National Coordination:

- Directorate General for Natural Resources, Safety and Maritime Services (DGRM)

Participating Entities:

- Directorate General for Natural Resources, Safety and Maritime Services (DGRM)
- Portuguese Institute for Sea and Atmosphere (IPMA)
- Regional Directorate for Fisheries in Azores (RAA)
- Institute of Marine Research (IMAR-RAA)
- Regional Directorate for Fisheries in Madeira (DRPM/RAM)

Commission Implementing Decision (EU) 2017/1004 of 17 May 2017

on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008 (recast).

Commission Implementing Decision (EU) 2016/1251 of 12 July 2016

adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019.

Commission Implementing Decision (EU) 2016/1701 of 19 August 2016

laying down rules on the format for the submission of work plans for data collection in the fisheries and aquaculture sectors.

PORTUGAL

Annual Report for data collection in the fisheries and aquaculture sectors

2017-2019

Version [1] – [May 31, 2018]

[Lisbon, May 31, 2018]

CONTENTS

Text Box 1C: Sampling intensity for biological variables

TB 1C.1 - ICES Division IXa

1. Evidence of data quality assurance

   Information coming from Table 5A is available.

2. Deviations from the Work Plan

   Summary of cases where the achieved number of sampled individuals was below the minimum planned number of sampled individuals:

   1a) For *Aphanopus spp*. Commercial samples could not be obtained throughout most of the year which limited the sampling of biological variables.

   1b) For *Merluccius merluccius*, Commercial samples were not obtained in 2017 as it was agreed in the assessment working group (ICES WGBIE) that an international length-weight relationship for combined sexes is used in stock assessment since 1999 and maturity ogive for stock assessment is based on sampling from another MS.

   1c) For some species (*Argyrosomus regius, Boops boops, Conger conger, Dicentrarchus labrax, Dicologlossa cuneata, Phycis blennoides, Solea solea, Sparus aurata, Zeus faber*) and biological variables, the minimum number of sampled individuals (at-market or during survey) for some biological variables (mostly weight) was not attained because the implementation of a new sampling protocol for these species and variables was delayed.

   1d) For some species (*Argyrosomus regius, Diplodus sargus, Lophius budegassa, Lophius piscatorius, Mullus surmuletus, Nephrops norvegicus, Pagellus bogaraveo, Parapenaeus longirostris, Phycis blennoides, Phycis phycis, Sardina pilchardus, Scomber colias, Sepia officinalis, Solea solea, Sparus aurata*) and biological variables, the minimum number of individuals to be sampled was not attained since the minimum number of PSU for the sampling scheme/s in which the species is sampled was attained, but sampling is concurrent and the number of individuals available for sampling depends on landings (at-market) / catch (at-sea and during survey).

   1e) For *Octopus vulgaris* and biological variable Length, the minimum number of individuals to be sampled was not attained since at-market sampling in some particular ports does not allow individual measurements of this biological variable.

   1f) For *Sardina pilchardus* commercial samples could not be obtained in some of the year due to temporary fishing closures.

   Summary of cases where the number of achieved sampled individuals was above the minimum planned number of sampled individuals:

   2a) For some species (*Boops boops, Dicentrarchus labrax, Dicologlossa cuneata, Diplodus vulgaris, Engraulis encrasicolus, Helicolenus dactylopterus, Loligo vulgaris, Merluccius merluccius, Micromesistius poutassou, Nephrops norvegicus, Pagellus acarne, Phycis blennoides, Sardina pilchardus, Scomber colias, Scomber scombrus, Trachurus picturatus,*

Trachurus trachurus, Trisopterus spp., Zeus faber), the minimum number of individuals to be sampled was exceeded since individuals were sampled during concurrent sampling at-market, at-sea or during survey.

2b) For some species (*Engraulis encrasicolus, Loligo vulgaris, Micromesistius poutassou, Scomber colias, Trachurus picturatus, Trisopterus luscus*) the minimum number of individuals to be sampled in Commercial samples was exceeded to increase the effective sample size to provide data to ICES Working Group, or improve knowledge on species biological parameters.

2c) For *Trachurus trachurus*, the minimum number of individuals to be sampled was exceeded since in this year there was a simultaneous implementation of two sampling Schemes. The protocol based on Market sampling by Commercial size category aims to optimize sampling effort and intensity (reduce) in subsequent years.

Additional lines in the AR compared to the WP:

Two new lines (in red font) were included in the AR since this task was proposed in table 1B of the WP but was not proposed in Table 1C (*Scomber scombrus*, ICES IXa, Weight).

3. Actions to avoid deviations.

1a) This issue has been improved in 2018.

1b) Propose further discussion in ICES WGBIE (end-user) for guidance on minimum sampling of biological variables by MS.

1c) The new sampling protocol has been implemented in 2018.

1d) The minimum planned number of individuals to be sampled will be reevaluated and adjusted if needed. It is expected that the outcome of EU project FishPi2 and ICES WKBIOPTIM in which we are involved will provide guidance on the optimization of sampling effort and intensity.

1e) Issue has been addressed in 2018, by sampling the biological variable Weight instead of Length in all ports.

1f) Efforts are being made to improve collection of Commercial samples throughout the year through contacts with fishers associations.

2a) The minimum planned number of individuals to be sampled will be reevaluated and adjusted if needed. It is expected that the outcome of EU project FishPi2 and ICES WKBIOPTIM in which we are involved will provide guidance on the optimization of sampling effort and intensity.

2b) The minimum planned number of individuals to be sampled will be reevaluated and adjusted if needed. It is expected that the outcome of EU project FishPi2 and ICES WKBIOPTIM in which we are involved will provide guidance on the optimization of sampling effort and intensity.

2c) Optimization of sampling effort and intensity in 2018-2019 based on the results of the analysis of the two sampling Schemes (Concurrent sampling versus Sampling by Commercial size category).

TB 1C.2 - IOTC

1. Evidence of data quality assurance

Information coming from Table 5A is available.

2. Deviations from the Work Plan

Summary of cases where the number of achieved sampled individuals was above the minimum planned number of sampled individuals:

- For several species, sampling carried out when performing concurrent sampling at-sea. No additional expenditure.

3. Actions to avoid deviations.

- No additional expenditure. No action planned.

