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Draft Standards forms for monitoring commercial landings and discards of cartilaginous fish and recording data on rarely observed, endangered and protected species

For reasons of economy, this document will be available in a limited number at the meeting.
You are kindly requested to bring your copy to the meeting and not to request additional copies.

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I- INTRODUCTION

The information about trends in the abundance of a certain species population is one of the most important issues to assess species status. Knowing the status and recent trends in the abundance of a given species is essential to manage and protect it.

The Action Plan for the Conservation of cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea set among its priorities the proper monitoring of fisheries affecting them. Without a recording of elasmobranches catch by species, it is too difficult to assess and manage the populations of these fishes, usually with sensitive, slow recovering, populations. Management programmes for sustainable fisheries catching are also priorities within the Action Plan, which at the same time have as a basic prerequisite an adequate recording of catch. Within the implementation measures needed, the scientific collection of standardised data, aimed to estimate densities and status, depends on the existence of such standardisation at regional level.

The present document contains a first proposal for such standard data collection in the Mediterranean region to assist the countries on having a common base of discussion and eventual agreement for standardisation. The forms were presented and discussed at the "International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean" (Istanbul, Turkey 14-16 October 2005) to get the views and inputs of experts from the Mediterranean countries. The experts attending the meeting concluded that the standard forms prepared by RAC/SPA to record catch, fishing effort, rare species, etc, should be regionally used and they advised to do it after they are revised by experts from the whole Mediterranean area.

The planning of programs, protocols and sampling forms to collect information from fisheries must be done taking into account the following factors, which have been considered for the standard forms presented in the document:

- Information Source (Fishery-dependent sampling or fishery-independent data)
- Data type
- Fishing Gear

The document comprises two related but different issues. Regarding the first issue, protocols for monitoring commercial landings and discards by species are compiled, while the second one involves protocols to collect data on rare or endangered species.

To collect the information used in both issues, national and international reports, projects results and published literature have been used. These results came from The Spanish Institute of Oceanography (IEO), developer of the present work, and other EU programs targeting the Mediterranean region, as well as other international results obtained by the NOAA and IUCN.

II- SOURCES OF INFORMATION

1) FISHERY-DEPENDENT SAMPLING

Fishery-dependent data collection is one of the most valuable tools available to fishery managers.
The management plans based on fishery-dependent sampling will only be as good as the data collected. It is critical to determine what is the most important data to be collected and implement some system of data recording before overfishing occur. This chapter provides a

wealth of information on what type of data should be collected in a shark fishery, and what methods can be used for collection.

In a general point of view five methods are utilized in the collection of fisheries and biological data: These include fisheries observers, shore- and dockside sampling, logbooks and surveys. Each have positive and negative aspects, and the decision to use one or other usually depends upon the size of the vessels, the length of fishing trips, which data are desired, and the funding available to support data gathering.

Usually a combination of two or more methods is required for adequate data gathering.

1.1 Fisheries observers

Fisheries observer programs are used worldwide to collect fisheries data including:

- biological data
- species composition
- discards

This is the main method to increase data accurate, but it is more costly than other data gathering methods. Observers should be trained in biology and be able to obtain better quality data than fishers.

Observers collect a variety of information, including:

- fishing location and depth
- time of sets and haul back
- oceanographic data (e.g., water temperature and salinity)
- type and amount of gear used
- gear characteristics
- effort data
- to note changes in the gear or fishing strategy
- species identification (**figures 1, 2, 3,4,5,6**)
- catch vitality
- discards quantification (figures **7 & 8**)
- Total catch data (Commercial plus discards)
- sexes
- lengths and weights (**figures 9-**trawling-, **10**- purse seine-& **11 –**longline-).
- maturity
- biological samples
- Phothograph matherial
- Fishers awareness about fisheries management requirements

Observers are extremely beneficial to management programs because of the amount and accuracy of the information they collect. However, observer programs can be expensive, time consuming, and impractical if the boats in the fishery are too small.
Figures **12**, **13**, **14** & **15** show fishing forms to gattering data on longline (**12 & 13**), Trawling (**14**) and Purse seine (**15**).

1.2 Shoreside sampling

Shoreside sampling is very useful in fisheries where sharks are landed whole, such as recreational and some artisinal fisheries. Sharks often are dressed at sea and landed headed and gutted, which can pose significant problems for land based sampling since species identification, sex, fork and total length, reproductive sampling, and at-vessel vitality cannot be deter-mined.

If sharks are landed intact, then a shore-based data collector can produce many of the same data as an at-sea observer:

- Commercial weigth at landing data
- acurate identification of commercial species
- sexes
- lengths and weights (**figures 9-**trawling-, **10**- purse seine-& **11 –**longline-).
- Maturity

Additional data, such as fishing location and depth, type and amount of gear utilized, lengths of sets, etc can be gathered by fishers interviews. If the exact location is known, fishing charts can be used to determine the depth, and water temperatures can be estimated in some circumstances using existing oceanographic data. **Figure 16** shows an example of shoreside sampling form to trawling gear, **figure 17** an example to puse seine and the **figures 18 & 19** show accurate forms to botton and surface longlines.

1.3. Local fishery authority data

The local authority usually gathers data about landing of each comercial species. These information generally consist of temporal series of total fleet landing of each comercial species. An example of forms designed to gathering this kind of information can be seen in the figures **20** y **21**.
The main problem of this kind of data are that:

- Lack of discards data
- Lack of by-catch of non commercial species
- No data about fishing operations, gear and effort can be obtained
- Speciphic identification errors

1.4. Logbooks

Logbooks, although not very common in the Mediterranean fisheries are used in many fisheries but data gathered in such a manner is highly variable. Despite this, logbooks are commonly used in stock assessments and as the major data collection source in numerous fisheries. Fishers are required to fill out logbooks while at sea. The following data can be recorded in logbooks:

- species identification
- number caught
- sex
- size
- disposition
- gear and amount used
- gear modifications
- location
- time of set and haul back
- depth and water tem-perature

It is widely recognized that fishers do not always record accurate data, under-report their catches, and frequently identify species incorrectly.

Correct species identification is a major issue because most fishermen are not scientifically trained in proper identification techniques.
Logbooks offer limited information due mainly to the lacking of data about effort or discards.

This type of data collection is inexpensive and is often the only method available if funding is lacking or if vessels are too small to take observers.
Some estimates of the accuracy of logbook data may be available when limited observer data are also available from the same fishery. This can be done by comparing the observers record of various parameters to those in the logbook records. **Figure 22** shows an example of logbooks form.

1.5. Telephone and dockside sampling

Telephone or dockside surveys often used to monitor recreational fishers involve either calling or going to the docks and interviewing fishermen about their trips as they come back in. Surveyors usually ask questions about the species targeted and catch composition, type and amount of gear employed, gear modifications and lengths, and size of the vessel (**figures 23** & **24**). This is a very basic type of data collection and there are real problems associated with this type of sampling. Interviews are often done several days after a trip, which results in fisher memory lapses and poor data quality. As in logbook data, this type of data gathering is relatively inexpensive and provides an alternative to more costly methodologies. Also we can use telephone and dockside surveys to collect data about the rarely observed, threatened or endangered species (**figure 25** & **26**)

2) FISHERY-INDEPENDENT SAMPLING

Fishery-independent surveys provide valuable measures of relative abundance, rates of population change, and size and sex composition for a wide range of species (**figure 27** & **28**). As these measures are obtained from scientific sampling or within an experimental design, they are less subject to the unknown and often confounding factors that complicate the interpretation of fishery-dependent indices of stock status. Such generalizations, however, do not apply entirely to elasmobranchs. For a variety of reasons, fishery-independent surveys for elasmobranchs are more difficult to interpret (Simpfendorfer et al., 2002) than surveys for teleosts and shellfish. Emphasis is placed on gears that have actually been used in such surveys (trawls, longlines, and gillnets) rather than potential, but as yet unproven, gear (purse seines, traps) or other technologies (such as acoustics or optical systems).

There are two main uses of fishery-independent surveys .

The first use is to generate an estimate of population abundance.

The second is to examine attributes of the sampled population (such as size frequency, maturity, sex ratios, age). These attributes have inherent value in understanding the species biology and in developing life history models (Rago et al., 1998).

Some Use of scientist surveys

Estimate Relative Density can be used to infer trends over time and calibrate numerical population models but the target population and area must be defined. Otherwise inferences are restricted to population available to area sampled.

Define mating, spawning and nursery areas useful for monitoring trends in important localized habitats.

Biological attributes of population Inferences regarding size composition, growth rates, sex ratio, maturity status, fecundity, etc., can be extended to whole population if samples are representative (**figures 29** & **30**).

Sharks are processed at sea in many fisheries and measurements cannot be made prior to finning and gutting. In order to develop statistically significant correlations between those measurements at least 30 individuals for each species must be measured. These relationships allow fishery biologists to convert an alternative measurement into a missing desired primary measurement, for example fork, total or precaudal length (**figures 31**, **32** &**33**).

Seasonal presence/absence

Relative selectivity of commercial gear
Establish sampling properties of commercial gear and facilitate interpretation of relative biases.

