Camiñas, 2003).

Marine mammals are also caught incidentally by *longlines*, either when entangled in the lines or when trying to swallow the bait or the fishes that have already been caught: depredation.

Among the three species of marine turtles in the Mediterranean, it appears that only *Caretta caretta* is regularly caught by *longlines* (Gerosa and Casale, 1999). The green turtle is a herbivorous species that frequents different areas than the *longline's* target areas. The leatherback turtle is rarely caught and only represented 0.1% of the turtles caught in many fishing drives in Spain, Italy and Greece (Laurent *et al.*, 2001).

Recent studies done in the Mediterranean show catch rates of the order of 0.69 to 1.41 turtles/1,000 hooks in Spain (Camiñas *et al.*, 2006), 0.27 turtles/1,000 hooks in the Ionian Sea (Italy) (De Florio *et al.*, 2005), 0.97 turtles/1,000 hooks around the Island of Lampedusa in Italy (Casale *et al.*, 2007), and about 0.82 in the Gulf of Gabès region in Tunisia (Jribi *et al.*, 2008). Total catch of *Caretta caretta* by surface *longlines* is, according to Casale (2008), about 50,000, with deaths of over 20,000 specimens, essentially in Spain, Morocco, Italy, Greece, Malta, Libya and other possible countries.

Benthic *longlines* are much less studied than surface *longlines*; a study done in Italy shows a catch rate of the order of 0.87 turtles/1,000 hooks (Casale *et al.*, 2007), whereas in the Gulf of Gabès in Tunisia the rate is about 0.28 turtles/1,000 hooks (Jribi *et al.*, 2008). This gear also gives rise to a fairly sizeable catch of over 35,000, with about 14,000 deaths, essentially in Tunisia, Libya, Greece, Turkey, Italy, Egypt, Morocco and other possible countries (Casale, 2008). Bottom *longlines* are harmful in that turtles remain attached to the hooks near the bed for longer, in general, than their apnoea capacities. The danger also depends to a great extent on the depth at which the gear is placed. Its use at great depths should not pose any problem. However, in the Mediterranean, this method is usually carried on in shallow depths and is thus harmful to the Mediterranean population of loggerhead *Caretta caretta* turtles in particular.

## V.2 Forms

### V.2.1 Fishing trip

This form is filled in once only for each fishing trip. It is used to record the features of each trip (name and characteristics of the ship, licence number, name of operator, etc.). When it is

separated from the observer's other sheets it becomes very difficult to associate it with the appropriate ship, so care must be taken not to separate the sheets.

The main information to record is:

- Observer identifier: This is given to each observer during training or when s/he is first recruited. It is written in the top left-hand corner of the form
- Type of trip: Two types of gear will be used during a trip to practice benthic or pelagic fishing (Surface). Use the letter **S** for surface or fairly shallow fishing and the letter **B** for benthic fishing. If several kinds of gear are used, this must be noted in the additional information box. The type of trip is written in the upper left-hand corner of the sheet
- Trip number: In the upper right-hand corner of the sheet, write the gear used (SP=surface *longline*; BP=bottom *longline*; BT=benthic trawl; PT=pelagic trawl; and MN=mesh net) followed by the number of the trip in 4 figures
- Ship identifier: This means the number of the ship written on both sides of the prow and the sides of the wheel-house, the name of the boat as it appears on the stem, the length that can be obtained via the ship's papers or directly from the captain, and lastly the name of the ship's real owner
- Start of trip:
  - Date/time of departure: The date and the exact time of departure are recorded the moment the ship casts off from the quay using the Day Month Year form (DD MM YYYY) (e.g. the 9<sup>th</sup> July 2010 is recorded as 09 07 2010). Local time is used and the clock is a 24-hour one with two figures for the hour and two figures for the minutes (e.g. 5 minutes past 6 is 0605; 4.27 p.m. is 1627).
  - Port of registry: Indicate the name of the town from which the ship sets out.
  - Port of call: From time to time the ship visits ports for reasons other than landing catch. In this case the appropriate boxes must be filled in. Sometimes the ship leaves the quay to moor in another part of the port to take on ice, bait or other supplies. These stops must not be seen as ports of call or intermediary ports. The number of call stops is written on the sheet starting with the number 1.
- End of trip:
  - Date/time of arrival: The date and exact time of arrival are recorded the moment the ropes are attached to the quay at the end of the fishing trip. The data is written down in the same way as for the departure
  - Port of arrival: The port of arrival is where the ship lands its catch. This port is not automatically the port of departure.
- Comments: This section is used for any explanation concerning details of the halts in ports of call or any other information that does not appear in the data boxes. This section should also be used to record all the specimens that are not recorded on the catch form. This could mean, for example, a sea bird that dies on deck after smashing into the ship but was not brought in by fishing gear.

Use the other side of the sheet if the appropriate box is not big enough.



**RAC/SPA  
by-catch Protocol  
Fishing Trip Form**

**Observer identifier**

**Trip number**

**Type of trip**

**Features of trip**

Number of ship

Name of ship

Length of ship

Name of owner

**Time of trip and ports of call**

**Departure of the trip**

Departure : Date/time

Day

Month

Year

Hour

Minute

Port of departure

**Stop**

**Departure**

N°

Day

Month

Year

Hour

Minute

Day

Month

Year

Hour

Minute

Port of call

**End of trip**

End : Date/Time

Day

Month

Year

Hour

Minute

Port of registry

Comments and additional information

.....  
.....  
.....

A large rectangular area with rounded corners, containing 25 horizontal dotted lines for writing. The lines are evenly spaced and extend across the width of the page, providing a template for text entry.

### V.2.2 *Longline*/Dropping and drawing up the gear

All the information on the form is used to describe and record the basic elements of the *longline's* dropping of gear. This information is gained by direct observation and mainly concerns:

- General information about the observer, the trip (number of trip) and anchorage (numbered for each trip starting from 01)
- Information about dropping the gear: This is information taken at the beginning and end of the dropping of the gear:
  - Date (DD MM YYYY) and exact time (24-hur clock) of the setting of the first mooring and at the end of the setting of the last mooring
  - Location: The ship's position (latitude and longitude) is taken using the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Meteorological conditions: mainly concerning the state of the sea (follow the key on the sheet) and the direction and force of the wind (follow the key on the sheet)
  - Surface temperature of the water taken using a ship's thermometer (if it has one) and using a portable thermometer
- Information about **drawing in the lines**: This is information taken at the beginning and end of the drawing in of the lines:
  - Date (DD MM YYYY) and exact time (24-hour clock) of the beginning and the end of drawing in the *longline's* gear
  - Location: The ship's position (latitude and longitude) is taken using the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Meteorological conditions: mainly concerning the state of the sea (follow the key on the sheet) and the direction and force of the wind (follow the key on the sheet)
  - Surface temperature of the water taken using a ship's thermometer (if it has one) and using a portable thermometer
- Other events: During the fishing operation, certain accidental events can happen and can affect catch of target species and interaction with protected species.
  - The starting tip for raising the lines: The drawing in usually starts by the tip last set, but this is not always so. Drawing in can sometimes start from the other end of the line, or even from some other point
  - Loss of part of the line: State whether the main line was accidentally cut during the drawing in or whether the crew cut the main line at the level of a bad section or a tangle
  - Interaction with protected species: State on the form whether there was interaction with a protected species, even if this was an attempted approach to the gear during the setting of the gear. Details will be written on the forms about the interaction with the protected species
- Comments: This section is used to report unusual or important events that have an effect on the fishing strategy, or caused problems. It is used to describe any event or particularity that has no place or is not recorded on the form. It can also be used to explain why information was not gathered.

**RAC/SPA**  
**By-catch Protocol**  
**Mesh net/Fishing operation Form**

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Observer identifier

--	--	--	--	--	--

Trip number

--	--

Drop number

**Information Dropping/Drawing in gear**

**Beginning of drop**

Date/time Day Month Year Hour Minute  
 Deg Min  
 Latitude Deg Min N  
 Deg Min  
 Longitude Deg Min E  
 State of sea Wind/direction Wind/force  
 Surface temperature °C

**End of drop**

Date/time Day Month Year Hour Minute  
 Deg Min  
 Latitude Deg Min N  
 Deg Min  
 Longitude Deg Min E  
 State of sea Wind/direction Wind/force  
 Surface temperature °C

**Beginning of drawing in**

Date/time Day Month Year Hour Minute  
 Deg Min  
 Latitude Deg Min N  
 Deg Min  
 Longitude Deg Min E  
 State of sea Wind/direction Wind/force  
 Surface temperature °C

**End of drawing in**

Date/time Day Month Year Hour Minute  
 Deg Min  
 Latitude Deg Min N  
 Deg Min  
 Longitude Deg Min E  
 State of sea Wind/direction Wind/force  
 Surface temperature °C

**State of sea**

- 01 Calm
- 02 Rippled
- 03 Choppy
- 04 Rough
- 05 Very rough

**Wind direction**

- 01 North
- 02 North/east
- 03 South/east
- 04 East
- 05 South
- 06 South/west
- 07 West
- 08 North/West

**Wind force**

- 01 Calm
- 02 Light breeze
- 03 Breezy
- 04 Fresh breeze
- 05 Moderate

**Drawing in from**

- Start end
- End end
- Other

**Net damaged** No  Yes

- Interaction with protected species**
- No  During gear drop
  - Yes  During drawing in of gear
  - At rest



### V.2.3 *Longline*/Features of the gear

The data in this form describes the features of the different parts of the fishing gear. It can be used *inter alia* to study the effect on catch of protected species and target species. The form must be filled in before the start of the fishing operation via direct observations or measurements taken by the observer himself. He must from time to time consult the captain or crew for further details. A form must be filled in for each fishing day, even if nothing has changed.