TB 1C.3 - NEAFC (ICES III)

1. Evidence of data quality assurance

Information coming from Table 5A is available.

2. Deviations from the Work Plan

Summary of cases where the number of achieved sampled individuals was below the minimum planned number of sampled individuals:

1a) Sampling of the Scheme / Stratum ID Code where the species is sampled could not be performed.

Summary of cases where the number of achieved sampled individuals was above the minimum planned number of sampled individuals:

2a) Sampling was carried out by observer already on board and additional samples can be made on a sampling day, with no additional expenditure.

3. Actions to avoid deviations.

1a) Efforts are made to enable sampling of this Scheme/Stratum ID Code in 2018.

2a) No additional expenditure. No action planned.

TB 1C.4 - NAFO (FAO area 21)

1. Evidence of data quality assurance

Information coming from Table 5A is available.

2. Deviations from the Work Plan

Summary of cases where the number of achieved sampled individuals was below the minimum planned number of sampled individuals:

1a) Species with TAC 0, not a target or with low catches compared to other species.

1b) Few opportunities for sampling by the observer, since the observer has other priority duties onboard.

Summary of cases where the number of achieved sampled individuals was above the minimum planned number of sampled individuals:

2a) Sampling carried out by a NAFO observer already on board and additional samples can be made on a sampling day, with no additional expenditure.

3. Actions to avoid deviations.

1a) The number of sampled individuals depends on catches of the species in the sampled trip. No action planned.

1b) The number of sampled individuals depends on the availability of the observer during the trip hauls. No action planned.

2a) No additional expenditure. No action planned.

TB 1C.5 - ICCAT (Mainland)

1. Evidence of data quality assurance

Information coming from Table 5A is available.

2. Deviations from the Work Plan

Summary of cases where the number of achieved sampled individuals was below the minimum planned number of sampled individuals:

1a) Species is not a target species. Sampling depends on catches / landings.

1b) For one particular species, change in trap operation from fishing to farming prevented higher coverage of sampling at-market

1c) For some species, sampling at-market does not allow individual measurements of biological variables Length and Weight and/or there was a decrease in self-reporting, and/or it was not possible to sample for sex:ratio

Summary of cases where the number of achieved sampled individuals was above the minimum planned number of sampled individuals:

2a) For several species, sampling carried out when performing concurrent sampling at-market or at-sea. No additional expenditure.

2b) Commercial samples supported by ICCAT SMTYP

3. Actions to avoid deviations.

1a) The number of sampled individuals depends on catches of the species in the sampled trip. No action planned.

1b) The opportunity for sampling depends on the dynamics of the fish-trap operation throughout the year. No action planned.

1c) Efforts can be made to increase self-reporting, but this cannot be guaranteed.

2a) No additional expenditure. No action planned.

2b) No additional expenditure. No action planned.

TB 1C.6 - CECAF 34.1.2

1. Evidence of data quality assurance

The sampling design and protocols follow the outcomes of sampling expert groups as mentioned in Table 5A.

2. Deviations from the Work Plan

In Madeira, CECAF 34.1.2., the threshold (>150%) was surpassed for all species in the case of the variable "length". This oversampling was achieved without additional costs benefiting of the presence of the sampling teams in the pier while performing concurrent sampling during landings of vessels.

In the particular case of the limpets, the threshold (>150%) was surpassed for all biological variables benefiting from confiscations by the monitoring and control authorities due to various reasons (e.g. small size of the individuals, catches during the closure period, etc.).

A small deviation in the sampling intensity of biological variables of species *Aphanopus carbo* (89%) was registered, due to difficulties to obtain commercial samples in some periods of the year. The reasons were linked to administrative procedures which delayed the acquisition of samples in real time.

3. Actions to avoid deviations

No actions are planned to avoid oversampling as it had no extra costs. These samplings are performed while the samplers are doing concurrent sampling during the unloading, and this is important in order to follow the fishery and enhance the data quality, particularly tuna with unpredictable catches along the year and from year to year. It should be pointed out that the planned samples of the reference years could not reflect the real catch of the year considered.

In order to avoid the under sampling occurred in the *Aphanopus spp.*, a revision of the target samples of biological variables is planned to the following years in order to readjust the acquisition of specimens without losing data quality in the foreseen objectives.

TB 1C.7 - ICES area X

1. Evidence of data quality assurance

At market and at sea sampling design is documented as an internal document that has not been yet made available. Both sampling design and protocols follow the outcomes of WGCATCH concerning commercial catch sampling and estimation and setting guidelines for best practice in at-sea and on-shore sampling of length and age compositions of landings and discards. Also taken into consideration are the outcomes of WGBIOP in terms of procedures and methods standardization concerning age, sex ratio and sexual maturity variables. Regarding storage and processing of data, RCM NA recommendations are considered and followed. Quality control assessment analysis are implemented on the database. Quality checks and validation procedures implemented are: (1) All samples are checked by a coordinator before the input of data; (2) All data introduced in database is checked for syntax errors; (3) A random check of 10% of the data is execute by inspecting the registered data for logical errors, like for example, type of data and values range of variables; (4) Length distributions are then connected with the market landings for future cross examinations.

2. Deviations from the Work Plan

In general, the sampling targets set in the WP proposal were met. However, in some cases, under or oversampling occurred. As sampling for length, weight, age, sex & maturity usually is performed on the same individual, the mentioned deviations are applicable to all these parameters, except if stated otherwise.

2.1. Reasons for oversampling

i) *Survey samples*: occurrence of higher abundance of the species in question in defined fishing locations [*Helicolenus dactylopterus; Pagellus bogaraveo; Phycis phycis* (all variables except length)];

ii) *Commercial samples*: sampling was addressed to collection of length and weight variables from 3 size classes of smaller individuals (*Trachurus picturatus*); higher

availability of the species at landings, made available for sampling a greater number of size classes (*Phycis blennoides*);

iii) *Market samples*: increasing in landings quantities reflected in higher availability of the species for length sampling [*Phycis blennoides* (length)];

iv) *Discards samples*: existence of a minimum landing size (MLS) reflects in high quantities of the species discarded being all measured according to at sea sampling protocol [*Helicolenus dactylopterus* (length)];

2.2. Reasons for shortfalls

i) *Survey samples*: occurrence of lower abundance of the 2 species in question in defined fishing locations (*Beryx decadactylus; Beryx splendens*);

ii) *Market samples*: management policies (MLS, fishing quotas) [*Beryx decadactylus* (length)] and decreasing in landings quantities reflected in lower availability of the species [*Scomber colias* (length); *Pagellus bogaraveo* (length); *Phycis phycis* (length)];

iii) *Commercial samples*: the acquisition of samples for biological sampling was suspended in the last quarter of the year by superior decision [(*Scomber colias; Phycis phycis; Trachurus picturatus* (age, sex ratio, sexual maturity)]; species being landed gutted (*Conger conger*); price/kg to expensive (*Polyprion americanus*).