Evaluate alternative fishing methods
Assist in development of fishery management measures.

Tag release programs
Essential information for defining stock structure, possible migration patterns and rates, validating growth rates, and so forth.

3) TYPE OF DATA

3 1. Catch estimates

Several key factors or indicator are used to determine the status of a fishery. Among these factors are the catch estimates for both target species and bycatch. Each individual fishery should maintain a continuous database including all reported catch, estimates of discard, and estimates of non-reported catch.
Catch estimates are used to:

- illustrate the species composition of individual fisheries
- utilization rates of each captured species
- monitoring quotas
- estimate fishing mortality
- to calculate Catch Per Unit Effort (CPUE).

These estimates include not only what is sold at port, but also that which is discarded or utilized as bait at sea and that which is retained for personal consumption or transferral by the vessel's crew. In other words, all fishes retained or discarded should be documented.
Catch estimates allow managers to better determine the current status of a fishery and also be used to show historical trends in the fishery, and estimate the population abundance. These numbers can also be integrated into models to predict the outcome of future management plans or the current management effects on the stock.
In fisheries where the whole catch is not marketed, at-sea monitoring provides the most robust catch data. At sea, fishery observers should accurately record the number of individuals by species, note whether the shark is alive or dead when landed, and record the final disposition (final fate of the shark) of each shark boarded.

Disposition estimates for individual species allow fishery managers to better understand what is actually happening in the fishery.
At-sea catch estimates often give a very different view of what is actually happening in a fishery than landings (marketed catch) data. However, in areas where the entire catch is brought back to port, landings data accurately depict the scope of total fishing mortality.

Bycatch is a common side effect of fisheries, its level depending upon the type of gear employed and amount of effort expended. Sharks commonly are caught as bycatch in a number of fisheries such as the oceanic tuna and swordfish longline fisheries; inshore and offshore gillnet fisheries targeting mackerels (Scombridae), herrings (Clupeidae), and other species; and shrimp trawl fisheries. The catch numbers, mortality, and disposition for all of these sharks must be recorded in the same manner as in directed and multi-species fisheries.

3.2. Fleet inventory

Data about the fleet that operate in a determinate fishing ground is another key factor affecting the fishery management. These data can be used to estimate the total effort that is being apply to a determinated fishing ground (fishing power)
This inventory consist of a list of all vessels that operate in this area., and gather together all the charachteristics of each vessel: GRT, HP, Length, Base port, equipment, fishing gear, etc. (**figures 34** & **35**).

3.3 Fishing effort (CPUE)

The "effort" usually refers to the time a uniformly designed and employed piece of fishing gear is deployed in the water.

Catch per unit effort (CPUE) is a ratio commonly used to eliminate temporal and regional trends in fish stock abundance. The "catch" portion of the measure may be expressed as the number or weight of the entire catch, or a particular species in the catch. Many aspects of the fishery can be monitored utilizing CPUE analysis, including trends in overall fishery catch rates, catch rates of target vs. bycatch species, catch rates in specific depth strata, seasons or subregions, catch rates of size classes and sexes, and catch rates of specific vessels or types of vessels. CPUE is a much more powerful tool than catch data alone. A decline in CPUE over a time period is usually a good indication that stocks are declining. However, changes in fishing gear, improvements in fishing abilities of captains and crews, and changes in fishing grounds, current pattern or weather can influence CPUE trends.

The effort units are dependent on the type of fishing gear used and can use such measures as the numbers of vessels, vessel-days, gillnet or longline sets or number of hook hours, and trawl or gillnet hours.

3.3.1 Gillnet fishing gear

The important characteristics of gillnet gear include total net length; mesh size; number of panels; panel length and depth; water depth at deployment; deployed depth in the water column (bottom, midwater or surface set); orientation of the set (parallel or perpendicular to shore or current); and soak time (time the gear is in the water) Figure XX. The type of information fisheries managers are seeking from CPUE data dictates the catch and unit effort measures used to calculate CPUE. The following are examples of possible CPUE calculations (**figure 36**)

3.2.2 Longline fishing gear

Longline gear characteristics include mainline length; branch line length, number, size and type of hooks; water depth at deployment; where deployed in the water column (bottom, midwater depth or surface set); orientation of the set (parallel or perpendicular to shore or current); and soak time (**figura 12**). As with gill nets, the types of catch and unit effort measures used by fisheries managers to calculate CPUE are based on the specific information they are seeking.

3.3.3 Trawl fishing gear

Trawl CPUE is usually determined as the catch per hour of bottom trawling time. Variables that affect trawl CPUE include mesh size; length and width of net; distance between trawl doors; lengths of bridles and foot rope; length and depth of float line; time of trawling; presence of a

Turtle Excluder Device (TED, not used in the Mediterranean), Bycatch Reduction Device (BRD), beam, "tickler chain," or rollers; and cod end mesh size and configuration (**figura 14**). Standardization of gear type employed, trawling speed, and time of trawling greatly increases the reliability of generated CPUE's.

3.3.4 Purse seine fishing gear

Purse seine nets vary in circumferential length and depth, mesh size, and ability of the fishing crew (**figura 15**). CPUE is usually calculated as the number of sharks caught per set, but, as in trawling gear, standardization in gear type greatly facilitates comparisons of CPUE's.

3.4 Landings

3.4.1 Landings reports

Landings reports are part of the process of estimating total catch and are also used to show how many of each species of shark are brought to port for distribution or sale. There is often quite a difference in the number of sharks caught and the number of sharks landed. Management plans that use quota systems often use only the reported landings against the quota. This is a biased assessment of the actual catch; because many sharks may be discarded at sea, there is commonly underreporting (and occasionally overreporting) of the landed sharks, and sharks are difficult species to identify. A well-designed management plan will utilize both catch and landings data.

3.4.2 Problems associated with species identification

A major shortcoming in using landings data is the common lack of species identification. In many shark fisheries, the sharks are dressed at sea in order to ensure high quality of the flesh. Properly dressing a shark involves removing the head, fins and entrails as soon as possible after being caught. This makes it nearly impossible to accurately identify sharks to species at landing. When proper identification is not possible at sea, then the landings reports will only reveal the total number of sharks caught and cannot be used to show trends in species abundance. There are a few exceptions to this, including the landings of sharks with telltale external coloration or morphological features such as tiger, leopard, whale, blue, white and mako sharks. Some regional guides to carcasses (called "logs") or to fins may be available.

Carcassed landings also eliminate the ability to record the total size or weight of a shark. However this can be solved by developing length relationships by species and relating interdorsal distance to total length (see Moutopoulos and Stergiou, 2002 for examples of length-length relationships in teleosts).
The weight of landed sharks is more easily measured on shore than at sea, but trying to convert from dressed to whole weight can be tricky because conversion factors vary between species, along species life cycle, fishers and over time.
In addition, sex and maturity cannot be determined after the shark has been dressed.
Quantification of bycatch is also lost using landings data, as is information on cryptic mortality (e.g., freshly-caught sharks used as bait at sea) and vitality (alive or dead) of captured sharks.

Landings data are easy to obtain because it is done on land, the sharks are dead, and there is usually more space and equipment available, but is time consuming and need a good statistic system. However, because of the limitations noted above, landings records offer a restricted amount of pertinent information and should be used with caution.

3.5 Fishing mortality

Fishing mortality is a very important but sometimes underreported aspect of fishery-dependent monitoring. Individual species react differently to being hooked or ensnared in a net.

3.5.1 Alive vs. dead condition at capture

The condition, alive or dead, of every shark that is caught, whether targeted or taken as bycatch, should be recorded. This condition does not refer to the final fate of the shark, rather to its status—alive or dead—when initially removed from the fishing gear. There are a number of shark species that typically survive longer than other sharks when taken on a longline hook or in a gillnet. In some regions these species are considered of low market value and often are returned alive to the sea. By contrast, other species have short survival times when captured in fishing gear. Knowledge of the high fishing mortality these species endure may affect a fishery regulator's choice of management measures(**figure 27**).

3.6 Fishing area

Development of preferred fishing areas is dependent upon vessel size and cruising range, the availability of targeted species and size classes, weather, currents, and bottom configuration. Recording accurate fishing locations associated with catch data allows fishery managers:

- species distribution range
- to distinguish geographical variability in catch rates
- denote changes in the activities of the fishing fleet
- determine sub-population differences in life history parameters

Significant declines in regional catch rates should be examined carefully because such trends often are indicative of localized overfishing.

The most specific and preferred way to report fishing location is by recording the latitude and longitude of every set (see **figures 14** & **15**). Usually those coordinates are recorded as gear first enters the water, at the point all gear is deployed and effective fishing has begun, as retrieval of gear begins ending effective fishing, and at the time all gear is returned to the vessel. Depth, fishing depth, and time of day also should be recorded at each of these four events, the latter of critical importance in calculating accurate fishing effort. Similarly, a single bottom trawl may cover a range of water depths and varying seafloor topography. This information is entered into a database and can be plotted to show all the locations and depths where sets are being made.

Most commercial fishing vessels from developed nations have GPS or LORAN systems on board. For those that do not, a hand-held GPS can be used to determine location. When monitoring fisheries from shore, interviews with fishers may reveal which fishing grounds, reefs or banks were visited on a given trip.