- General information about the observer, the trip (trip number) and fishing operation
- Hooks/floats/weights: This information mainly concerns:
  - The number of floats: This is the number of main (attached to the tips of the line) or intermediary floats or buoys that enable the boat to localise the line and alert other fishing units to the presence of the *longline*. State whether luminous devices are used for this purpose (state number and colour)
  - Number of weights: This is the number of weights used to fix the mother line on the sea bed for the benthic *longline*. The nature of the weights may also be recorded
  - Hooks: This means the number of hooks used (J hooks, circular hooks, tuna hooks etc.), their size, the number between two consecutive floats, number between two weights and number for each dropping of the gear. It is better to count the number of hooks before the start of each fishing operation
- Mother line, *avançons* and *orins*: In this part, state the material used, and the lengths and diameters of the various lines used in the *longline*'s makeup
- Fishing technique: In this part of the form, state the depth at which the captain intends to carry out the fishing operation, the target species and the bait used. Say whether many kinds of bait are used
- Comments: This section is used to record every detail or specificity of the gear that has not been noted on the form.



#### V.2.4 Longline/Catch

The form concerns all the target and protected species caught during the fishing operation. It also concerns their condition, location and certain metrical features. The data recorded basically helps when calculating the catch rate for target species and protected species. The data will be of very great use for determining the efficacy of certain methods (e.g. circular hooks) on catch of target species and protected species.

The observer must record all the specimens of fishes and protected species caught. Each specimen is recorded on a separate line. At the end of the line it must be shown whether there is a marking applied and if a photo has been taken. Any catch of a strange or uncommon species must be written under 'Comments'.

The observer must not take measurements in dangerous conditions (very active dangerous animal, bad weather, etc.).

The main data to be recorded is:

- General information about the observer, the trip (trip number), the fishing operation, page number and date
- Name of species: State the common and scientific name of the species. It would be better to have a guide of fishes on hand for this task. It is always better to take photos and attribute their number to each specimen
- Float or mooring number: The floats (especially surface *longline*) and weights (bottom *longline*) are counted consecutively starting from the number 01
- Hook number: The hooks are counted consecutively between the floats or weights. If, for example, a specimen has been caught three hooks after the drawing in of float 05, write float 05 and hook 03
- Animal's physical condition: State the physical condition of the animal when caught.
  - Fish: **A**=Taken **Alive**; **D**=Taken **Dead**; **ID**=Indeterminate state
  - Protected species: **A**=Taken **Alive**; **D**=Taken **Dead**; **C**=**Comatose**; **W**=**Wounded**; **ID**=Indeterminate state
- Animal kept/rejected: State whether the caught animal was kept or thrown back into the water and the condition when it was thrown back.
  - Kept: **K**
  - Rejected: **RA**= Rejected **Alive**; **RD**=Rejected **Dead**; **RW**=Rejected **Wounded**; **RC**=Rejected **Comatose**; **RR**=Rejected after **Rehabilitation**; **RID**=Rejected in Indeterminate state
- Sex: Where possible, state the animal's sex. If its sex is not determined with precision, leave the box empty (**M**=**Male**; **F**=**Female**; **ID**=Indeterminate)
- Measurement: Where possible, take measurements of fishes (**TL**=**Total Length** and **LF**=**Length at Fork**). Do not take measurements of dangerous fishes that are still alive (e.g. sharks). For turtles, simply state whether measurements have been taken. A special form for marine turtles will be filled in. It is possible for certain specimens, which have not been landed on deck, to state approximate measurements



- Tagging: State (X) for protected species, if the captured animal is tagged or if a tag has been applied (this mainly concerns marine turtles)
- Sample: State (X) if a biological sample has been taken (a piece of tissue or the whole animal)
- Photo: State (X) if a photo has been taken of the animal
- Comments: State (X) if there are comments describing the animal. This section will be used for any explanation or any detail concerning the animal in question.



### V.2.5 *Longline*/Interaction with threatened species

This form allows data concerning the nature and number of protected species (marine turtles, marine mammals and sea birds) linked to *longline* fishing operations to be recorded. However, in this form, there can be a description of these animals when they were observed without their having been direct contact with the fishing gear.

During a fishing operation, several contacts (observation or capture) with threatened species may take place. Each contact is recorded on a separate line and a form contains as many lines as there were contacts.

- General information's about the observer, the trip (trip number), and the fishing operation
- Page number: During a fishing operation, if many contacts with threatened species took place, several pages will be filled in. Each page will be numbered
- Number and nature of the contact: Each contact (observation or capture of the animal) is recorded on a separate line. If there are not enough lines on the page for a fishing operation, continue on another form without starting again from 01. For example, if the first form has contacts from 01 to 10, page 02 starts with contact 11
- Date/time: The date and the exact time are recorded at the moment of each contact
- Activity of the ship: Record the activity of the ship at the moment of contact. This contact may take place when sailing towards or leaving the fishing grounds, when the lines are being dropped or drawn in...(follow the key on the form)
- Location: The location (latitude and longitude) is taken using on-board GPS at the moment of contact. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
- State of the sea: Fill in from the key on the form
- Species: The key of species is recorded from the list on the form. The list concerns the most common species in the Mediterranean
- Animal's behaviour: The animal's behaviour is recorded from the key on the form. The animal may enter into direct contact with the gear and may or may not be caught, moving around or pursuing prey (fishes or other), pursuing the ship, resting on the surface of the water, feeding on gear catch, etc.
- Animal's physical condition: This criteria indicates the condition in which the animal was observed or caught. The animal can be dead or alive, wounded, decomposing...(follow the key on the form)
- Number of animals: This criterion basically concerns observed animals. An approximate estimate of the number will be important if the exact number is difficult to determine
- Photo: State whether a photo has been taken of the animal
- Comments: This section is used to describe any event or particularity that has no place or is not recorded on the form. It can also be used to give further information or to explain why certain information was not gathered.



### V.2.6 *Longline* Catch of marine turtles

This form must be filled in every time a marine turtle is caught. Even if the turtle was not brought on deck, as much data as possible must be given. Data collection also concerns turtles that were strangled or tangled in the lines. For turtles not brought on deck, the general information (heading of the form) and data concerning the catch and the release must be recorded.

The main data to be recorded is:

- General information about the observer, the trip (trip number), and the fishing operation
- Name of species: State the scientific name of the species of marine turtle. If this is another species that is not common in the Mediterranean, put 'Other' and take a photo
- Other information: State (X) if a photo has been taken, a sketch made, a sample taken or a tag applied to or removed from the animal
- Corresponding page and line on the catch form: State the page number and line number on the catch form corresponding to the turtle in question
- Catch: State the data concerning the capture of the turtle.
  - Date/time: The date and time of the capture are recorded using the Day Month Year (DD MM YYYY) format and the 24-hour clock
  - Location: The latitude and longitude of the point of capture are taken using the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Tagging: State whether the turtle bears a tag at the moment of capture
- Release: State the data concerning the release of the turtle
  - Date/time: The date and time of the capture are recorded using the Day Month Year (DD MM YYYY) format and the 24-hour clock
  - Location: The latitude and longitude of the point of release are taken using the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Tagging: State whether a tag was applied to or removed from the turtle at the moment of release
  - Physical condition: State (from the key on the form) the animal's physical condition when it was released
- Method of catch:
  - Caught by hook or strangulation: state how the animal was caught
  - Place of the hook or the strangling: state the position of the hook or line on the turtle causing its capture
  - Removal from the gear: State in the best way possible how the animal was removed from the gear and whether part of the gear (hook or line) remained attached to the animal

- Morphology:
  - Cover of the carapace: State whether the carapace was covered by skin or plates
  - Plates of the carapace: If it is covered by plates, state the number of vertebral, right and left costal, right and left marginal and right and left infra-marginal plates (consult the sketch for the names of the various plates)
- Measurement: The curve measurements are the simplest and most often used by herpetologists. They will be taken using a tape measure. Remove all the epibionta that have adhered to the carapace and that can affect the measurements. The main measurements to take are:
  - The standard curved carapace length (SCCL): This is the distance between the nuchal and the most distal of the two last marginal.

SCCL

- The curved carapace width (CCW): This is the curved measurement of the widest part of the carapace

CCW

- Tail length (TL): This is the distance between the posterior tip of the plastron and the point of the tail

- Signal buoy: State in this section of the form the nature of the signal buoys used (the same as on the fishing gear form), their colour and distance (in number of *avançons*) between the captured turtle and the closest buoy
- Comments: This section is used to state certain details that do not appear on the form. This mainly concerns how the turtle was brought on deck (if it was), removal of the fishing gear, rehabilitation of the animal if it was comatose, etc.