3. Actions to avoid deviations.

Collection of biological data for the Azores is in a process of transition of technical competences.

Implementation of the Fishmetrics system is foreseen to be a reality in 2018, which will provide length measurements for market samples through automatic image acquisition of fish boxes.

TB 1C.8 – ICCAT (Azores Grounds)

1. Evidence of data quality assurance

At market and at sea sampling design is documented as an internal document that has not been yet made available. Both sampling design and protocols follow recommendations from ICCAT. Quality control assessment analysis are implemented on the database. Quality checks and validation procedures implemented are: (1) All samples are checked by a coordinator before the input of data; (2) All data introduced in database is checked for syntax errors; (3) A random check of 10% of the data is execute by inspecting the registered data for logical errors, like for example, type of data and values range of variables; (4) Length distributions are then connected with the market landings for future cross examinations.

2. Deviations from the Work Plan

In general, the sampling targets set in the WP proposal were met. However, in some cases, under or oversampling occurred. As sampling for length, weight, age, sex & maturity usually is performed on the same individual, the mentioned deviations are applicable to all these parameters, except if stated otherwise.

2.1. Reasons for oversampling

i) *Market samples*: at Azores, increasing in landings quantities reflected in higher availability of the species for length sampling [*Thunnus alalunga* (weight)];

2.2. Reasons for shortfalls

i) *Market samples*: at Azores, decreasing in landings quantities reflected in lower availability of the species for length sampling [*Prionace glauca* (weight); *Thunnus albacares* (weight)];

ii) *Commercial samples*: at Azores, decreasing in landings quantities forced the processing industry to assimilate available specimens, becoming the acquisition of samples for biological sampling very difficult [*Katsuwonus pelamis* (sex ratio, sexual maturity)];

3. Actions to avoid deviations

Collection of biological data for the Azores is in a process of transition of technical competences.

Implementation of the Fishmetrics system is foreseen to be a reality in 2018, which will provide length measurements for market samples through automatic image acquisition of fish boxes.

Efforts will be employed to overcome the lack of a sampler in Pico island or to appoint staff from neighboring islands to the ones where the presence of this métier is more representative, as well as more regular visits to industry facilities in order to perform biological sampling.

Text Box 1D - Recreational fisheries

SECTION 1: BIOLOGICAL DATA

Pilot Study 1.1: Relative share of catches of sea bass recreational fisheries compared to commercial fisheries in Mainland

PS1.1

1. Aim of pilot study:

The few studies conducted on recreational fisheries in the Portuguese coast indicate that this activity involves a large number of fishermen. It is also referred that this activity may have a high impact on some fish stocks (e.g. Erzini et al., 2008; Rangel & Erzini, 2007; Veiga et al., 2010; Veiga, et al., 2013). Nevertheless, as the activity of recreational fishing in Portugal remains insufficiently monitoring, DGRM has in course a preliminary study, developed by "Centro de Ciências do Mar e do Ambiente" in "Fundação da Faculdade de Ciências da Universidade de Lisboa" (MARE/FCUL), to obtain an overview on sea bass recreational fishing and to define a data collection methodology to this species. With those outcomes, available in December 2016, DGRM will launch a pilot study to obtain consistent information on sea bass recreational fishing activity namely catches estimates, fishing areas and seasons, catch composition and released catches.

The pilot study will be developed by an external entity. The study has to be ordered through a tendering process.

2. Duration of pilot study:

Taking into account the duration of administrative procedures, it is expected that the pilot study will start in the second semester of 2017. The duration is estimated to be of 3 semesters as the pilot study shall be developed during a whole fishing season.

3. Methodology and expected outcomes of pilot study:

Recreational fishing in Portugal includes three segments, onshore fishing ("pesca apeada"), boat fishing and spear fishing. In mainland the highest number of licenses is from onshore fishing. In 2015, 112.467 licenses were issued for onshore fishing followed by boat fishing with 64.171 licenses. The number of licenses may not match with the number of the recreational fishermen who exercised this activity as a significant number of licenses are granted for periods less than one year and, each year, a fisherman may acquire several licenses. Moreover, recreational fishing without gears does not need a fishing authorization.

3.1. Population

The population is all recreational fishermen in a given year or period, who carry on their activity in the Portuguese coast, integrating the three segments: onshore fishing; boat fishing and spear

fishing. The universe of the population corresponds to the total number of allowances allocated to these three groups.

3.2. Sampling

Sampling is expected to include some/all of the following components:

- Surveys by questionnaire available on the Internet and distributed among members of the recreational fisheries associations;
- Surveys by questionnaire conducted by observers during sampling surveys in coastal areas and recreational marinas, on dates randomly settled;
- Surveys in fishing competitions (sport fishing).

Sampling shall be stratified by recreational segments: onshore fishing; boat fishing and spear fishing and by coastal areas (NUTS II i.e. North, Centre, Lisbon area, Alentejo and Algarve).

For fishing competitions, sampling will be focused in five fishing contests.

Surveys of active fishermen in coastal areas will be carried out according to "roving creel surveys" method, based on the work of Malvestuto et al. (1978), Pollock et al. (1994) and Lockwood (2000). This method is particularly suitable for application in large areas where the distribution of fishermen is dispersed and unknown (Malvestuto 1996). In general, it is a direct contact method, in which a team of researchers travels to a given area and randomly intercepts the fishermen (Malvestuto, 1996).

For boat and spear fishing, the method of "access point survey" will be used. Surveys will be conducted at know points of access such as ports, marinas and landing ramps, in order to obtain quantitative information regarding the fishing effort and catches.