Catch time series from frequented areas are monitored to determine changes and species behavior. Prime fishing grounds such as the banks and reefs are exceptionally vulnerable to overfishing because they are easy to find, may host a variety of harvestable species, and may support multiple target fisheries.

Nursery areas, critical regions where young sharks congregate, also are prime fishing sites because of shark abundance and relative ease of capture. These fishing areas are extremely susceptible to fishing pressure and regionally-specific management is required to prevent localized overfishing. Management measures used to alleviate these problems may include area closures, seasonal closures, and regional fishing area quotas (Shotton, 1999).

A detailed analysis of fishing locations utilized by a specific fleet using catch or CPUE time series often shows clear trends. Catch estimates, changes in fishing practices, landing reports, market values, and export data are useful clues used in determining the influences of change.

3.7 Species identification

3.7.1 Importance of accurate species identification

Accurate identification of individual shark species is one of the most important and difficult aspects of fishery-dependent sampling.
Many groups, often look very similar to the untrained eye and even experts may have difficulty in identifying some species. In many areas these difficulties in species identification have lead to aggregated data simply recorded as “shark” (for all chondrichthyans), as “shark” or “ray”, or as only slightly narrower categories such as “large shark” and “small shark”.
Vernacular names of sharks frequently vary between geographic regions and should not be the only form of identification utilized in data taking.

Shark catches need to be reported at the species level to facilitate better fishery management. Lack of species-specific data has forced many countries to report national catches using designated multi-species groups. This can lead to mismanagement because of the large variation in life history patterns exhibited by individual shark species.
The lack of species-specific reporting is a global epidemic in shark fishery management.

3.7.2 Materials used for species identification

- FAO regional Guides
- National guides
- Some type of species identification reference guide
- education or training of the intended audience
- provision of an appropriate-sized poster outlining the key differences among species.

To facilitate data taking, a unique species code should be assigned to each shark taken in the fishery. Simple combinations of the first letters of the genus and species or the universally accepted vernacular name are easy to remember and to record quickly. As noted above, the use of vernacular names is discouraged unless the name is uniformly used throughout the recording area.

3.8 Size

The sizes of all sharks in the catch should be consistently and accurately taken. This can be an arduous task and may be unrealistic for some fisheries. Such data is critical because many species of sharks show dramatic population declines when certain size/age classes are targeted. Temporal shifts in the size of the catch can signal overfishing, but this may also be the result of changing fishing practices. The figures **9, 10, 11 & 37** show forms to collect the size data.

Many fisheries target specific size classes of sharks. Size limits are an efficient way to protect selected age classes from over-fishing, but the size of the sharks being taken in the fishery must be known in order to determine the potential effect of the measure.

Recorded weights of landed sharks are also used to show trends and shifts in the fishery. Most fisheries measure the quantity of landed sharks as dressed weight metric tons (dw mt). Landing tonnages often are used as surrogate indicators of catch increases and decreases. This can be very misleading if the sizes and numbers of sharks being caught are not reported as well. In the absence of numerical data, potential shifts in the size composition of the catch will be missed. The figures **20**, **21** & **22** show forms to collect the weight data in shark fisheries.

A variety of measurements are taken on sharks:

- fork length
- total length
- precaudal length
- first dorsal rear insertion to precaudal pit
- eye to eye (for hammerhead species)
- other miscellaneous measurements.

The three most frequently used measurements are fork, total and precaudal length. When only a single measurement can be taken, fork length is the choice of most shark biologists because it provides a consistent measure of body length.

All data takers should employ consistent modes and units of measurement; the metric system is preferred internationally. For each species taken in the fishery, one should take several of the measurements noted above on each of at least 30 individuals in order to develop statistically significant correlations between those measurements. These relationships allow fishery biologists to convert an alternative measurement into a missing desired primary measurement, for example fork, total or precaudal length (**Figure 31** & **32**).

If sharks are landed at market whole, measurements can be made at that time. However, in many fisheries sharks are processed at sea and measurements must be made prior to finning and gutting.
Obtaining the weight of a whole shark at sea is difficult, time consuming, and often impossible due to logistic considerations. For this reason, most biologists weigh the whole shark or carcass at the dock or simply estimate the weight. A major problem in dockside weighing is that any sharks used for bait or discarded at sea are not weighed. In addition, since only butchered carcasses are landed in many fisheries, whole body weight data is unobtainable. Generating statistically signifi-cant length-weight curves for major species early in the monitoring process is important because these relationships allow one to convert subsequent length data into biomass estimates. An alternative is to develop relationships between different lengths and between length and weight from fishery indepen-dent surveys where all the catch can be accurately measured and weighed. (See Kohler et al. (1995).

3.9 Sex

Sexual segregation of sharks based on depth, season, area and sexual maturity is common in some species. Many fisheries operate at only certain times of the year or in selected locations and thus may have a propensity to target, intentionally or unintentionally, a certain sex or maturity stage. Other fisheries target sharks in the same location at different times of the year, resulting in catches of seasonally different sexual maturity groups. Sharks generally have a long gestation period, produce few young and reproduce on yearly, biannual, or even triannual basis. Large fishing mortality on one sex or on a particular state of maturity can adversely affect the dynamics of a population. For that reason, it is imperative that representative samples of the sex and maturity composition of the catches are obtained regularly.

The sex of a shark is easily identifiable by the presence of claspers in males and their absence in females. In addition, the following information should be recorded whenever possible: for males, clasper size and maturity; and, for females, uterine condition, average ovum diameter, and the sizes and sexes of embryos (**figure 29, 32**).
Reproductive data collection on female sharks is much more labor and time intensive.

IV FIGURES

FAUNISTIC LIST 1 (COMMERCIAL)

VESSEL: DATE:_____________ CAST:_______

TOTAL CAPTURE (kg)		**CAPTURE SAMPLED** (kg)	

		TOTAL C.		SAMPLE				TOTAL C.		SAMPLE	
SPECIES	CODE	w (gr)	Nº	W (gr)	Nº	SPECIES	CODE	w (gr)	Nº	W (gr)	Nº
FISHES						Dentex dentex					
Alopias superciliosus						Diplodus annularis					
Alopias vulpinus						Diplodus sp.					
Aphia minuta						Diplodus vulgaris					
Argentina sphyraena						**Dipturus batis**					
Arnoglossus laterna						**Dipturus oxyrinchus**					
Arnoglossus rueppelli						**Echinorhinus brucus**					
Arnoglossus spp						Engraulis encrasicolus					
Arnoglossus thori						Epigonus denticulatus					
Arnoglosus imperialis						**Etmopterus spinax**					
Aspitrigla obscura						Eutrigla gurnardus					
Bathysolea profundicola						Gadiculus argenteus					
Blennius ocellaris						Gaidropsarus spp.					
Boops boops						**Galeorhinus galeus**					
C. caelorinchus						**Galeus atlanticus**					
Callionymus maculatus						**Galeus melastomus**					
Capros aper						Gnathophis mystax					
Carcharhinus altimus						Gobius niger					
Carcharhinus branchyurus						Helicolenus dactylopterus					
Carcharhinus brevipinna						**Heptranchias perlo**					
Carcharhinus falciformis						**Hexanchus griseus**					
Carcharhinus limbatus						Hoplostethus mediterraneus					
Carcharhinus obscurus						**Isurus paucus**					
Carcharhinus plumbeus						**Lamna nasus**					
Carcharias taurus						Lepidopus caudatus					
Carcharodon carcharias						Lepidorhombus boscii					
Carharhinus melanopterus						Lepidotrigla cavillone					
Centrolophus niger						Lesueurigobius sanzoi					
Centrophorus granulosus						**Leucoraja circularis**					
Centrophorus ujato						**Leucoraja fullonica**					
Centroscymnus coelolepis						**Leucoraja melitensis**					
Cepola rubescens						**Leucoraje naevus**					
Cetorhinus maximus						**Leucoraje undulata**					
Citharus linguatula						Lophius budegassa					
Conger conger						Lophius piscatorius					
Chaulodius sloani						Lophius spp					
Chelidonichthys obscurus						Macroramphosus scolopax					
Chelidonichthys obscurus						Merluccius merluccius					
Chimaera monstrosa						Micromesistius poutassou					
Chlorophthalmus agassizi						**Mobula mobular**					
D. quadrimaculatus						Mullus barbatus					
Dalatias licha						Mullus surmuletus					
Dasyatis centroura						**Mustelus asterias**					
Dasyatis pastinaca						**Mustelus mustelus**					

Figure 1. Species list for observers (trawling and purse seine). Sources of IEO.