**RAC/SPA**  
**By-catch Protocol**  
**Longline /Marine Turtle Form**

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Observer identifier

--	--	--	--	--	--

Trip number

Drop number 

--	--

Catch / marine turtle

Species 

--	--

01	Loggerhead turtle <i>Caretta caretta</i>
02	Green turtle <i>Chelonia mydas</i>
03	Leatherback turtle <i>Dermochelys coriacea</i>
04	Other

Photos	<input type="checkbox"/>
Sample	<input type="checkbox"/>
Sketch	<input type="checkbox"/>
Tag	<input type="checkbox"/>

Page number/Catch form	<table border="1" style="width: 30px; height: 20px;"><tr><td style="width: 15px; height: 10px;"></td><td style="width: 15px; height: 10px;"></td></tr></table>		
Line number/Catch form	<table border="1" style="width: 30px; height: 20px;"><tr><td style="width: 15px; height: 10px;"></td><td style="width: 15px; height: 10px;"></td></tr></table>		

**Capture**

Date/time    Day    Month    Year    Hour    Minute

Latitude    















 N

Longitude    















 E

Presence of tag 

--	--

01 yes  
02 no

**Release**

Date/time    Day    Month    Year    Hour    Minute

Latitude    















 N

Longitude    















 E

**Tag**

Applied

Removed

**Physical Condition**

--	--

01 Already dead  
02 Good condition  
03 Wounded  
04 Died on deck  
05 Comatose  
06 Indeterminate

**Method of catch**

By hook     Hook visible 

--	--

--	--

 01 yes

By strangling

Position of hook

Position of strangling

Gear remove 







 01 yes  
02 no

Gear still attached to the animal

01 Swallowed    02 Head/neck  
03 Beak    04 Forefoot  
05 Hindfoot    06 Carapace  
07 Tail    08 Other

01 Gear removed  
02 Hook  
03 Line  
04 Hook and line

**Commentaire :**

.....

.....

.....

**Morphology**

Carapace cover 







 01 Skin  
02 Plates

**Number of plates**

Vertebral plates

Right costal plates

Left costal plates

Right marginal plates

Left marginal plates

Right infra-marginal plates

Left infra-marginal plates

**Measurements**

(State carapace measurements to within about 0.5 cm)

**SCCL**(Standard Curve Carapace Length)

**CCW** (Curved Carapace Width)

**TL** (Tail length)

**Catch/Signal buoys**

Type

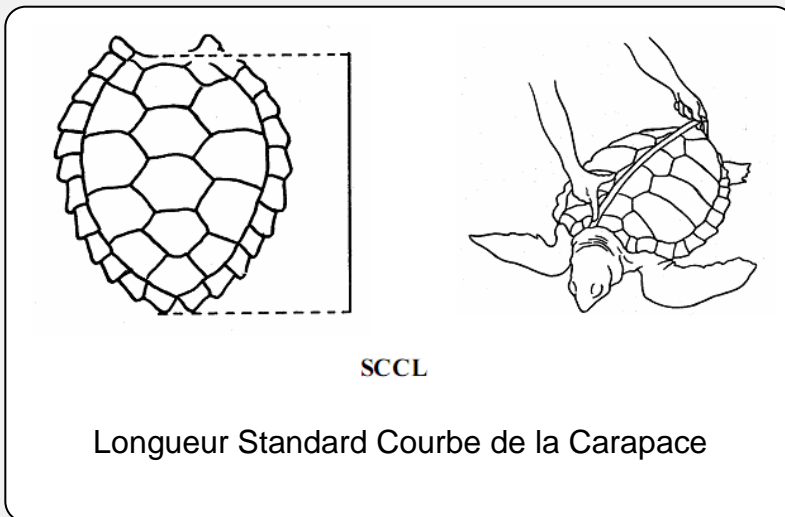
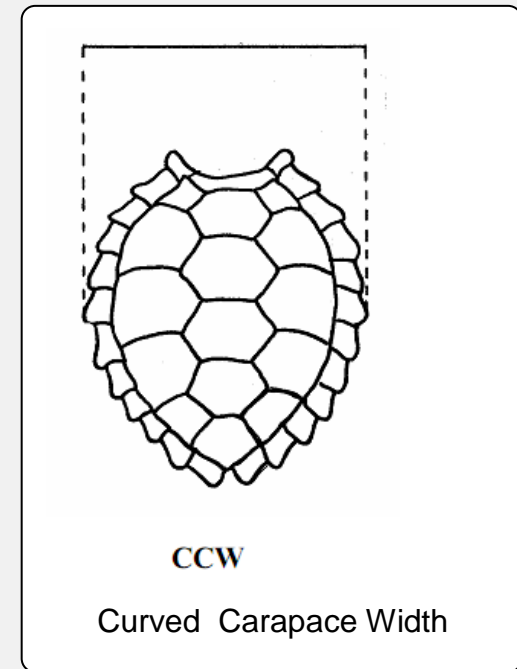
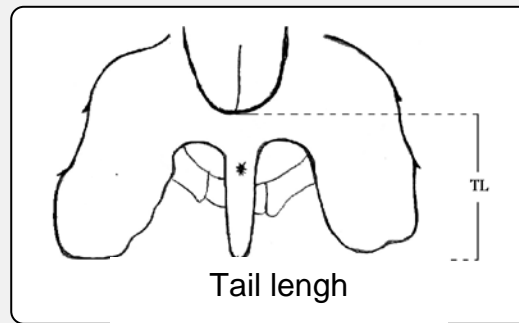
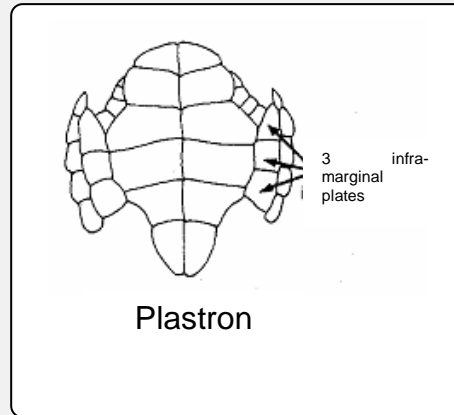
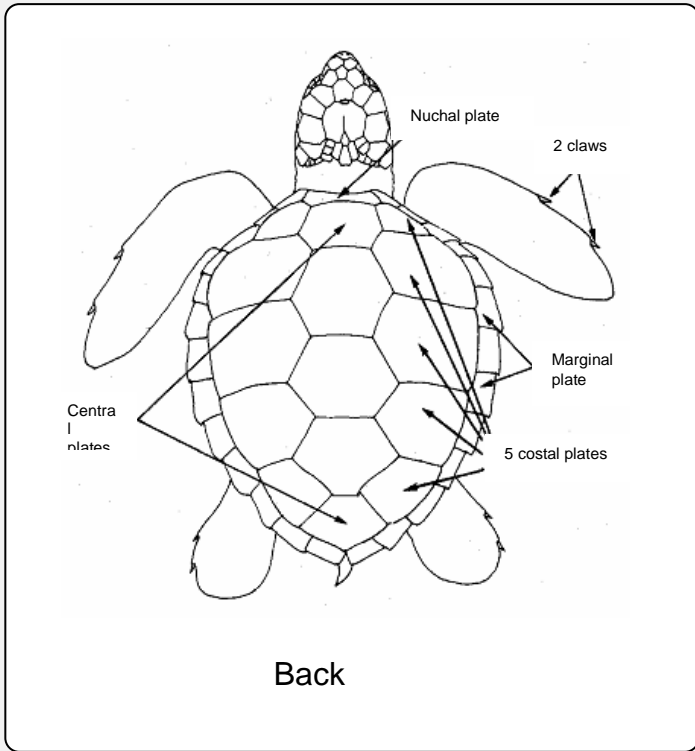
01 Flag  
02 Luminous

Colour

Distance buoy/turtle caught

(State number of avançons)

01 White  
02 Black  
03 Green  
04 Red  
05 Blue  
06 Yellow  
07 Other



**Comments**

.....

.....

.....

.....

.....

.....

.....



## VI. Trawls

A trawl is a dragged net of approximately conical shape, whose small base is closed by a 'dead end' pocket while the biggest hole is kept open by a pole or panels set at the lateral tips. The net is trawled by one or many ships. This is an 'active' way of fishing in that it catches every animal on its path, conveying them into a terminal bag.

According to the trawled area and the target species, the kinds of trawl (and there are many) can be put into two big categories according to whether or not they come into contact with the sea bed: benthic trawls (Fig. 3) and pelagic trawls (Fig. 4).