The pilot study will be based on a stratified random sampling method with unequal probabilities of selection. This approach intends to divide the population into non-overlapping sampling units or strata, after each unit was individually sampled. The stratified sampling is particularly useful in cases where populations and different habitats have to be covered, allowing the reduction of the variances coming from the estimations (Malvestuto et al., 1978, Pollock et al., 1994).

The stratification process will be carried out at spatial and temporal scales. Concerning the spatial scale, the study area will be divided into five zones, corresponding to the coastal areas of the divisions NUTS II: North, Centre, Lisbon area, Alentejo and Algarve. Each of these zones will be further divided into sections of 5 km long. Then, 10 to 20 sections per zone, depending on its size, will be sampled.

Concerning temporal scale, the sample will be stratified by season, namely: spring, summer, autumn and winter. The sampling period will be between 9:00h and 18:00h. Previous studies on recreational fishing in coastal areas showed that the struggle between the sunrise and 9:00h and between 18:00h and the sunset is residual when compared with the remained daytime (Erzini et al. 2008).

3.3 Data collection

Data collection will be focused on three key aspects, namely: socio-economic characterization, fishing method, estimation of fishing effort and catches.

Sampling carried out on onshore fishing and fishing competitions will also collect information on the size and weight of the captured individuals.

Questionnaires will be used for data collection and databases will be organized with all the collected information.

References:

Erzini, K, Veiga, P, Ribeiro, J., Almeida, C., Oliveira, F., Bentes, L., Monteiro, P. and Gonçalves, J. 2008. Caracterização da pesca recreativa de costa do sul e sudoeste de Portugal. University of Algarve. Project Final Report. 127 pp.

Lockwood, R. N. 2000. Sportfishing Angler Surveys on Michigan Inland Waters, 1993-99. Michigan Department of Natural Resources. Ann Arbor, USA. Fisheries Technical Report 2000-3. 16 pp.

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Pollock, K. H., Jones, C. M. and Brown, T. L. 1994. Angler survey methods and their applications in fisheries management. American Fisheries Society Special Publication 25. Bethesda, USA: 371 pp.

Rangel, M. O. and Erzini, K. 2007. An assessment of catches and harvest of recreational shore angling in the north of Portugal. Fisheries Management and Ecology, 14: 343-352.

Veiga, P., Ribeiro, J., Gonçalves, J. M. S. and Erzini, K. 2010. Quantifying recreational shore angling catch and harvest in the south of Portugal (Northeast Atlantic): implications for conservation and integrated fisheries management. Journal of Fish Biology, 76: 2216-2237

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

PS1.1 and PS1.2 are being developed in the same study ordered by the General Directorate of Natural Resources, Safety and Maritime Services (DGRM) and coordinated by the Center for Marine Sciences of the University of Algarve (CCMAR).

During the winter season of 2017/2018 the need for obtaining a larger volume of data became obvious, since the registered number of fishing events, recreational fishers and catches were substantially below the expected values. The low number of recorded fishing events was likely related to the atypically severe atmospheric and sea conditions. Thus, additional methodological procedures were included: fishing logbooks to distribute among recreational fishers (all fishing modes), and online surveys (still under analysis). Also, the field team verified that onboard

observers were key for the characterization of boat angling both for regular and charter boat fishing events.

In terms of sampling effort, 9 103 km were covered, during which 487 recreational fishermen were approached. A response rate of 75% was achieved, with 362 questionnaires eligible for analysis (262 for shore angling, 96 for boat angling and 4 for boat based spearfishing). For all the fishing trips with catches, 1374 individuals were captured, corresponding to 369.23 kg. The number of individuals and catch biomass was substantially higher for boat angling when compared with shore angling.

Moreover, of all the DCF species, only catches of sea bass (*Dicentrarchus labrax*) and spotted sea bass (*Dicentrarchus punctatus*) were reported. Sea bass was the most important target species for all recreational fishing modes.

The atypically harsh atmospheric and sea conditions observed during the winter season sampled, with heavy rain, low temperatures, windstorms and huge waves which led, on several occasions, to closing harbors all across the country, as well as various warnings for precaution and limitation of activities along the coastline (including permanence in this zone), led to the consensual decision of the research team which feels the need of more data, and a careful analysis of the spring sampling season that follows, to understand if the last fishing recreation season corresponded to an atypical event, or a new trend for this activity during the winter season in Portugal. Thus, regional and national estimates, as well as comparisons with commercial fisheries, will only be assessed in next phase of this study, already including data from the 2018 spring season and from the additional data collection methods as the fishing logbooks and potentially, an online survey.

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.

   Achievements will be evaluated after the conclusion of the pilot studies.

5. Incorporation of results from pilot study into regular sampling by the Member State.

   Sampling plan will be decided after the outcomes of a pilot study.

Pilot Study 1.2: Relative share of catches of recreational fisheries compared to commercial fisheries

PS1.2 – Recreational fisheries in Mainland Pollack, elasmobranchs, highly migratory species and eel

1. Aim of pilot study:
   This pilot study aims to estimate the total catch of the pollack, elasmobranches, highly migratory species and eel caught by recreational fishing in Portugal-mainland.

2. Duration of pilot study:
   Taking into account the duration of administrative procedures, it is expected that the pilot study will start in the second semester of 2017. The duration is estimated to be until the end of 2018.

3. Methodology and expected outcomes of pilot study:
   The national law applicable to recreational fishing was changed in 2014 by Portaria 14/2014, 23 January. Since then, the catches of several species, mainly tuna and tuna like species and sharks (*Carcharodon carcharias, Cetorhinus maximus, Lamna nasus, Hexanchus griseus, Carcharhinus falciformis, Carcharhinus longimanus, Alopias superciliosus*), if caught, must be released outright. The number of specimens per vessel and day, for tuna and tuna like species is also limited, namely to 3 bigeye tuna specimens, an annual quota of 500 kg for bluefin tuna, and a limit of 1 specimen for swordfish, blue marlin, white marlin and mako shark. National legislation also makes it mandatory to answer a survey promoted by DGRM, when required, and those who catch tuna-like species are obliged to fill a form on the DGRM website Art 16º (Erzini *et al.*, 2008).

   Concerning pollack there are no reports of catches by recreational fishing. However, a preliminary evaluation will be carried out to confirm this.