FAUNISTIC LIST 2 (COMMERCIAL)

VESSEL: DATE:_____________ CAST:_______

		TOTAL C.		SAMPLE				TOTAL C.		SAMPLE	
SPECIES	CODE	w (gr)	Nº	W (gr)	Nº	SPECIES	CODE	w (gr)	Nº	W (gr)	Nº
FISHES						**Sphyma zygaena**					
Mustelus punctulatus						**Sphyrna lewini**					
Myctophum punctatum						**Sphyrna mokarran**					
Myliobatis aquila						Spicara flexuosa					
Nezumia aequalis						Spicara maena					
Odontaspis ferox						Spicara smaris					
Ophidion barbatum						Spondyliosoma cantharus					
Oxynotus centrina						**Squalus acanthias**					
Pagellus acarne						**Squalus blainville**					
Pagellus bogaraveo						**Squatina aculeata**					
Pagellus erythrinus						**Squatina oculata**					
Pagrus pagrus						**Squatina squatina**					
Peristedion cataphractum						Stomias boa					
Phycis blennoides						Symphurus nigrescens					
Phycis phycis						T. trachurus					
Pomatoschistus spp.						**Torpedo marmorata**					
Prionace glauca						**Torpedo nobiliana**					
Pristis pectinata						**Torpedo torpedo**					
Pristis pristis						Trachinus draco					
Pteroplatytrygon violacea						Trachurus mediterraneus					
Raja asterias						Trachurus picturatus					
Raja branchyura						Trigla lucerna					
Raja clavata						Trigla lyra					
Raja miraletus						Trisopterus luscus					
Raja montagui						Uranoscopus scaber					
Raja naebo						Xiphias gladius					
Raja polystigma						Zeus faber					
Raja radula											
Raja rondeleti (of fullonica)											
Rhinobatos cemiculus											
Rhinobatos rhinobatos											
Rostroraja alba											
Sardina pilchardus											
Sardinella aurita											
Scomber japonicus											
Scomber scombrus											
Scorpaena sp.											
Scyliorhinus canicula											
Scyliorhinus stellaris											
Serranus cabrilla											
Serranus hepatus											
Solea vulgaris											
Somniosus rostratus											
Sphyma tudes											

Figure 2. Species list (Second part). Sources of IEO.

FAUNISTIC LIST 3 (COMMERCIAL)

VESSEL: DATE:_____________ CAST:_______

		TOTAL C.		SAMPLE				TOTAL C.		SAMPLE	
SPECIES	CODE	w (gr)	Nº	W (gr)	Nº	SPECIES	CODE	w (gr)	Nº	W (gr)	Nº
CRUSTACEAN						**MOLLUSKS**					
Alpheus glaber						Alloteuthis sp.					
Aristeus antennatus						Alloteuthis media					
Bathynectes maravigna						Alloteuthis subulata					
Calappa granulata						Eledone cirrhosa					
Dardanus arrosor						Eledone moschata					
Geryon longipes						Illex coindetti					
Goneplax rhomboides						Loligo vulgaris					
Homarus gammarus						Octopus salutii					
Liocarcinus depurator						Octopus vulgaris					
Macropodia longipes						Opistobranchia spp.					
Munida sp.						Pecten maximus					
Nephrops norvegicus						Sepia elegans					
Pagurus sp.						Sepia officinalis					
Parapenaeus longirostris						Sepia orbignyana					
Pasiphea sivado						Sepietta spp.					
Plesionika edwardsii						Sepiola spp.					
Plesionika giglioli						Todarodes spp.					
Plesionika heterocarpus						Cassidaria tyrrhena					
Plesionika martia						Sepia spp					
Plesionika sp.						Venus nux					
Pontocaris spp.						Todaropsis eblanae					
Solenocera membranacea											
Squilla mantis											
						OTHERS					
						Echinoidea					
						Asteroidea					
						Holothurioidea					
						Ophiuroidea					
						Without sorting					
						Plastic					
						Glass					
						Metal					
						Coal					
						Organic matter					
						Inorganic matter					
						Wood					

Figure 3: Species list (third part). Sources of IEO.

FAUNISTIC LIST 1 (DISCARDS)

VESSEL: DATE:______________ CAST:________

TOTAL CAPTURE (kg)		**CAPTURE SAMPLED** (kg)	

		TOTAL C.		SAMPLE				TOTAL C.		SAMPLE	
SPECIES	CODE	w (gr)	Nº	W (gr)	Nº	SPECIES	CODE	w (gr)	Nº	W (gr)	Nº
FISHES						Dentex dentex					
Alopias superciliosus						Diplodus annularis					
Alopias vulpinus						Diplodus sp.					
Aphia minuta						Diplodus vulgaris					
Argentina sphyraena						**Dipturus batis**					
Arnoglossus laterna						**Dipturus oxyrinchus**					
Arnoglossus rueppelli						**Echinorhinus brucus**					
Arnoglossus spp						Engraulis encrasicolus					
Arnoglossus thori						Epigonus denticulatus					
Arnoglosus imperialis						**Etmopterus spinax**					
Aspitrigla obscura						Eutrigla gurnardus					
Bathysolea profundicola						Gadiculus argenteus					
Blennius ocellaris						Gaidropsarus spp.					
Boops boops						**Galeorhinus galeus**					
C. caelorinchus						**Galeus atlanticus**					
Callionymus maculatus						**Galeus melastomus**					
Capros aper						Gnathophis mystax					
Carcharhinus altimus						Gobius niger					
Carcharhinus branchyurus						Helicolenus dactylopterus					
Carcharhinus brevipinna						**Heptranchias perlo**					
Carcharhinus falciformis						**Hexanchus griseus**					
Carcharhinus limbatus						Hoplostethus mediterraneus					
Carcharhinus obscurus						**Isurus paucus**					
Carcharhinus plumbeus						**Lamna nasus**					
Carcharias taurus						Lepidopus caudatus					
Carcharodon carcharias						Lepidorhombus boscii					
Carharhinus melanopterus						Lepidotrigla cavillone					
Centrolophus niger						Lesueurigobius sanzoi					
Centrophorus granulosus						**Leucoraja circularis**					
Centrophorus ujato						**Leucoraja fullonica**					
Centroscymnus coelolepis						**Leucoraja melitensis**					
Cepola rubescens						**Leucoraje naevus**					
Cetorhinus maximus						**Leucoraje undulata**					
Citharus linguatula						Lophius budegassa					
Conger conger						Lophius piscatorius					
Chaulodius sloani						Lophius spp					
Chelidonichthys obscurus						Macroramphosus scolopax					
Chelidonichthys obscurus						Merluccius merluccius					
Chimaera monstrosa						Micromesistius poutassou					
Chlorophthalmus agassizi						**Mobula mobular**					
D. quadrimaculatus						**Mullus barbatus**					
Dalatias licha						Mullus surmuletus					
Dasyatis centroura						**Mustelus asterias**					
Dasyatis pastinaca						**Mustelus mustelus**					

Figura 4 : Species discarded List observers. Sources of IEO

FAUNISTIC LIST 2 (DISCARDS)

VESSEL: DATE:_____________ CAST:_______

		TOTAL C.		SAMPLE				TOTAL C.		SAMPLE	
SPECIES	CODE	w (gr)	Nº	W (gr)	Nº	SPECIES	CODE	w (gr)	Nº	W (gr)	Nº
FISHES						**Sphyma zygaena**					
Mustelus punctulatus						**Sphyrna lewini**					
Myctophum punctatum						**Sphyrna mokarran**					
Myliobatis aquila						Spicara flexuosa					
Nezumia aequalis						Spicara maena					
Odontaspis ferox						Spicara smaris					
Ophidion barbatum						Spondyliosoma cantharus					
Oxynotus centrina						**Squalus acanthias**					
Pagellus acarne						**Squalus blainville**					
Pagellus bogaraveo						**Squatina aculeata**					
Pagellus erythrinus						**Squatina oculata**					
Pagrus pagrus						**Squatina squatina**					
Peristedion cataphractum						Stomias boa					
Phycis blennoides						Symphurus nigrescens					
Phycis phycis						T. trachurus					
Pomatoschistus spp.						**Torpedo marmorata**					
Prionace glauca						**Torpedo nobiliana**					
Pristis pectinata						**Torpedo torpedo**					
Pristis pristis						Trachinus draco					
Pteroplatytrygon violacea						Trachurus mediterraneus					
Raja asterias						Trachurus picturatus					
Raja branchyura						Trigla lucerna					
Raja clavata						Trigla lyra					
Raja miraletus						Trisopterus luscus					
Raja montagui						Uranoscopus scaber					
Raja naebo						Xiphias gladius					
Raja polystigma						Zeus faber					
Raja radula											
Raja rondeleti (of fullonica)											
Rhinobatos cemiculus											
Rhinobatos rhinobatos											
Rostroraja alba											
Sardina pilchardus											
Sardinella aurita											
Scomber japonicus											
Scomber scombrus											
Scorpaena sp.											
Scyliorhinus canicula											
Scyliorhinus stellaris											
Serranus cabrilla											
Serranus hepatus											
Solea vulgaris											
Somniosus rostratus											
Sphyma tudes											

Figure 5. Species discarded list (second part). Sources of IEO.