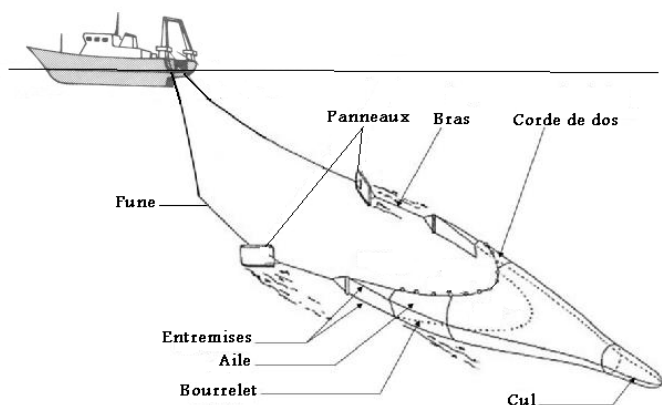


Figure 3: Chalut benthique

According to the mode of operation, in the Mediterranean there are three major families of trawl (Sacchi, 2007): (1) trawls with a small vertical opening (most of the Mediterranean bottom trawls belong to this type), less than 2 metres, adapted to catching animals that live very close to, or slightly detached from, the sea bed, such as shrimps and flatfish; (2) trawls with big vertical openings of 20-25 metres especially used for catching small pelagics or demersal species. These trawls can be used either with pelagic panels or dragged by two boats in tandem; (3) fixed frame trawls whose vertical and horizontal openings are fixed by a fixed or 'pole' frame in wood or metal.

When fishing with a panel trawl, the trawl is linked to the panels by a pair of flanges (in rope or steel cable), and the **gates** of the trawl are linked to the ship by a pair of *funes* (usually in steel cable). The opening is kept wide open by divergent panels (trawl gates) in front of the trawl that keep the trawl open at the sides, while the vertical opening is maintained by weights on the lower part (*bourrelet*) and floats on the upper part (back rope).

### VI.1. Impact on the environment and threatened species

Trawls (especially benthic ones) that scrape or eat into the sea bed have the greatest impact on the environment as regards destruction of the habitat and changes in sediment structure and selectivity of catch. The limited selectivity of trawls is a major problem. In most fisheries this gear simultaneously catches many species of different shapes and sizes and thus gives rise to pretty

sizeable throw back.

Habitats located in the trawled area, and composition of fixed flora and fauna, are all but irreversibly spoiled according to the frequency of the fishing. The impact is, however, variable according to the sectors fished: it is, for example, great in hard beds dominated by big sessile fauna, with a significant reduction in abundance of sponges, anthozoa and corals, but is fairly low in silty beds.

Although the populations of marine mammals and sea birds seem to be little affected in the Mediterranean by trawling, catches of chondrichthyans and marine turtles are recorded to be fairly sizeable.

In the Mediterranean, there is strictly speaking no chondrichthyan-targeted fishery. But the sustained growth of this type of fishing effort has helped bring about a gradual decline of certain species in the continental shelf and slope, particularly because of the deterioration of their habitats (Sacchi, 2007). Some endangered or vulnerable species are often among those thrown back into the sea.

As for sea birds, trawling does not cause direct mortality but can make certain species become dependent on throw back.

As for marine mammals, incidental catch by trawling is rarely mentioned. And yet cetaceans can approach the trawls, attracted by the fishes that escape from them or the catch that is thrown back. The sounds emitted by the engines, especially when the trawl pulls in the lines, are often characteristic and likely to attract dolphins.

As for marine turtles, the main impact is due to benthic trawling when done in relatively shallow waters frequented by these animals. Of the three species of marine turtle in the Mediterranean, it seems that the loggerhead turtle *Caretta caretta* is most affected by trawl catch, given the size of its population compared to the two other turtle species present in the basin.

Estimates available in the Mediterranean indicate fairly sizeable catch in Italy, Tunisia, Croatia, Turkey and Egypt. Overall, Italy and Tunisia seem to be the countries by far most concerned by by-catch, with over 20,000 catches per year for the two countries (Casale, 2008). The marine areas most affected by by-catch of marine turtles in the Mediterranean are the North African continental shelves (Tunisia, Libya and Egypt), the Adriatic, the Levantine Sea and the Aegean Sea.

In all, the available data enables us to estimate a yearly number of catches by the Mediterranean trawling fleet of over 40,000. Note that this figure represents the number of captures not that of individuals, for the same turtle can be caught several times over if it is released each time.

Mortality caused by trawling depends on several factors (e.g. duration of drag), making it extremely variable from one country to the next. Mortality recorded in the Gulf of Gabès in Tunisia, for example, is no more than 182 individuals per year despite a big total annual catch of the order of 5,458 catches (Jribi *et al.*, 2007). According to Casale (2008), there are 7,400 (20%), and probably even more than 10,000, annual deaths from benthic trawling in the Mediterranean.

## VI.2 Forms

### VI.2.1 Trawl/Dropping and drawing in the gear

This form is used to describe and record basic elements of the trawl gear drops. To collect the data the observer must consult the captain and members of the crew and go by direct observations. The data must be filled in for each trawl drag and mainly concerns:

- General information about the observer, the trip (trip number), and the trawling (drags are numbered for each trip starting from 01)
- Information about dropping the gear: This is information taken the moment the trawl drops the gear:
  - Date (DD MM YYYY) and exact time (24-hour clock) when the trawl is put into the water (beginning and end)
  - Location: The position of the ship (latitude and longitude) is taken using the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Meteorological conditions: Mainly concerns the state of the sea (follow the key on the sheet), and the direction and force of the wind (follow the key on the sheet)
  - Surface temperature taken using the ship's thermometer, if it has one, or a portable thermometer
- Information about drawing in the gear: This is information taken the moment the trawl draws in the gear:
  - Date (DD MM YYYY) and exact time (24-hour clock) when the trawl is drawn out of the water (beginning and end)
  - Location: (Latitude and longitude taken from the on-board GPS)
  - Meteorological conditions: Mainly concerns the state of the sea (follow the key on the sheet), and the direction and force of the wind (follow the key on the sheet)
  - Surface temperature taken using the ship's thermometer, if it has one, or a portable thermometer
- Other events: During the fishing operation, certain accidental events may happen and affect the catch of target species and interaction with protected species.
  - Interruption of the fishing operation: State whether the trawl drag was interrupted and why (mechanical, operational, etc.)
  - Interaction with protected species: State on the form whether there was interaction with a protected species even if this was an attempted approach to the gear during the dropping or drawing in of the gear. Details will be written on the form about the interaction with protected species and the form about capture of marine turtles
- Comments: This section is used to describe any event or particularity that has no place or is not recorded on the form. Interruption of the fishing operation is especially described in this section. It can also be used to explain why information was not gathered.

**RAC/SPA**  
**By-catch Protocol**  
**Trawl/Fishing operation Form**

--	--	--	--

Observer identifier

--	--	--	--	--	--

Trip number

Trawl drag number 

--	--

**Information Dropping/Drawing in gear**

**Start of dropping**

Date/hour Day Month Year Hour Minute  
 [ ][ ] [ ][ ] [ ][ ][ ][ ] [ ][ ] [ ][ ]  
 Deg Min  
 Latitude [ ][ ] [ ][ ] [ ][ ][ ][ ] N  
 Deg Min  
 Longitude [ ][ ] [ ][ ] [ ][ ][ ][ ] E

State of sea [ ][ ] Wind/direction [ ][ ] Wind/force [ ][ ]

Surface temperature [ ][ ][ ][ ] °C

**End of dropping**

Date/hour Day Month Year Hour Minute  
 [ ][ ] [ ][ ] [ ][ ][ ][ ] [ ][ ] [ ][ ]  
 Deg Min  
 Latitude [ ][ ] [ ][ ] [ ][ ][ ][ ] N  
 Deg Min  
 Longitude [ ][ ] [ ][ ] [ ][ ][ ][ ] E

State of sea [ ][ ] Wind/direction [ ][ ] Wind/force [ ][ ]

Surface temperature [ ][ ][ ][ ] °C

**Start of drawing in gear**

Date/hour Day Month Year Hour Minute  
 [ ][ ] [ ][ ] [ ][ ][ ][ ] [ ][ ] [ ][ ]  
 Deg Min  
 Latitude [ ][ ] [ ][ ] [ ][ ][ ][ ] N  
 Deg Min  
 Longitude [ ][ ] [ ][ ] [ ][ ][ ][ ] E

State of sea [ ][ ] Wind/direction [ ][ ] Wind/force [ ][ ]

Surface temperature [ ][ ][ ][ ] °C

**End of drawing in gear**

Date/hour Day Month Year Hour Minute  
 [ ][ ] [ ][ ] [ ][ ][ ][ ] [ ][ ] [ ][ ]  
 Deg Min  
 Latitude [ ][ ] [ ][ ] [ ][ ][ ][ ] N  
 Deg Min  
 Longitude [ ][ ] [ ][ ] [ ][ ][ ][ ] E

State of sea [ ][ ] Wind/direction [ ][ ] Wind/force [ ][ ]

Surface temperature [ ][ ][ ][ ] °C

**State of sea**

- 01 Calm
- 02 Rippled
- 03 Choppy
- 04 Rough

**Wind direction**

- |               |               |
|---------------|---------------|
| 01 North      | 02 North/east |
| 03 South/east | 04 East       |
| 05 South      | 06 South/west |
| 07 West       | 08 North/west |

**Wind force**

- 01 Calm
- 02 Light breeze
- 03 Breezy
- 04 Fresh breeze
- 05 Moderate gale

**Trawl drag interrupted** Non  Oui

**Interactions with protected species**

- No  During drag
- Yes  During gear drop
- During drawing in gear
- Other



## VI.2.2 Trawl/Features of the gear/Fishing operation

The data in this form describe the features of the trawl. It can be used *inter alia* to study the effect on catch of protected species and target species. The form must be filled in for each trawl drag via direct observations or measurements taken by the observer himself. He must from time to time consult the captain or crew for further details.