   With regard to fishing for highly migratory species by recreational fishermen, no significant impact of fishery carried onboard maritime tourist boats is expected. On the other hand, sport fishing catches, which take place mainly in the south of Portugal, are expected to be the best option to evaluate the long term trends in abundance, weight, mean size, and diversity of the catches taken. For countries such as Portugal, where historical information regarding the recreational fishing catches is scarce, fishing records from sport fishing competitions can be a cost-effective method to analyze long term trends in catch rates and effort and mean size of fish and to assess the status of a fishery (Coll *et al.*, 2004; Gartside *et al.*, 1999; Pradervand *et al.*, 2007). Additionally, anglers that participate in sport fishing competitions are generally more specialized and have different motivations for fishing than the recreational fishers in general.

   Logbooks survey will be distributed among members of the sport fishing companies and associations to estimate fishing effort, catch rates and composition, catch and released and economic expenses. The universe of the population corresponds to the total number of allowances given by area. Additional surveys will be conducted at know points of access such as ports, marinas and landing ramps, in order to obtain the total number and demographic profile of sport fishermen.

   The data will be compiled, and used to estimate the catches of the recreational fishery based on the total reported effort. These estimates will be compared with the catches from the commercial

fisheries, already available and regularly reported to DGRM. This will provide an estimate of the relative share of the catches from the recreational fishery compared to the total catches, for each of those species. With this information, it will then be possible to assess the relative impact of the recreational fisheries activities, and determine the need to establish regular monitoring and data collection programs for this activity. This information will also be useful to prioritize activities within the various components of the recreational fisheries.

Concerning eel, recreational fishing is forbidden in areas under maritime jurisdiction (Portaria nº 14/2014, of 23 January). In 2017, legislation is expected to be published with the ban of recreational fishing in fresh waters. However, a sampling plan will be decided if legislation with the ban for freshwater is delayed.

References:

Coll, J., Linde, M., Garcia-Rubies, A., Riera, F. and Grau, A. M. 2004. Spear fishing in the Balearic Islands (west central Mediterranean): species affected and catch evolution during the period 1975-2001. Fisheries Research, 70: 97-111.

Gartside, D. F., Harrison, B. and Ryan, B. L. 1999. An evaluation of the use of fishing club records in the management of marine recreational fisheries. Fisheries Research, 41: 47-61.

Pradervand, P., Mann, B. Q. and Bellis, M. F. 2007. Long-term trends in the competitive shore fishery along the KwaZulu-Natal coast, South Africa. African Zoology, 42: 216-236.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

PS1.1 and PS1.2 are being developed in the same study ordered by the General Directorate of Natural Resources, Safety and Maritime Services (DGRM) and coordinated by the Center for Marine Sciences of the University of Algarve (CCMAR).

Concerning eel, recreational fishing is forbidden in areas under maritime jurisdiction (Portaria nº 14/2014, of 23 January). In 2017, legislation was published with a ban of recreational fishing in fresh waters (Portaria 360/2017, of 22 November). Therefore, there will be no sampling plan for eel recreational fishery.

During the winter season of 2017/2018 the need for obtaining a larger volume of data became obvious, since the registered number of fishing events, recreational fishers and catches were substantially below the expected values. The low number of recorded fishing events was likely related to the atypically severe atmospheric and sea conditions. Thus, additional methodological procedures were included: fishing logbooks to distribute among recreational fishers (all fishing modes), and online surveys (still under analysis). Also, the field team verified that onboard observers were key for the characterization of boat angling both for regular and charter boat fishing events.

In terms of sampling effort, 9 103 km were covered, during which 487 recreational fishermen were approached. A response rate of 75% was achieved, with 362 questionnaires eligible for analysis (262 for shore angling, 96 for boat angling and 4 for boat based spearfishing). For all the fishing trips with catches, 1374 individuals were captured, corresponding to 369.23 kg. The number of individuals and catch biomass was substantially higher for boat angling when compared with shore angling.

Regarding the species contemplated in the Data Collection Framework (DCF), the recreational fishing season for elasmobranchs and highly migratory species only begins in May.

Moreover, of all the DCF species, only catches of sea bass (*Dicentrarchus labrax*) and spotted sea bass (*Dicentrarchus punctatus*) were reported. Sea bass was the most important target species for all recreational fishing modes.

The atypically harsh atmospheric and sea conditions observed during the winter season sampled, with heavy rain, low temperatures, windstorms and huge waves which led, on several occasions, to closing harbors all across the country, as well as various warnings for precaution and limitation of activities along the coastline (including permanence in this zone), led to the consensual decision of the research team which feels the need of more data, and a careful analysis of the spring sampling season that follows, to understand if the last fishing recreation season corresponded to an atypical event, or a new trend for this activity during the winter season in Portugal. Thus, regional and national estimates, as well as comparisons with commercial fisheries, will only be assessed in next phase of this study, already including data from the 2018 spring season and from the additional data collection methods as the fishing logbooks and potentially, an online survey.

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.

   Achievements will be evaluated after the conclusion of the pilot studies.

5. Incorporation of results from pilot study into regular sampling by the Member State.

   Sampling plan will be decided after the outcomes of a pilot study.

Pilot Study 1.3: Relative share of catches of elasmobranchs and highly migratory species recreational fisheries compared to commercial fisheries in Azores (ICES area X)

PS1.3

1. Aim of pilot study:
   This pilot survey aims to estimate the total catch of elasmobranches and tuna species by recreational fishing in Azores.

2. Duration of pilot study:
   The pilot survey is designed to have the duration of 16 months, between June of 2017 and September of 2018.

3. Methodology and expected outcomes of pilot study:
   The recreational fishing pilot survey for Azorean region is focused on the modality of recreational boat fishing. The methodology is based on an off-site survey design comprising three main elements which will be executed by phone: i) screening survey to estimate the characteristics of the population of recreational boat fishers (number of fishers, their demographic profile and stated fishing avidity); ii) 12 month logbooks survey selected during the screening survey to estimate fishing effort, catch rates and economic expenses; iii) one season (June-September) logbooks survey for charter boats to estimate fishing effort, catch rates and economic expenses.