FAUNISTIC LIST 3 (DISCARDS)

VESSEL: DATE:_____________ CAST:_______

		TOTAL C.		SAMPLE				TOTAL C.		SAMPLE	
SPECIES	CODE	w (gr)	Nº	W (gr)	Nº	SPECIES	CODE	w (gr)	Nº	W (gr)	Nº
CRUSTACEAN						**MOLLUSKS**					
Alpheus glaber						Alloteuthis sp.					
Aristeus antennatus						Alloteuthis media					
Bathynectes maravigna						Alloteuthis subulata					
Calappa granulata						Eledone cirrhosa					
Dardanus arrosor						Eledone moschata					
Geryon longipes						Illex coindetti					
Goneplax rhomboides						Loligo vulgaris					
Homarus gammarus						Octopus salutii					
Liocarcinus depurator						Octopus vulgaris					
Macropodia longipes						Opistobranchia spp.					
Munida sp.						Pecten maximus					
Nephrops norvegicus						Sepia elegans					
Pagurus sp.						Sepia officinalis					
Parapenaeus longirostris						Sepia orbignyana					
Pasiphea sivado						Sepietta spp.					
Plesionika edwardsii						Sepiola spp.					
Plesionika giglioli						Todarodes spp.					
Plesionika heterocarpus						Cassidaria tyrrhena					
Plesionika martia						Sepia spp					
Plesionika sp.						Venus nux					
Pontocaris spp.						Todaropsis eblanae					
Solenocera membranacea											
Squilla mantis											
						OTHERS					
						Echinoidea					
						Asteroidea					
						Holothurioidea					
						Ophiuroidea					
						Without sorting					
						Plastic					
						Glass					
						Metal					
						Coal					
						Organic matter					
						Inorganic matter					
						Wood					

Figure 6. Species discarded list (third part). Sources of IEO.

BY-CATCH & DISCARDS

SIZE DISTRIBUTIONS **Vessel:..............................**

SET:	**DATE:**

Species: ______			Species: ______			Species: ______		
Code: ____			Code: ____			Code: ____		
Category: ____			Category: ____			Category: ____		
Total weight: ____			Total weight: ____			Total weight: ____		
Sample weight: ____			Sample weight: ____			Sample weight: ____		
Minimum size: ____			Minimum size: ____			Minimum size: ____		
Maximum size: ____			Maximum size: ____			Maximum size: ____		
		cm			cm			cm
0			0			0		
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
0			0			0		
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
0			0			0		
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
0			0			0		

Figure.7. Form for discards quantification in trawling and longline fisheries. Sources of IEO.

BY-CATCH & DISCARDS

SIZE DISTRIBUTIONS **Vessel:..............................**

SET:	**DATE:**

Species:	______________	Species:	______________	Species:	__________
Code:	_____	Code:	_____	Code:	_____
Category:	_____	Category:	_____	Category:	_____
Total weight:	_____	Total weight:	_____	Total weight:	_____
Sample weight:	_____	Sample weight:	_____	Sample weight:	_____
Minimum size:	_____	Minimum size:	_____	Minimum size:	_____
Maximum size:	_____	Maximum size:	_____	Maximum size:	_____

		cm			cm			cm
0			0			0		
0,5			0,5			0,5		
1			1			1		
1,5			1,5			1,5		
2			2			2		
2,5			2,5			2,5		
3			3			3		
3,5			3,5			3,5		
4			4			4		
4,5			4,5			4,5		
5			5			5		
5,5			5,5			5,5		
6			6			6		
6,5			6,5			6,5		
7			7			7		
7,5			7,5			7,5		
8			8			8		
8,5			8,5			8,5		
9			9			9		
9,5			9,5			9,5		
0			0			0		
0,5			0,5			0,5		
1			1			1		
1,5			1,5			1,5		
2			2			2		
2,5			2,5			2,5		
3			3			3		
3,5			3,5			3,5		
4			4			4		
4,5			4,5			4,5		
5			5			5		

Figure.8. Form for discards quantification in purse seine fishery. Sources of IEO.

COMMERCIAL

SIZE DISTRIBUTIONS **Vessel:..............................**

SET:			**DATE:**					
Species: ______			Species: ______			Species: ______		
Code: ____			Code: ____			Code: ____		
Category: ____			Category: ____			Category: ____		
Total weight: ____			Total weight: ____			Total weight: ____		
Sample weight: ____			Sample weight: ____			Sample weight: ____		
Minimum size: ____			Minimum size: ____			Minimum size: ____		
Maximum size: ____			Maximum size: ____			Maximum size: ____		
		cm			cm			cm
0			0			0		
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
0			0			0		
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
0			0			0		
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		

Figure.9. Form for lengths and weights quantification in trawling and longline fisheries.Sources of IEO.

COMMERCIAL

SIZE DISTRIBUTIONS **Vessel:..........................**

SET:	**DATE:**

Species: ______________ Code: ____ Category: ____ Total weight: ____ Sample weight: ____ Minimum size: ____ Maximum size: ____ ____	Species: _____________ Code: ____ Category: ____ Total weight: ____ Sample weight: ____ Minimum size: ____ Maximum size ______ ____	Species: ____________ Code: ____ Category: ____ Total weight: ____ Sample weight: ____ Minimum size: ____ Maximum size:__________

		cm			cm			cm
0			0			0		
0,5			0,5			0,5		
1			1			1		
1,5			1,5			1,5		
2			2			2		
2,5			2,5			2,5		
3			3			3		
3,5			3,5			3,5		
4			4			4		
4,5			4,5			4,5		
5			5			5		
5,5			5,5			5,5		
6			6			6		
6,5			6,5			6,5		
7			7			7		
7,5			7,5			7,5		
8			8			8		
8,5			8,5			8,5		
9			9			9		
9,5			9,5			9,5		
0			0			0		
0,5			0,5			0,5		
1			1			1		
1,5			1,5			1,5		
2			2			2		
2,5			2,5			2,5		
3			3			3		
3,5			3,5			3,5		
4			4			4		
4,5			4,5			4,5		
5			5			5		

Figure.10. Form for lengths and weights quantification in purse seine fishery (commercial species). Sources of IEO.

SIZE OF SPECIES CAPTURED (LOWESTcm)

	SWORDFISH	BLUEFIN TUNA	ALBACORE	BLUE SHARK	SHORTFIN MAKO	COMMON THRESHER	BIGEYE THRESHER	SPHYRNA SP.
	LJFL	FL	FL	FL/TL	FL/TL	FL/TL	FL/TL	FL/TL
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

COMMERCIAL CAPTURE

Species	Number of retained fishes	Weight retained	Number of discarded fishes
Swordfish			
Bluefin tuna			
Albacore			
Skipjack tuna			
Blue shark			
Shortfin Mako			
Common Thresher Shark			
Bigeye thresher shark			
Sphyrna zigaena			
Other			
Total			

BY-CATCH CAPTURE

Species	Number of specimens alive	Number of specimens dead
Total		

Figure.11. Form for lengths and weights data collection of target and by-catch species (Longline). Sources of IEO.

Fishing Data

Set Code:

Observer:	Departure date:
Vessel:	Landing date:
Base Port:	Landing port:

1. FISHING EFFORT

Fishing gear/Target species	Bait type (% of species)	Number of hooks (% sizes)
	Bait size:	Fluorescent baits (% and colour)

2. CAST SPECIFICATIONS

CAST	START	END	**TACK**	START	END
Situation			Situation		
Date			Date		
Time			Time		
Depth			Depth		
Temperature			Temperature		
Sea state			Sea state		
Wind strength			Wind strength		
Wind direction			Wind direction		
Lunar stage			Lunar stage		
Miles covered					
Distance to Coast			Distance to Coast		

Changes of direction			
Time:	Situation:	Time:	Situation:
Time:	Situation:	Time:	Situation:

Fishing incidents and other remarks

Figure 12. Fishing form for gathering data on longline fisheries. Sources of IEO.

I	Start time	End time	**II**	Start time	End time	**III**	Start time	End time
IV	Start time	End time	**V**	Start time	End time	**VI**	Start time	End time
VII	Start time	End time	**VIII**	Start time	End time	**IX**	Start time	End time
X	Start time	End time	**XI**	Start time	End time	**XII**	Start time	End time
XIII	Start time	End time	**XIV**	Start time	End time	**XV**	Start time	End time

Figure 13. Fishing form for gathering data on longline fisheries (catches by gear units). Sources of IEO.

ON BOARD OBSERVERS SET FORM

VESSEL
FISHING GEAR

TYPE OF DOOR
WEIGHT DOOR

NUMBER OF SETS ……

DATE (DAY/MONTH/YEAR) ______________________
CABLE HAULED IN (m) ______________________
DISTANCE TO COASTLINE (m) ______________________

BEGINNING

TIME (hour, minutes) ____________________________
LATITUDE (degree, minutes) ________ . ______________N
LONGITUDE (degree, minutes) ________ . ______________W
DEPTH (meters) __________________

FINISHING

TIME (hour, minutes) ____________________________
LATITUDE (degree, minutes) ________ . ______________N
LONGITUDE (degree, minutes) ________ . ______________W
DEPTH (meters) __________________

COURSE (degree) :
VELOCITY/SPEED (knot) :

GENERAL WEATHER CONDITIONS
CLOUDINESS (1/8 – 8/8):
RAINFALL:
WIND STRENGTH (calm, breeze, light, storm):
WIND DIRECTION:

SEA STATE
SEA STATE (calm, slight swell, swell, heavy swell):

º	LATITUDE									
º	LONGITUDE									
GPS	COURSE									
	TIME									
DEPTH FINDER	DEPTH									

Figure 14. Set form to be filled by observers on board of trawling vessels. Sources of IEO.