- General information about the observer, the trip (number of trip) and trawl drag
- Type of trawl: State whether it is a benthic or pelagic trawl
- Position of the gear: State the position of the gear (port side, starboard, stern and prow) (follow the key on the form)
- Trawl: In this section, state the features of the trawl used during the fishing operation
  - Length of back rope: State the length in metres of the back rope at each trawl drag
  - Length of *bourette*: State the length in metres of the *bourette* for each trawl drag
  - Other measurements: In this section, state the mesh size of the body of the trawl and the bottom of the trawl, the presence (or not) of a scraper chain and its features, and the features of the panels (material and measurements)
- Fishing technique: In this part of the form, state the depth at which the captain intends to carry out the fishing operation and the target species
- Fishing operation: In this section, state the length of the *funes*, the length of the arms and the speed of the ship (in sea-miles/hour) when the gear is being dragged
- Comments: This section is used to describe any event during the fishing operation or particularity of the gear that has no place or is not recorded on the form. It can also be used to explain why information was not gathered.



### VI.2.3 Trawl/Catch

A form is filled in for each trawl drag. It concerns all the target and protected species caught. It also concerns their quantity, condition, location and certain metrical features. The data recorded basically helps when calculating the catch rate for target species and protected species.

Each target species or each specimen of protected species or strange and uncommon species is recorded on a separate line. At the end of the line it must be shown whether there is a tag applied and if a photo has been taken.

The observer must not take measurements in dangerous conditions (very active dangerous animal, bad weather, etc.).

The main data to be recorded is:

- General information about the observer, the trip (trip number), the trawl drag, page number and date
- Name of specie: State the common and scientific name of the species. It is always better to take photos and attribute their number to each specimen
- Quantity: State the number of crates and approximate weight for the target species. For protected species, or big species, state the number and approximate weight
- Animal's physical condition: State the physical condition of the animal when caught.
  - Fish: **A=Taken Alive**; **D=Taken Dead**; **ID=Indeterminate state**
  - Protected species: **A=Taken Alive**; **D=Taken Dead**; **C=Comatose**; **W=Wounded**; **ID=Indeterminate state**
- Animal kept/thrown back: State whether the caught animal was kept or thrown back into the water and the conditions when it was thrown back.
  - Kept: **K**
  - Rejected: **RA= Rejected Alive**; **RD=Rejected Dead**; **RW=Rejected Wounded**; **RC=Rejected Comatose**; **RR=Rejected after Rehabilitation**; **RID=Rejected in Indeterminate state**
- Sex: Where possible, state the animal's sex (**M=Male**; **F=Female**; **ID=Indeterminate**). This does not concern species caught in great quantities
- Measurement: Where possible, take measurements of big fishes caught in small quantities (**TL=Total Length** and **LF=Length at Fork**). Do not take measurements of dangerous fishes that are still alive (e.g. sharks). For turtles, simply state whether measurements have been taken. A special form for marine turtles will be filled in. It is possible for certain specimens, which have not been landed on deck, to state approximate measurements
- Tagging: State whether the captured animal is tagged or if a tag has been applied (this mainly concerns marine turtles)
- Sample: State (X) if a biological sample has been taken (a piece of tissue or the whole animal)
- Photo: State (X) if a photo has been taken of the animal



- Comments: State (X) if there are comments describing the animal. This section will be used for any explanation or any detail concerning the animal in question.



#### VI.2.4 Trawl/Interaction with threatened species

This form allows data concerning the nature and number of protected species (marine turtles, marine mammals and sea birds) linked to trawling operations to be recorded. However, in this form, there can be a description of these animals when they were observed without their having been direct contact with the fishing gear.

During a fishing operation, several contacts (observation or capture) with threatened species may take place. Each contact is recorded on a separate line and a form contains as many lines as there were contacts.

- General information about the observer, the trip (trip number), and the trawl drag
- Page number: During a fishing operation (trawl drag), if many contacts with threatened species took place, several pages will be filled in. Each page will be numbered
- Number and nature of the contact: Each contact (observation or capture of the animal) is recorded on a separate line. If there are not enough lines on the page for a fishing operation, continue on another form without starting again from 01. For example, if the first form has contacts from 01 to 08, page 02 starts with contact 09
- Date/time: The date and the exact time are recorded at the moment of each contact
- Activity of the ship: Record the activity of the ship at the moment of contact. This contact may take place when sailing towards or leaving the fishing grounds, when the lines are being paid out or drawn in, during the dragging of the trawl (follow the key on the form)
- Location: The latitude and longitude are taken using the on-board GPS at the moment of contact. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
- State of the sea: Fill in from the key on the form
- Species: The key of species is recorded from the list on the form. The list concerns the most common species in the Mediterranean
- Animal's behaviour: The animal's behaviour is recorded from the key on the form. The animal may enter into direct contact with the gear and may be caught or not, moving around or pursuing prey (fishes or other), pursuing the ship, resting on the surface of the water, feeding on throw back, etc.
- Animal's physical condition: This criteria indicates the condition in which the animal was observed or caught. The animal can be dead or alive, comatose, wounded, decomposing...(follow the key on the form)
- Number of animals: This criterion basically concerns observed animals. An approximate estimate of the number will be important if the exact number is difficult to determine
- Photo: State whether a photo has been taken of the animal

- Comments: This section is used to describe any event or particularity that has no place or is not recorded on the form. It can also be used to give further information or to explain why certain information was not gathered.

**RAC/SPA**  
**By-catch Protocol**  
**Interaction Mesh net/Protected species Form**

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Observer identifier

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Trip number

Page number

Fishing operation number

Interaction Mesh net/Protected species

Contact Number	Nature of contact	Date/time					Activity of ship	Location		State of sea	Species	Behaviour	Physical condition	Number	Photo ✓
		Day	Month	year	Hour	minute		Latitude	Longitude						
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

<p style="text-align: center;"><b>Contact</b></p> <p>01 Catch 02 Observation 03 Other</p>	<p style="text-align: center;"><b>State of sea</b></p> <p>01 Calm 02 Rippled 03 Choppy 04 Rough 05 Very rough</p>	<p style="text-align: center;"><b>Common protected species</b></p> <p>01 Lofferhead turtle <i>Caretta caretta</i> 02 Green turtle <i>Chelonia mydas</i> 03 Leatherback turtle <i>Dermochelys coriacea</i>  04 Bottlenose dolphin <i>Tursiops truncatus</i> 05 Common dolphin <i>Delphinus delphis</i> 06 Striped dolphon <i>Stenella coeruleoalba</i> 07 Risso's dolphin <i>Grampus griseus</i> 08 Killer whale <i>Orcinus orca</i> 09 Long-finned pilot whale <i>Globicephala melas</i> 10 Common rorqual <i>Balaenoptera physalus</i> 11 Sperm Whale <i>Physeter catodon</i>  12 Cory's shearwater <i>Calonectris diomedea</i> 13 Balearic shearwater <i>Puffinus yelkouan</i> 14 Terns <i>Sterna sp</i> 15 Other</p>	<p style="text-align: center;"><b>Behaviour</b></p> <p>01 Contact (catch) 02 Attempt, without contact 03 Near the gear 04 Swimming on the surface 05 Resting on the surface 06 Feeding on throw back 07 Pursuing the ship 08 Other</p>	<p style="text-align: center;"><b>Physical condition</b></p> <p>01 Alive, good condition 02 Comatose 03 Wounded 04 Freshly dead 05 Decomposing 06 Condition unknown</p>	<p style="text-align: center;"><b>Comments</b></p> <p>..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....</p>
<p style="text-align: center;"><b>Activité du navire</b></p> <p>01 Navigation (aller) 02 Navigation (retour) 03 Filage 04 Virage 05 Repos 06 Autre</p>					

## VI.2.5 Trawl/Catch of marine turtles

This form must be filled in every time a marine turtle is caught. As much data as possible must be used.