   The screening survey aims to estimate the total number and demographic profile of recreational boat fishers in Azores. The survey objective is to contact 3000 households in a period of four months with a stratified random design (accounting the island population weight) using the Portuguese telephone database (PT – Portugal Telecom company) from Azores region. The survey is embedded in an omnibus questionnaire that will cover the thematic "use of sea". One member of the household will respond to the questionnaire on behalf of each member of the family of 6 years old or older. Respondents will be asked whether each member of their household had fished recreationally in the Azores during 2017, which gear(s) they had used, whether they were planning to do any recreational fishing in the Azores in 2018 and whether they would be interested in participating in a 12-month logbook survey in the period of 2017-18. In addition, participants who had fished during 2017 will be asked to indicate the number of fishing trips (1–10, 11–20, 21–30, 31–50, or > 50 trips) that were undertaken in the previous 12 months in an attempt to profile activity into broad avidity classes.

   The logbook survey aims to monitor fishing activity in detail over 12 months. The minimum age of participation is 6 years old and participants will be selected from two different sources: i) those respondents who, during the screening survey, had indicated an interest in participating in the logbook survey; and ii) the use of boat fishing licenses data to obtain the contact of the boat fishers. Logbook survey participants will be sent a survey kit comprising a logbook per each trip and a logbook manual. Participants are asked to record detailed information in the logbooks for each fishing trip undertaken and they will then be contacted by phone once a month and requested to transfer the data recorded in their paper logbooks to the survey logbook filled by the survey member.

   In relation to the recreational boat charters for big game fishing and bottom fishing, it is expected that logbooks will be provided to the enterprises in order to obtain their retained and catch and

released per trip. They will be contacted by phone once a month and requested to transfer the data recorded in their paper logbooks to the survey logbook filled by the survey member.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

The recreational fishing pilot survey for Azorean Region, previewed to start in June 2017, was postponed to 2018 due to the delay on the screening survey of recreational boat fishers. It is now expected to start in June 2018 and finish in September 2019, covering the high season for recreational fishing in Azores. However, in the end of 2018, preliminary catch estimates will be available.

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.

   Achievements will be evaluated after the conclusion of the pilot studies.

5. Incorporation of results from pilot study into regular sampling by the Member State.

   Sampling plan will be decided after the outcomes of a pilot study.

Pilot Study 1.4: Relative share of catches of highly migratory species recreational fisheries compared to commercial fisheries in Madeira (CECAF 34.1.2)

PS1.4

1. Aim of pilot study:
   Conduct a study to analyze catches of species obtained in recreational fishing, and to assess the impact compared to commercial fishing. In order to determine the social and economic importance of this activity and define the rules that help maintaining a sustainable fishery.

2. Duration of pilot study:
   From 1st January 2017 until 31th December 2017.

3. Methodology and expected outcomes of pilot study:
   Madeira is an important attraction for marine tourism, with many activities directed to that sector. One of them, is offshore recreational fishery, directed mainly to the capture of large migratory species, is generally practiced along the south coast of the island, and their economic relevance is suspected to be very high, probably higher than the commercial fishery (Graça, 2009).

   The most common type of fishing, which affects the populations of highly migratory species, is known as "Big Game Fishing". Trolling is the most used method of fishing from the vessel, where one or more fishing lines are thrown into the sea, and when the animal bites the hook, consists of running a large area at low speed (3 to 4 nodes), constant for a variable period of time, to tire him. The captured fish, depending on the species and its state after the fight, can be or not released ("Catch and Release"). Normally, marlins are free, but sometimes, due to the effort made by the animal, could be dead or nearly, then it would take to the port, and they are measured, weighed, and normally donated to charity institutions. Instead, other species like tuna or wahoo, which has more gastronomic interest, sometimes are retained for consumption by the crew (Graça, 2009).

   One of the problems is that this style of fishery, is also used by non professional fishermen involved somehow in a small scale into the artisanal fisheries, and since they do not have to declare fishing obtained, part of the catch of these species cannot be estimated.

   Recreational fishing has a lower impact per vessel, but significant for its total volume. Definitely, this is a fishery with a social and economic relevance, but it still needs a lot of adjustments and some basic rules.

   First, the companies of the R.A.M. will be contacted, which are responsible for providing this activity to the tourists, and will be asked for their cooperation to make an analysis of this fishery in the area. For that we need to perform a preliminary analysis of catches in recent years, hoping that they give us the historical catch data, with the species that have fished, their sizes and weights, the area and time of capture and the season. A request will be conducted that includes an explanation of the project and its objectives, along with a survey sheet that will be distributed to fishermen, to be filled every time the vessels goes out to the sea.

   Also a permission will be asked for a scientific observer to be taken on board and participate in the fishery, to examine the protocol and do some sampling. The data will continue to be collected

for the duration of the pilot study and will be analyzed to assess the catches and interaction with the commercial fishery.

The information obtained from surveys and samples obtained at the outings, will serve to create a database as a basis for statistical analysis, for the preparation of the final report of the pilot project.

Moreover, data on catches obtained by vessels engaged in fishing large pelagic of commercial fisheries will be analyzed. Also it will be interesting to try to relate the information obtained from the different catches with the migratory nature of these species, because they are highly related to their patterns of distribution and abundance. These could have been altered in recent years due to climate change that could modify the course of some oceanic currents.

The result of this study will allow us to know the abundance of species caught and to evaluate the status of their populations. Also the catch of the species subject to recreational fisheries will be analyzed, and be compared with those reported for commercial fishing, in order to develop a policy that includes both fisheries to characterize the stock defined for this type of species.

References:

Graça, M.J.D. (2009) Caracterização da pesca grossa na ilha da Madeira. Dissertação apresentada para obtenção do grau de mestre em Biologia Marinha. Universidade do Algarve, Faculdade de Ciências do Mar e Ambiente (Faro). 60pp.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

The pilot study covered the period between January and December 2017.

The first phase of the study was the collection of historical data and catch records from recreational fishing companies in Madeira. Nevertheless, most of those companies didn't have consistent records of the activity or considered them confidential. Thus, other data sources were also used, namely:

- Fishing logbooks from companies with information on fishing trips (day, duration, number of fishers, captures or sightings);

- Facebook pages or blogs referring significant catches and dates for each vessel;

- Catch data obtained from the captains of some professional and private boats of Big Game Fishing;

- Trophy records posted at http://billfishreport.com/;

- Questionnaires carried out in companies and private boats involved in recreational activity, in order to know vessel characteristics, costs per trip, fishing data and catches.