ON BOARD OBSERVERS SET FORM

VESSEL
FISHING GEAR

TYPE OF DOOR
WEIGHT DOOR

NUMBER OF SETS ……

DATE (DAY/MONTH/YEAR) ______________________
CABLE HAULED IN (m) ______________________
DISTANCE TO COASTLINE (m) ______________________

BEGINNING

TIME (hour, minutes) ___________________________
LATITUDE (degree, minutes) ________ . ______________N
LONGITUDE (degree, minutes) ________ . ______________W
DEPTH (meters) __________________

COURSE (degree) :
VELOCITY/SPEED (knot) :

GENERAL WEATHER CONDITIONS
CLOUDINESS (1/8 – 8/8):
RAINFALL:
WIND STRENGTH (calm, breeze, light, storm):
WIND DIRECTION:

SEA STATE
SEA STATE (calm, slight swell, swell, heavy swell):

º	LATITUDE									
º	LONGITUDE									
GPS	COURSE									
	TIME									
DEPTH FINDER	DEPTH									

Figure 15. Set form to be filled by observers on board of longline vessels. Sources of IEO.

PORT:___________________________ DATE:_______________________ LOCAL TIME:______________________

VESSEL	FISHING GROUND	FISHING TRIPS	NUMBER OF SETS	AVERAGE SETS DURATION	DEPTH	DURATION OF FISHING OPERATIONS	FISHING TRIPS (PREVIOUS MONTH)

Figure 16-. Shoreside sampling form for trawling gear. Sources of IEO
.

PORT :__________________ DATE:____________ LOCAL TIME:______________

Vessel	Species/Category	Number of boxes	Total weight	Specimens number	Specimens weight

Figure 17. Shoreside sampling form for purse seine. Sources of IEO.

PORT: ______________________________

SPECIES: ______________________________

REPORTER: ______________________________

VESSEL: ______________________________

BIOLOGICAL SAMPLINGS

SPECIES	ROUND WEIGHT	MALE	SEX FEMALE	INDET.	SIZE	TOTAL

TOTAL						

Figure 18. Accurate forms for bottom and surface longlines. Sources of IEO.

LANDING PORT:________________________

INFORMER:________________________________

GEAR:____________________

BASE:______________

DATE:________________ VESSEL:___________________

Days at sea :____________ SETS:________ Hooks:___________ Bait:_______________

Miles: ___________

Hours:______________

POSITION SETS AREA NUMBER---WEIGHT

SHORTFIN MAKO:
BLUE SHARK:

B Y C A T C H S P E C I E S

	N	W		N	W
HAMMERHEAD SHARKS			WAHOO (Acanthocybium.)		
BLUE SHARK(TOTAL)			ALBACORE		
SHORTFIN MAKO			YELLOWFIN TUNA		
THRESHER SHARK			BIGEYE TUNA		
CARCHARINUS			WHITE MARLIN		
MEDITERRANEAN SPEARFISH					
BLUEFIN TUNA			ATLANTIC SAILFISH		

BYCATCH SPECIES

SPECIES

	sex	size	weight	sex	size	weight	sex	size	weight
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
TOTAL									

Figure 19-. Forms for bottom and surface longlines. Sources of IEO.

STATISTIC AND SAMPLING NET						REPORTER:		PORT:	
Date	Vessel	Fishing gear	Fishing area	Species	Specimen nº	Total weight	Fishing days	Fishing Effort	Remarks

Figure 20. Form designed for gathering temporal series of total fleet landing of each commercial species. Sources of IEO.

OBSERVER - TRIP CODE **FISHING TRIPS DATA**

VESSEL	....
Number of sets	....
DEPARTURE DATE	....
ARRIVAL DATE	....
LANDING PORT	
SALE TYPE	....

SALE SPECIFICATIONS :

SPECIES	NUMBER	ROUND WEIGHT RW (kg)	DRESSED WEIGHT DW (kg)
Swordfish			
Bluefin tuna			
Albacore			
Blue shark			
Shortfin Mako			
Dolphin fish			
Pomfret			

IMPORTANT:
Please, when you note the weight, you must specify if it is round, dressed, gutted or trunk weight

Figure 21. Forms designed for gathering temporal series of total fleet landing of each commercial species. Sources of IEO.

Vessel:______________________

Longline type:

Date:_______/_______/_______

Longline characteristics: depth: ______________ Hook distance: _______________
Hook size: ____________ Longline length: _______________ Bait:
Appelling

Lights: yes ___ no ___ number ______

<table>
<tr><th>Situation at the beginning of fishing operation</th><th>Situation at the end of fishing operation</th><th>Number of hooks</th><th>Species</th><th>Number</th><th>Weight (average)</th><th>Individual weights: swordfish / bluefin tuna/ albacore</th></tr>
<tr><td></td><td></td><td></td><td>Swordfish</td><td></td><td></td><td rowspan="10"></td></tr>
<tr><td>Hours:</td><td>Fishing operation duration:</td><td></td><td>Bluefin tuna</td><td></td><td></td></tr>
<tr><td colspan="3">Temperature :
Sea stage:</td><td>Albacore</td><td></td><td></td></tr>
<tr><td colspan="3" rowspan="7">Observations:</td><td>Billfish</td><td></td><td></td></tr>
<tr><td>Blue shark</td><td></td><td></td></tr>
<tr><td>Shortfin Mako</td><td></td><td></td></tr>
<tr><td>Thresher shark</td><td></td><td></td></tr>
<tr><td>Heptranquias</td><td></td><td></td></tr>
<tr><td>Dasyatis spp.</td><td></td><td></td></tr>
<tr><td>Other species</td><td></td><td></td></tr>
</table>

Figure 22. Example of logbooks form. Sources of IEO.

24. In the event that my supervisor wishes to verify that I have been conducting interviews here today , may I have your name and phone number?

ANGLER´S NAME

D or N
PHONE # (__ __ __) __ __ __ - __ __ __ __ __ Name and phone number not given

25. UNAVAILABLE CATCH. Did you land any fish that are not here for me to look at? For example, any that you may have thrown back or use for bait? IF YES, COMPLETE TYPE 2 RECORD FOR THIS INDIVIDUAL ANGLER. NOT GROUP CATCH. NOTE : FILLETS ARE UNAVAILABLE CATCH.

DISPOSITION CODES FOR Q25

1. Thrown back alive/legal
2. Thrown back alive/not legal/legality refused
3. Eaten/plan to eat
4. Used for bait/plan to use for bait
5. Sold/plan to sell
6. Thrown back dead/plan to throw away
7. Some other purpose

TYPE 2 RECORDS: (INDIVIDUAL CATCH UNAVAILABLE IN WHOLE FORM)

		SPECIES CODE	# OF FISH	DISP
1.	________________________________	__ __ __ __ __ __ __ __ __ __	__ __ __	__
2.	________________________________			
3.	________________________________			
4.	________________________________			
5.	________________________________			
6.	________________________________			
7.	________________________________			

26. Did you catch any fish while you were fishing that I might be able to look at?

1 ___ Yes
2 ___ No – Code q. 27, 28, 29 as “8´s,”Not Applicable
3 ___ Yes, BUT fish on another angler´s form-
Fill interview # where fish are listed

___ ___ -Code q. 27, 28, 29 as “8´s”Not Applicable

27. Did you catch these yourself or did someone else catch some of them?

1. ___ All Caught by Angler – Code q. 28, 29, as “8´s”Not Applicable
2. ___ Other Contributors 8. ___ Not Applicable

28. Can you separate out your individual catch?

1. ___ Yes _ Code 29 as “88”
2. ___ No 8. ___ Not Applicable

29. How many anglers including yourself have their catch here? Please de not include anyone who did not catch fish. Only count those who have their catch here.
___ ___ No. Of Contributors 88___ Not Applicable

BOX C. If q. 11 is SH mode, code q. 30 as “88”, and Code Box D as”8”.

30. How many people fished on your boat today?

___ ___ No. of People 88 ___ Shore Mode

Box D. If response to q. 30 is 1, code as “8”, Not Applicable. Otherwise, is this the first angler from this boat that I have interviewed?

1. ___ Yes 8. ___ Not Applicable
2. ____ No –Record interview # of 1” angler in the fishing party
___ ___

31. AVAILABLE CATCH . COMPLETE TYPE 3 RECORD BY ASKING: May I look at your fish? What do you plan to do with the MAJORITY of the (species)?

DISPOSITION CODES FOR Q31

3. Eaten/plan to eat
4. Used for bait/plan to use for bait
5. Sold/plan to sell
6. Thrown back dead/plan to thrown away
7. Some other purpose
8. Don´t know/Didn´t ask
9. Refused

TYPE 3 RECORDS: *(INDIVIDUAL CATCH AVAILABLE IN WHOLE FORM)*

	SPECIES CODE	# OF FISH	LENGTH (mm)	WEIGHT (kg)	DISP
1.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
2.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
3.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
4.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
5.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
6.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
7.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
8.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
9.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
10.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
11.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
12.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
13.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
14.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___
15.______________________	___ ___ ___ ___ ___ ___ ___ ___ ___ ___	___ ___ ___	___ ___ ___ ___	___ ___ ___ . ___ ___	___

Figure 23. Survey form. Sources of NMFS (USA).