The main data to be recorded is:

- General information about the observer, the trip (trip number), and the trawl drag
- Name of species: State the scientific name of the species of marine turtle. If this is another species that is not common in the Mediterranean, put 'Other' and take a photo
- Other information: State (X) if a photo has been taken, a sketch made, a sample taken or a tag applied to or removed from the animal
- Catch: State the data concerning the capture of the turtle.
  - Trawl drag: State the page number and line number in the catch form corresponding to the trawl drag where the turtle was caught
  - Method of catch: State where the captured turtle was in the gear (bottom of the bag, caught on the net of the body of the trawl, etc.)
  - Tagging: State whether the turtle bears a tag at the moment of capture
- Release: State the data concerning the release of the turtle
  - Date/time: The date and time of the capture are recorded using the Day Month Year (DD MM YYYY) format and the 24-hour clock
  - Location: The latitude and longitude of the point of release are taken using the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Tagging: State whether a tag was applied to or removed from the turtle at the moment of release
  - Physical condition: State (from the key on the form) the animal's physical condition when it was released
- Morphology:
  - Cover of the carapace: State whether the carapace was covered by skin or plates
  - Plates of the carapace: If it is covered by plates, state the number of vertebral, right and left costal, right and left marginal and right and left infra-marginal plates (consult the sketch for the names of the various plates)
- Measurements: The curve measurements are the simplest and most often used by herpetologists. They will be taken using a tape measure. Remove all the epibionta that have adhered to the carapace and that can affect the measurements. The main measurements to take are:
  - The standard curved carapace length (SCCL): This is the distance between the nuchal and the most distal of the two last marginals
  - The curved carapace width (CCW): This is the curved measurement of the widest part of the carapace

- Tail length (TL): This is the distance between the posterior tip of the plastron and the point of the tail
- Comments: This section is used to state certain details that do not appear on the form. This mainly concerns the rehabilitation of the animal if it was comatose, etc.

**RAC/SPA  
By-catch Protocol  
Trawl/Marine Turtle Form**

Observer identifier

Trip number

Trawl drag number

Catch/Marine turtle

Species

- 01 Loggerhead turtle *Caretta caretta*
- 02 Green turtle *Chelonia mydas*
- 03 Leatherback *Dermochelys*

Photos

Sample

Sketch

Tag

**Capture**

Page number/Catch form

Line number/Catch form

**Method of capture**

01 In the trawl Bottom

02 Caught on the net

03 Other place

**Presence of tag**

01 yes

02 no

**Release**

Time/hour Day Month Year Hour Minute

Latitude     N

Longitude     E

**Tag**

Applied

Removed

**Physical condition**

01 Already dead

02 Good condition

03 Wounded

04 Died on deck

05 Comatose

06 Indeterminate

**Measurements**

(State carapace measurements to within about 0.5 cm)

**SCCL** (Standard Curve Carapace Length)

**CCW** (Curved carapace Width)

**TL** (Tail length)

**Morphology**

Carapace cover

01 Skin

02 Plates

**Number of plates**

Vertebral plates

Right costal plates

Left costal plates

Right marginal plates

Left marginal plates

Right infra-marginal plates

Left infra-marginal plates

**Croquis**

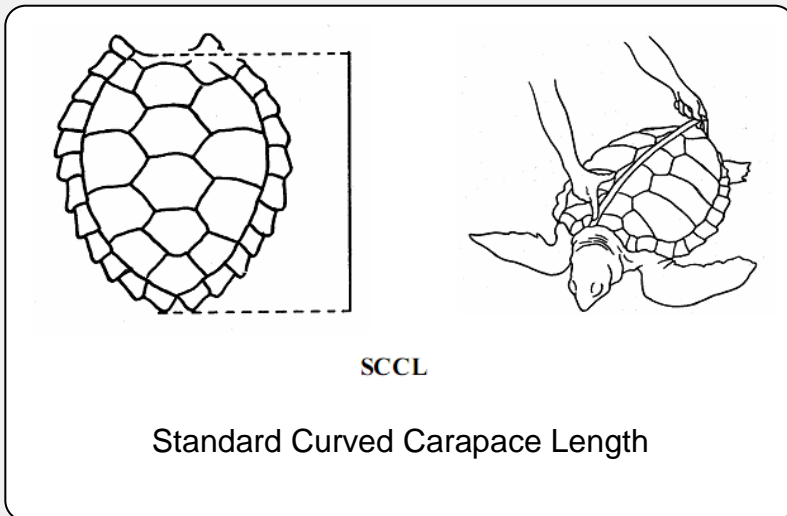
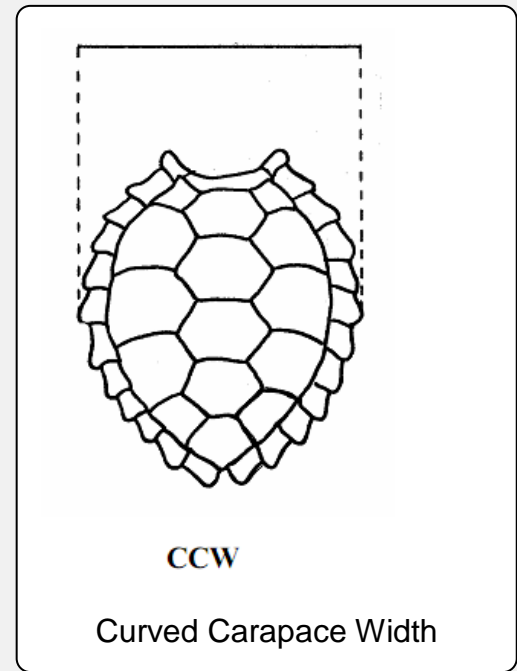
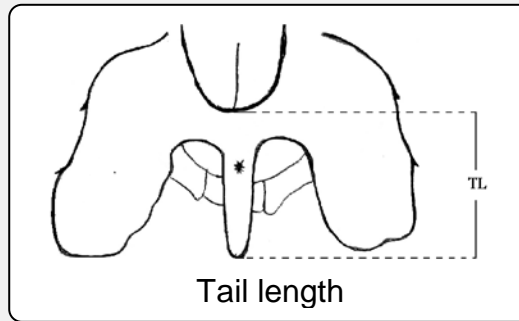
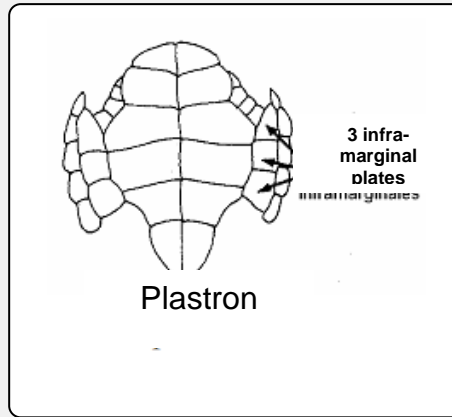
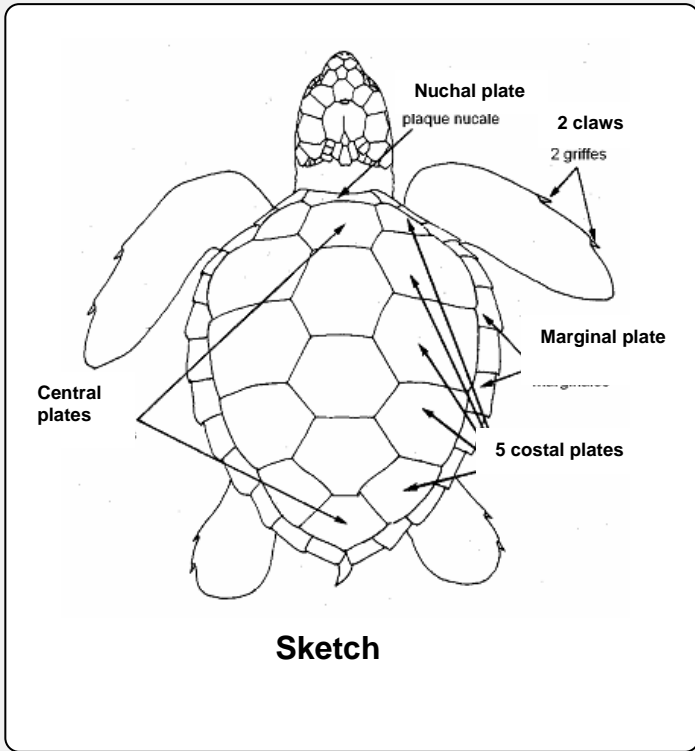
**Comment**

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.....





**Comments**

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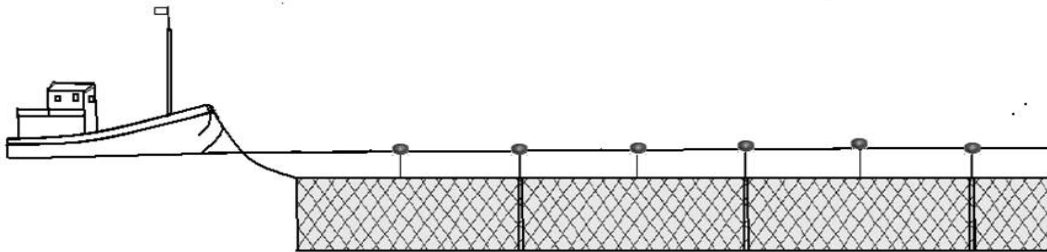
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.....