In addition, the annual activity of some vessels was tracked. It was observed that in the beginning and in the end of the year, there is a considerable reduction of recreational fishing activity.

Permission was requested for boarding a scientific observer in order to monitor the fishing operations.

In 2017, the Big Game Fishing around Madeira was performed by 31 vessels, from which 19 were chartered vessels and 12 private ones. A total of 1323 trips was recorded representing 8125 hours of fishing effort and 373 fishes were captured and released.

It was observed that October and November are the months with higher catches. In those months, despite a lower number of trips, relevant catches occurred. Most of the species observed were Wahoo (*Acanthocybium solandri*) and the Dolphin fish (*Coryphaena spp*.). During summer months, from May to July, the most abundant species in this fishery was the Blue Marlin (*Makaira nigricans*) with 248 specimens, with a significant difference compared to the others (Wahoo and Bigeye, tuna 47 specimens each, White Marlin, 15 specimens, and Dolphin Fish, 18 specimens).

The distribution and abundance of these species differs from year to year, mainly because they are large pelagic migratory species with different migration patterns.

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.

With the data collected from the catches and sightings of the most abundant species over the months, an annual distribution can be established for Madeira fishing area. For Blue Marlin, catches are mainly made between June and August. For White Marlin there is no significant occurrence of this species until the months of July and August. Wahoo is available all year round, but in small quantities and its presence is more frequent from August to October. For Dolphin Fish, there is a similar pattern with a peak in July and August. The Bigeye tuna can be found all year round, with greater abundance from April to June.

5. Incorporation of results from pilot study into regular sampling by the Member State.

Achievements are now being evaluated.

6. Incorporation of results from pilot study into regular sampling by the Member State.

Sampling plan will be decided depending on the evaluation.

Text Box 1E: Anadromous and catadromous species data collection in fresh water

1. Justification of data collection programme for the PT EMU

Stock assessment requires collection of stock indicators to accomplish the goals set by the Eel Regulation (mortality and biomass indicators). A combination of methods including the commercial fishery and independent surveys will be used as a proxy to estimate those indicators. The river basin chosen to represent the PT EMU is River Mondego (estuary and freshwater) to compare with data from the 1990's but because this EMU is the whole country and the production of eels is affected by the type of aquatic system, a coastal lagoon (Santo André Lagoon) is also included in the data collection to represent the variety of aquatic systems (river + estuary + coastal lagoon). The fishery will be monitored (mortality) and a sample of eels will be collected (length, weight, sex, age).

It is prohibited to fish glass eels and silver eels in the PT EMU, which implies that commercial fisheries can only provide data for yellow eels between January and September, when the fishery is allowed. Data on recruitment, stock abundance and silver eel migration/production, have to be obtained from independent surveys. The methods used to collect that information will be electrofishing for freshwater and fake nets for the estuary and coastal lagoon. To obtain data related to the fishery, questionnaires will be done to all fishermen licensed to fish in freshwater, and to all fishermen licensed to fish in brackish water. Besides, and to assess the pressure of the fishery, logbooks will be distributed monthly to some fishermen who volunteer to cooperate, and samples will be obtained from commercial fishery.

2. Justification of data collection programme for the Minho EMU

Glass eel: Glass eel fishing allowed for professional fishermen between November and February (4 new moons). Concerning recruitment analysis, it is intended to perform experimental fishing using one stow net in estuary, in new moon, between November and May. Position, depth, water temperature, salinity, water velocity as well as biological parameters such as length, weight and pigmentation stage will be recorded from a glass eel sample. Logbooks will be analyzed to estimate CPUE and compare with experimental fishing.

Yellow/silver eels: Commercial and recreational fishing is not allowed in the River Minho. Concerning the analysis of stock abundance and sex ratio of emigrating eel, it is intended to perform electric fishing in tributaries covering the maximum area during three years and sampling in different stream order classification. Fishing area (m^2), stream average width, average depth, position, temperature, oxygen, visual sediment characteristics, as well as biological parameters such as length, weight and ocular index (Pankhurst and/or Durif indices), will be recorded. A sample of 30 eels per year in migrant stage (silvering) with length less than 50 cm, will be used for sex ratio and age analysis. In River Minho, in different points of the estuary, 10 fyke-nets will be used during two nights with a monthly periodicity. For biological data acquisition the same procedures apply as described above.

1. Were the planned number achieved? Yes/ No

Minho EMU: Yes for logbooks, fishing with fyke-nets and biological samples. No for stow net and electric fishing. The main reason for non-conformity was late contract signing which meant delays in the equipment acquisition and human resources recruitment for field work. The fieldwork will be strengthened in 2018.

PT EMU: Most of the planned number were achieved: 100% for all planned numbers except for the distribution of logbooks/questionnaires in the Mondego River, due to the reduced number of fishermen and their dispersion across the river basin. To overcome this, we have strongly increased the effort to contact eel fishermen, and some questionnaires have already been conducted during 2018.

Text box 1F: Incidental by-catch of birds, mammals, reptiles and fish

1. Results

Incidental bycatch species were:

ICES IXa at-market and at-sea:

-Birds: *Larus michahellis*, *Morus bassanus* (MVB)

-Elasmobranchs (prohibited catch): *Rostroraja alba* (RJA)

-Mammals: *Delphinus delphis* (DCO)

ICCAT at-sea:

-Reptiles: *Dermochelys coriacea* (DKK), *Lepidochelys olivacea* (LKV), *Caretta caretta* (TTL).

-Elasmobranchs (prohibited catch): *Lamna nasus* (POR), *Alopias superciliosus* (BTH), *Carcharhinus falciformis* (FAL), *Carcharhinus longimanus* (OCS), *Sphyrna zygaena* (SPZ).

IOTC at-sea:

-Elasmobranchs (prohibited catch): *Alopias superciliosus* (BTH), *Carcharhinus falciformis* (FAL), *Sphyrna zygaena* (SPZ).