List of main species rarely observed, endangered, and protected in the Mediterranean.

Dipturus batis

Squalus megalops

Squatina aculeata

Squatina oculata

Squatina squatina

Carcharias taurus

Odontaspis feroz

Cetorhinus maximus
Carcharodon carcharias

Pristis pectinata

Pristis pristis

Figure 24. Second part of the survey form shown in the figure 23.

Data Collection about rare or threatened species

Set	Hour	Species	FL	Tag Number	Condition	Remarks

Figure 25-Example of form to collect data about rare or threatened species. Sources of IEO.

Sightings of rare or threatened species

Position	Date	Time	Species	Specimen number	Remarks

Figure 26.-Form to collect data about sightings of rare or threatened species. Sources of IEO.

Data collection in oceanographic cruises

Catch of main species

Date: ____________________ **Depth:**______________________

Time:_____________________ **Latitude:**____________________

Longitude:___________________

General weather conditions

Cloudiness (1/8 – 8/8):
Rainfall:
Wind strength (calm, breeze, light, storm):
Wind direction:

Sea state

Sea state (calm, slight swell, swell, heavy swell):

Vessel name:
Fishing gear:
Port:

Number of animals:______________

State of the animals:

- Alive: ____ Nº: ____
- Dead: ____ Nº: ____
- In state of putrefaction: ____ Nº: ____
- In a very advanced state of putrefaction:..... ..____ Nº: ____
- Fragmented: ____ Nº: ____

Figure 27. Form to use in fishing scientist surveys to collect general oceanographic data and general condition data of target species. Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).

By-catch species

Date: ___________________ **Depth:**_____________________

Time:____________________ **Latitude:**___________________

Longitude:__________________

General weather conditions

Cloudiness (1/8 – 8/8):
Rainfall:
Wind strength (calm, breeze, light, storm):
Wind direction:

Sea state

Sea state (calm, slight swell, swell, heavy swell):

Vessel name:
Fishing gear:
Port:

State of animals:

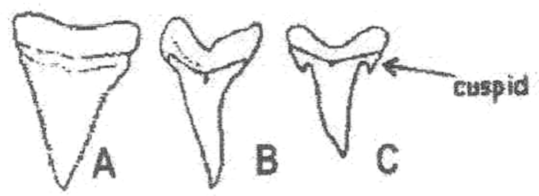
- Alive animals have been released _____ Nº: _____
- Dead animals have been released _____ Nº: _____
- Animals were already dead when caught _____ Nº: _____

Specie	Weight	Size	Sex

Photographs **Yes:**_____ **No:**_____

Figure 28. Form to use in fishing scientist surveys to collect general oceanographic data and general condition data of by-catch species. Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).

Teeth shape



Notched margin _____
Smoothed margin _____

Teeth photos YES ____ NO ____

Other informations:

Stomach contents: **Yes: _____ No: _____**

Embryo in the uterus: **Yes: _____ No: _____**
(if possible conserve them frozen)

What kind of samples have you taken?
____
____
____

Photographs **Yes: _____ No: _____** **Video** **Yes: _____ No: _____**

NOTES:
____
____
____
____

OBSERVER:
Name:
Address:

Figure 29. Form to use in fishing scientist surveys to collect data about teeth shape, stomach contents, reproductive and other biological data. Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).

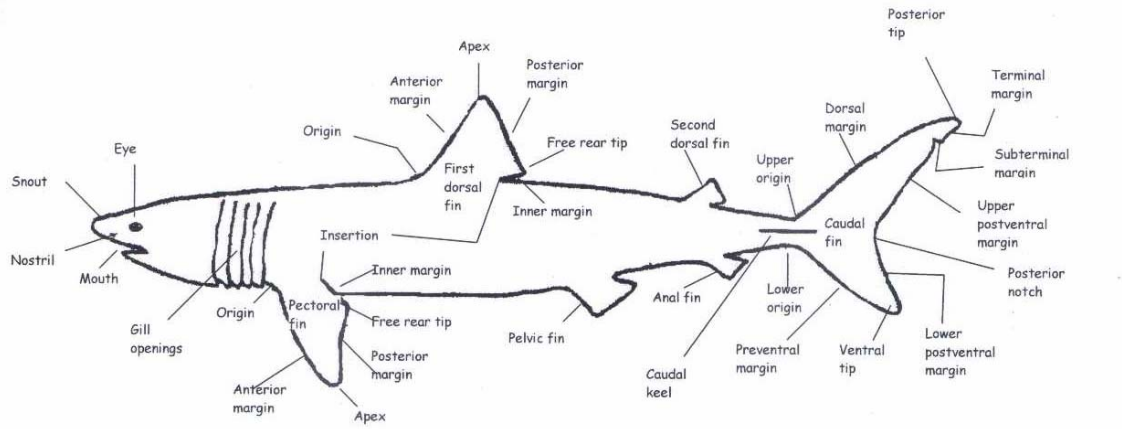
Important samples to take and how to conserve them

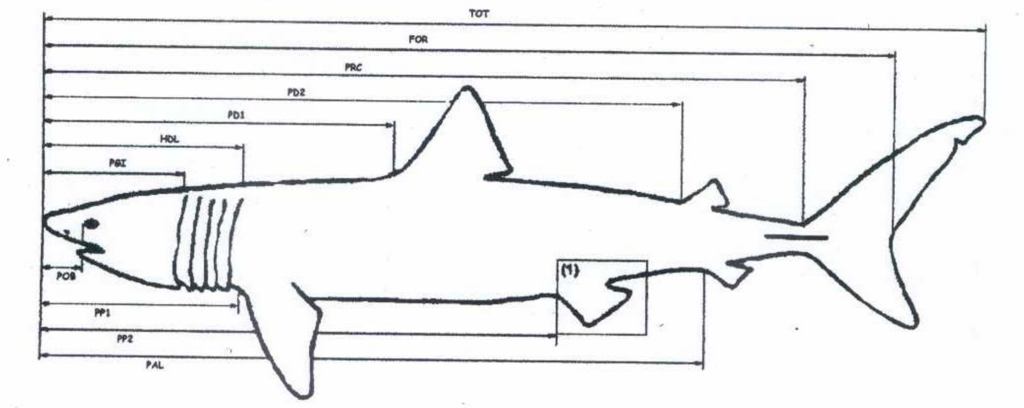
	Alcohol 70%	Formalin 4%	Frozen	Bouin
Stomach contents	***	*	*	
Intestine contents	***	*	*	
Gonads		***		
Muscle	***		*	
Liver		***		
Gill and gill-rakers[1]		***		
Eye				***
Vertebra			***	
Skin		***		
Underkin fat		***		
Spermatophores		***		
Parasite		***		
Utera	***	***		

******* Recommended method * Alternative method

1: for the conservation of gills and gill-rakers it will be better to fix the sample with formalin 10% (formalin and sea water) for a period of 12-24 h; then rinse the sample with fresh water and store it in alcohol 80º.

Figure 30. Form to use in fishing scientist surveys to collect biological samples. Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).





TOT = total length (snout-posterior tip of caudal fin) _____

FOR = fork length (snout-caudal posterior notch) _____

PRC = precaudal length (snout-precaudal pit, upper origin) _____

PD2 = pre-second dorsal length (snout-origin second dorsal fin) _____

PD1 = pre-first dorsal length (snout-origin first dorsal fin) _____

HDL = head length (snout-5th gill openings) _____

PGI = prebranchial length (snout-1st gill openings) _____

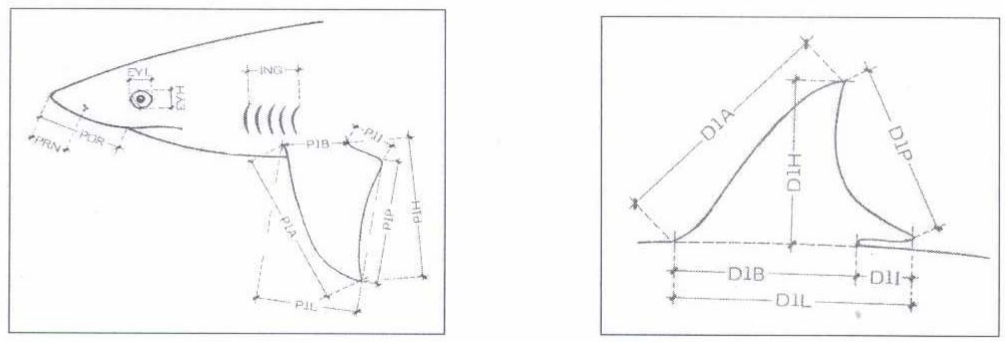
POB = preorbital length (snout-anterior eye margin) _____

PP1 = prepectoral length (snout-origin of the pectoral fin) _____

PP2 = prepelvic length (snout-origin pelvic fin) _____

PAL = preanal length (snout-origin anal fin) _____

Figure 31. Form to use in fishing scientist surveys to collect general length measurements in sharks. Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).