## VII Mesh nets

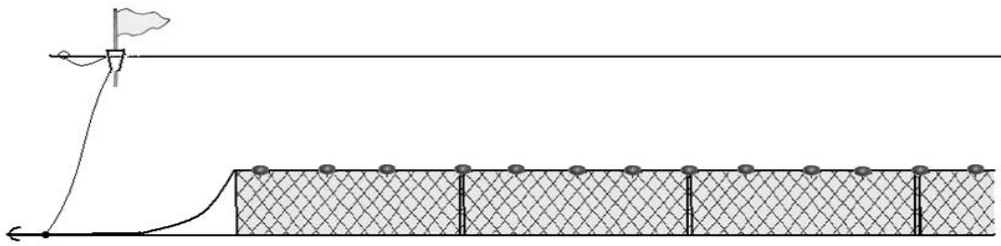
Mesh nets are walls of thousands of meshes, each one a deadly trap for fishes which enter and are then unable to pass through. They are made up of one or many rectangular sheets of net, hanging vertically in the water. Floats are fixed to the top part; the bottom part is weighed down to keep the nets vertical. Fishes of precise size are caught in the mesh that has the right dimensions to hold them by the head or the forepart of the body.

The drift mesh net (Fig. 5) is a mesh net held on the surface of the sea or at shallow depth by floats; it drifts with the current, without being attached to anything, or, more usually, being attached to the ship it belongs to. Put end to end, the nets can be several dozen kilometres long.

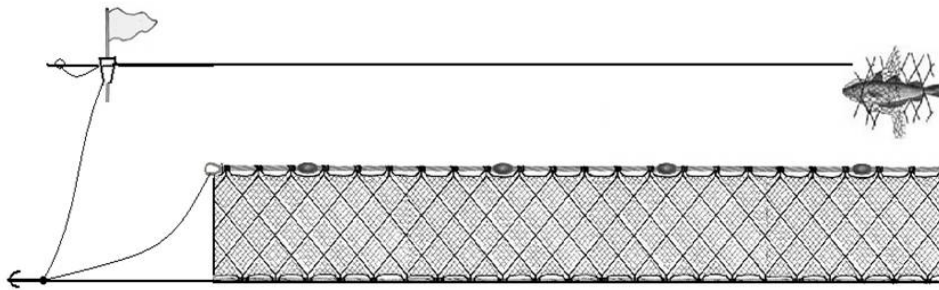


**Figure 5 : Drift mesh net**

When the weighting is greater than the ability to float the mesh net stays on the bed. Then it is called a set net. When there is just one sheet it is called a straight net (Fig. 6). When it is made of several sheets it is called a tangling net, one of the most often used being the trammel net (Fig. 7) made up of three adjacent nets. The two outside nets (the *aumées*) are coarse mesh and the inside net (the *flue*) is finer but bigger, able to hold big and little fishes alike.



**Figure 6 : Straight bottom net**



**Figure 7 : Trammel net**

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Straight mesh nets, including trammels, are the fishing gear most commonly used by small Mediterranean fisheries.

The mesh nets are usually dropped in the evening; several hours or even days later they are drawn up.

The gear is drawn up by hand or by a net-spin winch, usually located at the back of the boat (Ferretti, 1990).

Mesh nets present certain advantages, particularly their small impact on beds and marine habitats and their selectivity, since they only retain one size range of the target fish. But for various reasons these nets are abandoned on the bed; then they are called ghost nets and have harmful effects on the stocks of fish and other marine organisms and can even represent a danger to boats.

### **VII.1 Impact on the environment and threatened species**

The impact of mesh nets on sea beds is fairly small, and only concerns straight bottom nets. These are in contact with the bed via the lower bolt rope; the risks of biotope degradation happen when the net is drawn up and if it catches on rocky and coral beds.

Few mesh net fisheries target sharks, like those of the northern Adriatic (Sacchi, 2007) and the south of Tunisia (Echwikhi *et al.*, 2010); however, incidental catch of sharks and rays has been mentioned in various drift net fisheries and in bottom net fisheries.

Incidental catch of sea birds by drift nets is rare and seems basically to happen in coastal waters.

Marine mammals are frequently taken in mesh nets, with which they maintain an interaction. Cetaceans can find themselves caught up in the sheets of net while trying to eat the fish caught therein. This basically concerned the less experienced juveniles. When a marine mammal is caught up in a net, fairly severe lesions can appear on the skin in contact with the sheet and ropes, and if it remains tangled up it can drown. The fishing gear can be seriously harmed or even destroyed.

Incidental catch in mesh nets concerns various species of marine mammal, but mainly dolphins.

Marine turtles are caught by accident in mesh nets when they move around. But these animals actively try to feed on fish caught up in the net, damaging the gear (Panou *et al.*, 1993) and run the risk of being tangled up and drowned. Once caught up in the net, the animals cannot reach the surface to breathe and die if they are not quickly released. However, even if a marine turtle survives and is released, there may be later mortality if the fisherman does not cut the turtle free from all the ropes of the net. What is certain is that this material can cause serious wounds and necrosis.

Reports give a high mortality and a large number of captures for nets set near regions where marine turtles are present (Delaugerre, 1987; Argano *et al.*, 1992; Laurent, 1991; Lazar *et al.*, 2006; Echwikhi *et al.*, 2010). As regards the Mediterranean, in a recent study Echwikhi *et al.* (2010) noted a mortality rate of 69.4% for specimens of *Caretta caretta* caught up in shark nets in the Gulf of Gabès region, known to be a marine turtle feeding and wintering area. In other regions, the mortality rate varied between 53.7% in France (Laurent, 1991), 54.9% in the northern Adriatic (Lazar *et al.*, 2006) and 94.4% in Corsica (Delaugerre, 1987). Mesh nets thus seem to be very dangerous fishing gear. If used on a wide scale this could have an impact on the Mediterranean population and even the Atlantic population, some specimens of which enter the Mediterranean basin via the Strait of Gibraltar.

When the net is pulled up, several turtles are brought up in a comatose state. If through ignorance the fisherman does not recognise these turtles as being comatose and deems them to be dead, throwing them back, they will die, and this will further increase the mortality rate.

## VII.2 Forms

### VII.2.1 Mesh net/Dropping and drawing in the gear

All the information on this form is used to describe and record the basic elements of the mesh net drop. This information is obtained via direct observation and mainly concerns:

- General information on the observer, the trip (trip number) and gear drops (gear drops are numbered for each trip starting from 01)
- Information on dropping the gear: This is information taken at the beginning and end of the drop
  - The date (DD MM YYYY) and exact time (24-hour clock) when the net is dropped (beginning and end)
  - Location: The location is taken from the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Meteorological conditions: Mainly concerns the state of the sea (follow the key on the sheet) and the direction and force of the wind (follow the key on the sheet)
  - Surface temperature taken with the ship's thermometer, if it has one, or using a portable thermometer
- Information on drawing in the gear: This is information taken at the beginning and end of the drawing in:
  - The date (DD MM YYYY) and exact time (24-hour clock) when the net is drawn in (beginning and end)
  - Location: The location is taken from the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
  - Meteorological conditions: Mainly concerns the state of the sea (follow the key on the sheet) and the direction and force of the wind (follow the key on the sheet)
  - Surface temperature taken with the ship's thermometer, if it has one, or using a portable thermometer
- Other events: During the fishing operation, certain accidental events can happen and affect the catch of target species and the interaction with protected species:
  - The end where the raising starts: State the end of the net from which the drawing in of the net starts. The drawing in can start with the first end or the last end, or sometimes another point
  - Damage to the fishing net: State whether the fishing net was damaged during the fishing operation. A detailed description will be written in the 'Comments' section
  - Interaction with protected species. State on the form whether there was any interaction with a protected species, even if this was an attempted approach to the gear. The details will be written on the form concerning interaction with protected species and the catch form if this involves a marine turtle
- Comments: This section is used to describe any event or particularity that has no place or is not recorded on the form. It can also be used to explain why information was not gathered.

**RAC/SPA**  
**By-catch Protocol**  
**Mesh net/Fishing operation Form**

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Observer identifier

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Trip number

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Drop number

**Information Dropping/Drawing in gear**

**Beginning of drop**

Date/time Day Month Year Hour Minute

Latitude Deg Min N  
    N

Longitude Deg Min E  
    E

State of sea   Wind/direction   Wind/force

Surface temperature     °C

**End of drop**

Date/time Day Month Year Hour Minute

Latitude Deg Min N  
    N

Longitude Deg Min E  
    E

State of sea   Wind/direction   Wind/force

Surface temperature     °C

**Beginning of drawing in**

Date/time Day Month Year Hour Minute

Latitude Deg Min N  
    N

Longitude Deg Min E  
    E

State of sea   Wind/direction   Wind/force

Surface temperature     °C

**End of drawing in**

Date/time Day Month Year Hour Minute

Latitude Deg Min N  
    N

Longitude Deg Min E  
    E

State of sea   Wind/direction   Wind/force

Surface temperature     °C

**State of sea**

- 11 Calm
- 12 Rippled
- 13 Choppy
- 14 Rough
- 15 Very rough

**Wind direction**

- 01 North
- 02 North/east
- 03 South/east
- 04 East
- 05 South
- 06 South/west
- 07 West
- 08 North/West

**Wind force**

- 01 Calm
- 02 Light breeze
- 03 Breezy
- 04 Fresh breeze
- 05 Moderate gale

**Drawing in from**

- Start end
- End end
- Other

**Net damaged**

No  Yes

**Interaction with protected species**

- No  During gear drop
- Yes  During drawing in of gear
- At rest



## VII.2.2 Mesh net/Features of the gear

The data on this form describes the features of the net. It can be used *inter alia* to study the effect on catch of protected species and target species. The form must be filled in for each gear drop via direct observation and measurements taken by the observer himself. He must from time to time consult the captain or the crew for further details.