Head

EYL = eye length ______
EYH = eye height ______
POR = preoral length (snout-mouth) ______
PRN = prenarial length (snout-nostril) ______
ING = intergill length (1^{st}-5^{th} gill) ______

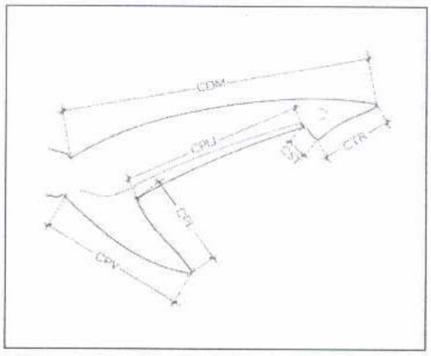
Pectoral fin

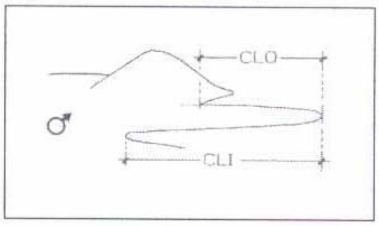
P1A = pectoral anterior margin (origin-apex) ______
P1L = pectoral length (origin-free rear tip) ______
P1P = pectoral posterior margin (apex-insertion) ______
P1H = pectoral height (apex-insertion) ______
P1B = pectoral base (origin-insertion) ______
P1I = pectoral inner margin (insertion-free rear tip) ______

Dorsal fin

D1A = first dorsal anterior margin (origin-apex) ______
D1B = first dorsal base (origin-insertion) ______
D1L = first dorsal length (origin-free rear tip) ______
D1I = first dorsal inner margin (insertion-free rear tip) ______
D1P = first dorsal posterior margin (free rear tip-apex) ______
D1H = first dorsal height (apex-middle point of the base) ______

Figure 32. Form to use in fishing scientist surveys to collect head and fin measurements. Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).





Caudal fin

CDM = dorsal caudal margin (posterior margin of upper origin of precaudal pit-posterior tip)

_____

CTR = terminal caudal margin

_____

CST = subterminal caudal margin

_____

CPU = upper postventral caudal margin (subterminal notch-posterior notch)

_____

CPL = lower postventral caudal margin (posterior notch-ventral tip)

_____

Clasper

CPV = preventral caudal margin (ventral tip-posterior margin of lower origin of precaudal pit)

_____

CLO = clasper outer length

_____

CLI = clasper inner length

_____

Figure 33. Form to use in fishing scientist surveys to collect measurements of caudal fin and claspers.
Sources of MEDLEM PROGRAM (Mediterranean Large Elasmobranchs Monitoring).

FLEET FILE PORT:

MONTH:
YEAR:

VESSEL	LIST	AREA	HULL	REGISTRATION NUMBER	SHEET	GRT	HP	LENGTH	YEAR	BASE PORT	EQUIPMENT

Figure 34. Example of fleet data form. Sources of IEO.

Code of fishing gear: Date:

Target species:

Vessel: Length: GRT: HP: Base port:

Main line
Total length (mn)
Number of hooks
Material
Gauge (Diameter)

Unit
Length
Number of hooks

Branch line
Length
Material
Gauge (Diameter)

Stretch
Length
Number of units
Number of hooks

Hooks
Type
Size
Dimensions (mm)
Hooks gaps

IMPORTANT: YOU MUST DRAW A GEAR SKETCH, NOTE ANY PARTICULAR CHANGE IN THE GEAR OR TERMINOLOGY.

Figure 35. Example of form to collect gear characteristics in longline fisheries. Sources of IEO.

NIMFS FISHERIES OBSERVER PROGRAM

OBS/ TRIP ID	
DATE LAND (mm/yy)	

GILLNET GEAR LOG

GEAR CODE | GEAR NUMBER(S) | NUMBER OF NETS

AVERAGE NET:	USED?	NO	YES	MEASUREMENTS
LENGTH ______FT	FLOATS	0___	1___	Dist Between _______ft
HEIGHT ______FT	TIE DOWNS	0___	1__ 2__	Length ____. _____ft
MESH COUNT VERTICAL ______	SPACE(S) BETWEEN NETS	0___	1___	Number ________
HANGING RATIO ____/____	DROPLINES	0___	1___	Width _________ft
TWINE SIZE___A /E	ADDTIONAL WTS	0___	1___	Lenght _________ft
# STRANDS ____	ANCHOR(S)	0___	1___	Weight _________lbs
				Number ________
NET MATERIAL				Weight _________lbs (total)
Unknown 0___				
Nylon 1___				Actual 1 ___
Other 9___				Estimated 2___
	SECURING METHOD(S)		1___	None
FLOATLINE MATERIAL			2___	Ocean Bottom
Unknown 0_			3___	Vessel / Ocean Bottom
Floating (foam core) 1_			4___	Vessel Only
Twisted Polypropylene 2_				
Other 9_	MM DETERRENT DEVICES USD?			
	ACTIVE	0 __	1 __	Number ________
LEADLINE WEIGHT	Brand _______________			Frequency _______kHz
_______.______lbs / net	PASSIVE	0 __	1 __	Number ________

# OF NETS	MESH SIZE in	(CIRCLE ONE)
	.	A / E
	.	A / E
	.	A / E
	.	A / E
	.	A / E

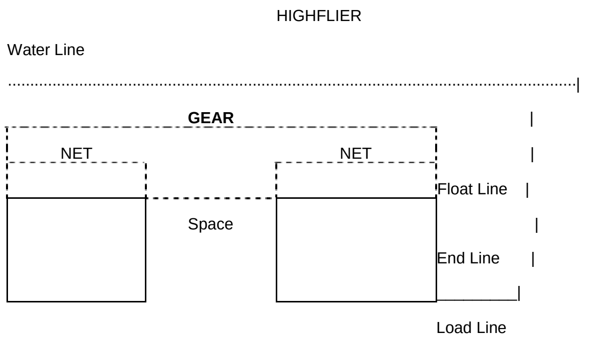
OR

MESH SIZE RANGE

_____-_____ - _____-_____

COLOR	
Unknow	00__
Clear	01__
White	02__
Pink	03__
Black	04__
Green	05__
Blue	06__
Mukti-color	07__
Red	08__
Orange	09__
Purple	10__
Combination	98__
Other	99__

(diagram for reference only)



COMMENTS

Page 1. Part___

Set # _ _ _ _ _ _ _ _ _
mm yy loc set

Vessel: ___________________________ Date: In ____________ Out _______________

Hooks:_____________ Size:________ Gear: Bottom ;Float Target:__________________Stow-away: in_____ out____

Bait: ____

	Time	Air T°	H_2OT°	Location	Depth(ft)
Set					
First Hook In:					
Last Hook In:					
Haul					
First Hook Out:				Set Length: ________________	
Last Hook Out:				Haulback Direction: B -> E , E-> B	

Spec#	Species	A/D	Disp.	FL(cm)	TL(cm)	Misc. Measure	Sex	Notes
1.								
2.								
3.								
4.								

Notes: ____

Figure 36. Form to collect sex data. Sources of IEO.

SIZE DISTRIBUTIONS VERS SEX 1/2 cm

Cruise:_________________ **Specie:**_________________________________ **CODE:**__________________

CAST:	DEPTH:	RANGE:	CODE:	SECTOR:	DATE:	**PAGE Nº:**

	MALES				1//2	cm		**FEMALES**				1//2	cm	**INDET**	1//2	cm
	I	**II**	**III**	**IV**				**I**	**II**	**III**	**IV**					
0							0							0		
0,5							0,5							0,5		
1							1							1		
1,5							1,5							1,5		
2							2							2		
2,5							2,5							2,5		
3							3							3		
3,5							3,5							3,5		
4							4							4		
4,5							4,5							4,5		
5							5							5		
5,5							5,5							5,5		
6							6							6		
6,5							6,5							6,5		
7							7							7		
7,5							7,5							7,5		
8							8							8		
8,5							8,5							8,5		
9							9							9		
9,5							9,5							9,5		
0							0							0		
0,5							0,5							0,5		
1							1							1		
1,5							1,5							1,5		
2							2							2		
2,5							2,5							2,5		
3							3							3		
3,5							3,5							3,5		
4							4							4		
4,5							4,5							4,5		
5							5							5		
5,5							5,5							5,5		
6							6							6		
6,5							6,5							6,5		
7							7							7		
7,5							7,5							7,5		
8							8							8		
8,5							8,5							8,5		
9							9							9		
9,5							9,5							9,5		
0							0							0		

Number of specimen sampled: Males= Females= Undetermined=

Total number estimated: Males= Females= Undetermined=
Total weight of this specie:_______________grs. Total specimen number (M+F+I):_________
Weight sampled:____________grs.
Conversion coefficient: Initial size:_________ Initial size:__________ Initial size:_________
Final size: _________ Final size:__________ Final size __________

Figure 37. Form to collect size data. Sources of IEO.

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