- General elements about the observer, the trip (trip number) and gear drop
- Type of net: State whether this is a drift net or a straight bottom net or a trammel net
- Net: In this section, state the features of the net used during the fishing operation:
  - Length: State the length in metres of the net
  - Depth: Corresponds to the height of the net pulled taut with the leaded rope during the fishing operation
  - Mesh size: State the mesh size measured in mm along one side
  - Mesh type: State whether the mesh is formed by monofilament cord or Multi monofil cord or other
  - Upper bolt rope: State the length with the two ends, the diameter of the cord, the number and diameter of floats and the distance between two successive floats
  - Lower bolt rope: State the length with the two ends, the cord diameter, the number of sinkers and the distance between two successive sinkers
- Fishing technique: In this part of the form state the depth at which the captain intends to carry out the fishing operation and the target species
- Comments: This section is used to describe any event during the fishing operation or particularity of the gear that has no place or is not recorded on the form. It can also be used to explain why information was not gathered.



**RAC/SPA**  
**By-catch Protocol**  
**Mesh net/Fishing gear Form**

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Identifiant de l'observateur

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Trip number

Drop number 

--	--

**Gear/Features and**

**Type of net**

Drift net  
  Straight bottom net  
  Trammel net  
  Other

**Fishing technique**

Depth (m) 

--	--	--

Target species  
.....  
.....  
.....

**Net/Features**

Length (m) 

--	--	--	--

Diameter (m) 

--	--	--	--

Mesh size (mm) 

--	--

Mesh type 

--	--

01 Monofilament  
02 Multi monofil  
03 Other

**Upper bolt rope**

Length (m) 

--	--	--	--

Diameter (mm) 

--	--

Number of floats 

--	--	--

Diameter of floats (mm) 

--	--

Distance between 2 floats (m) 

--	--

**Lower bolt rope**

Length (m) 

--	--	--	--

Diameter (mm) 

--	--

Number of sinkers 

--	--	--

Approx.weight of sinker bead 

--	--

Distance between 2 sinkers (m) 

--	--

**Comments**

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

### VII.2.3 Mesh net/Catch

A form is filled in for each gear drop. It concerns all the target species and protected species caught during the fishing operation. It also concerns their condition, location, and certain metric features. The data recorded is basically used to calculate the rate of catch of target species and protected species.

Each target species or each specimen of a protected species or a strange or uncommon species is recorded on a separate line. Mark at the end of the line if there is a tag applied and if a photo has been taken.

The observer must not take measurements in dangerous conditions (very active dangerous animal, bad weather, etc.).

The main data to be recorded is:

- General information on the observer, the trip (trip number), the gear drop, the page number and date
- Name of the species: State the common and scientific name of the species. It is always better to take photos and attribute their number to each specimen
- Quantity: State the number of crates and approximate weight for the target species. For protected or big species, state the number and approximate weight
- Animal's physical condition: State the animal's physical condition when caught
  - Fishes: **A=Taken Alive**; **D=Taken Dead**; **ID=Indeterminate**
  - Protected species: **A=Taken Alive**; **D=Taken Dead**; **C=Comatose**; **W=Wounded**; **ID=Indeterminate**
- Animal Kept/Rejected: State whether the caught animal was kept or thrown back into the water and the conditions at the moment when it was rejected
  - Kept: **K**
  - Rejected: **RA=Rejected Alive**; **RD=Rejected Dead**; **RW=Rejected Wounded**; **RC=Rejected Comatose**; **RR=Rejected after Rehabilitation**; **RID=Rejected in an Indeterminate state**
- Sex: Where possible, state the animal's sex (**M=Male**; **F=Female**; **ID=Indeterminate**). This does not concern target species caught in large quantities
- Measurement: Where possible, take measurements of big fishes caught in small quantities (**TL=Total Length** and **LF=Length at Fork**). Do not take measurements of dangerous fish that are still alive (e.g. sharks). For turtles, simply state whether the measurements have been taken. A special form for marine turtles will be filled in. For certain specimens that have not been landed on deck it is possible to state approximate measurements.
- Tagging: State (X) whether the animal has been tagged or if a tag has been applied (this mainly concerns marine turtles)
- Sample: State (X) whether a biological sample has been taken (a piece of tissue or the whole animal)

- Photo: State (X) whether a photo has been taken of the animal
- Comments: State (X) whether there are comments describing the animal. This section will be used for any explanation or all details concerning the animal in question.



#### VII.2.4 Mesh net/Interaction with threatened species

This form enables data concerning the nature and number of protected species (marine turtles, marine mammals and sea birds) linked to mesh net fishing operations to be recorded. However, in this form there may be a description of these animals when they are observed without there being any direct contact with the fishing gear.

During the fishing operation, several contacts (observation or capture) with threatened species may take place. Each contact is recorded on a separate line and a form contains as many lines as there are contacts.

- General information on the observer, the trip (trip number), and the fishing operation
- Page number: During a fishing operation, if many contacts with threatened species occur, several pages will be filled in. Each page will be numbered
- Number and nature of the contact: Each contact (observation of the animal or capture) is recorded on a separate line. If the number of lines on the page is not enough for a fishing operation, continue on another form without starting again with 01. For example, if the first form contains contacts from 01 to 08, page 02 starts with contact 09
- Date/time: The date (DD MM YYYY) and exact time (24-hour clock) are recorded at the moment of each contact
- Activity of the ship: Record the ship's activity at the moment of contact. This contact may take place when sailing towards or leaving the fishing grounds, when the nets are being dropped or drawn in, during rest periods...(follow the key on the form)
- Location: The latitude and longitude are taken at the moment of contact on the on-board GPS. Note the latitude (dd° mm.mmm') and longitude (ddd° mm.mmm') in decimal minutes (three decimals after the point)
- State of the sea: Fill in from the key on the form
- Species: The species key is recorded from the list on the form. The list concerns the commonest species in the Mediterranean
- Animal's behaviour: The animal's behaviour is recorded using the key on the form. The animal may enter into direct contact with the gear and may or may not be caught, moving around or pursuing prey (fishes or other), pursuing the ship, resting on the surface of the water, feeding on throw back, etc.
- Animal's physical condition: This criterion indicates the condition in which the animal was observed or caught. The animal may be dead or alive, comatose, wounded or decomposing...(follow the key on the form)
- Number of animals: This basically concerns the animals observed. An approximate estimate of the number will be important if the exact number is difficult to determine
- Photo: State whether a photo has been taken of the animal
- Comments: This section is used to describe any event or particularity that has no place or is not recorded on the form. It can also be used to give further information or to explain why certain information was not gathered.



## VII.2.5 Mesh net/Catch of marine turtles

This form must be filled in each time a marine turtle is caught. As much data as possible must be taken.

The main data to be recorded is:

- General information on the observer, the trip (trip number), and the fishing operation
- Name of the species: State the scientific name of the species of marine turtle. If this is a species that is not common in the Mediterranean, write 'Other' and take a photo
- Other information: State (X) if a photo has been taken, a sketch made, a sample taken or a tag applied to or removed from the animal
- Corresponding page and line on the catch forms: State the page number and line number on the catch form corresponding to the turtle in question
- Catch: State the data concerning the capture of the turtle
  - Date/time: The date and time of capture are recorded using the Day Month Year format (DD MM YYYY) and the 24-hour clock
  - Location: The latitude and longitude of the point of capture are recorded using the on-board GPS
  - Tagging: State whether the turtle bears a tag when it is caught
- Release: State the data concerning the release of the turtle
  - Date/time: The date and time of release are recorded using the Day Month Year format (DD MM YYYY) and the 24-hour clock
  - Location: The latitude and longitude of the point of release are recorded using the on-board GPS
  - Tagging: State whether a tag was applied or removed from the turtle when it was released
  - Physical condition: State (using the key on the form) the animal's physical condition at the time it was released
- Morphology:
  - Cover of the carapace: State whether the carapace is covered by skin or plates
  - Plates of the carapace: If the carapace is covered with plates, state the number of vertebral, right and left costal, right and left marginal and right and left infra-marginal plates (consult the sketch for the names of the various plates)
- Measurement: Curve measurements are the simplest and most often recorded by herpetologists. They are taken using a tape measure. Remove all the epibionta that have adhered to the carapace and that can affect the measurements. The main measurements to be taken are:
  - Standard curved carapace length (SCCL). This is the distance between the nuchal and the most distal of the two last marginals
  - Curved carapace width (CCW). This is the curve measurement of the widest part of the carapace
  - Tail length (TL). This is the distance between the posterior tip of the plastron and the point of the tail

- Comments: This section is used to state certain details that do not appear on the form. This mainly concerns rehabilitation of the animal if was comatose, etc.





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