ICES X/Azores at-market and at-sea:

Metiers LHP_CEP, LHP_LPF, LLD_LPF, FPO, GNS_FIF and PS_SPF are extremely selective fisheries without occurrence of by-catch. Metiers LHP_DWS, LHP_FIF, LLS_DWS and LLS_DEF are multispecies fisheries, targeting fish species included in the table 1D of Commission Implementing Decision 2016/1251. These regularly captured species, have high commercial interest as: *Beryx spp.*; *H. dactylopterus*; *L. caudatus*; *M. dypterygia*; *M. moro*; *P. Americanus*. For this reason, these species are not considered by-catch even being relevant species for deep water fisheries. Therefore, the results presented (table 1), are for commercial species with a status (legal framework) of High priority or Vulnerable species in the table 1D. Non-commercial species with the same legal framework are also indicated for at sea sampling (table 2).

Table 1 – Number of samples with occurrence of by-catch, per stratum ID code and species for at market sampling in 2017 at Azores grounds.

stratum ID code	species	N samples
AZM1 - LHP_FIF _<10m	*Raja clavata*	25
AZM1 - LHP_FIF _<10m	*Isurus oxyrinchus*	1
AZM37 - LHP_DWS _<10m	*Raja clavata*	12
AZM38 - LHP_DWS _>10m	*Epigonus telescopus*	2

AZM38 - LHP_DWS _>10m	*Raja clavata*	5
AZM6 - LLS_DEF _<12m	*Raja clavata*	10
AZM7 - LLS_DEF _1218	*Raja clavata*	1
AZM43 - LLS_DWS_<12m	*Epigonus telescopus*	2
AZM43 - LLS_DWS_<12m	*Raja clavata*	24
AZM44 - LLS_DWS _1218	*Epigonus telescopus*	3
AZM44 - LLS_DWS _1218	*Raja clavata*	6
AZM45 - LLS_DWS_>18m	*Epigonus telescopus*	2
AZM45 - LLS_DWS_>18m	*Raja clavata*	1
AZM29 - LLD_LPF	*Isurus oxyrinchus*	3

Table 2 – Number of samples with occurrence of by-catch, per stratum ID code and species for at sea sampling in 2017 at Azores grounds.

stratum ID code	species	N samples
AZS40 - LHP_DWS _>10m	*Raja clavata*	6
AZS40 - LHP_DWS _>10m	*Raja batis*	1
AZS40 - LHP_DWS _>10m	*Dalatias licha*	2
AZS40 - LHP_DWS _>10m	*Deania calcea*	2
AZS40 - LHP_DWS _>10m	*Etmopterus spinax*	3
AZS40 - LHP_DWS _>10m	*Etmopterus pusillus*	3
AZS48 - LLS_DWS_1218	*Centrophorus granulosus*	6
AZS48 - LLS_DWS_1218	*Centrophorus squamosus*	1

AZS48 - LLS_DWS_1218	*Chaceon affinis*	8
AZS48 - LLS_DWS_1218	*Epigonus telescopus*	6
AZS48 - LLS_DWS_1218	*Dalatias licha*	25
AZS48 - LLS_DWS_1218	*Deania calcea*	4
AZS48 - LLS_DWS_1218	*Hoplostethus mediterraneus*	1
AZS48 - LLS_DWS_1218	*Etmopterus spinax*	31
AZS48 - LLS_DWS_1218	*Etmopterus pusillus*	24
AZS48 - LLS_DWS_1218	*Raja clavata*	34
AZS48 - LLS_DWS_1218	*Raja batis*	26
AZS48 - LLS_DWS_1218	*Trachyscorpia cristulata equinata*	1
AZS49 - LLS_DWS_>18m	*Centrophorus granulosus*	10
AZS49 - LLS_DWS_>18m	*Chaceon affinis*	2
AZS49 - LLS_DWS_>18m	*Epigonus telescopus*	6
AZS49 - LLS_DWS_>18m	*Dalatias licha*	27
AZS49 - LLS_DWS_>18m	*Hoplostethus mediterraneus*	3
AZS49 - LLS_DWS_>18m	*Etmopterus spinax*	25
AZS49 - LLS_DWS_>18m	*Etmopterus pusillus*	23
AZS49 - LLS_DWS_>18m	*Raja clavata*	6
AZS49 - LLS_DWS_>18m	*Raja batis*	19
AZS31 - LLD_LPF	*Isurus oxyrinchus*	25

CECAF 34.1.2 at market and at-sea:

- Centrophorus spp (CWO), Nesiarchus nasutus (NEN), Mora moro (RIB), Epigonus telescopus (EPI), Polyprion americanus (WRF), Isurus oxyrinchus (SMA), Deania calcea (DCA)

For the Scheme "Longline for black scabbardfish: At-market" in **RFMO/RFO/IO - Sub-area / Fishing ground "ICES - IXa" and "CECAF - 34.1.2."** the "group of vulnerable species" indicated was a group of "deep-sea sharks". For these 15 species a restrictive by-catch allowance for 2017 and 2018 was introduced on a trial basis by permitting limited landings of unavoidable by-catches of deep-sea sharks in directed artisanal deep-sea fisheries for black scabbardfish that use longlines (COUNCIL REGULATION (EU) 2016/2285).

2. Deviations from Work Plan

No relevant deviations.

3. Data quality

- There is no sampling protocol specifically directed to incidental by-catch of birds, mammals, reptiles and fish. However, when they are observed during regular onboard sampling protocol (ICES IXa and ICES X/Azores) they are registered.

- Onboard observer protocol (ICES IXa) does not instruct to check for incidental bycatch of birds, mammals, reptiles or fish at the opening of the codend in trawls.

- Onboard observer protocol instructs to check for all catch (target + incidental bycatch + discards) during the hauling process in gill nets and longline. The sampled and non-sampled fraction of the gear is recorded in order to have estimates at haul level (ICES IXa and ICES X/Azores).

-The onboard observer protocol (ICES IXa) does not instruct to report on the use of mitigation (i.e. Escape Devices or Acoustic Deterrent Devices).

- The sampling design and protocol (ICES IXa and ICES X/Azores) follow recommendations from relevant expert groups (WGCATCH, SGPIDS, WKPICS, WKRDP).

- As proposed in the Work Plan (ICES IXa and ICES X/Azores), data are stored in national databases (Table 5A). Detailed data were reported to ICES WGBYC, ICCAT and IOTC.

Pilot Study 2: Level of fishing and impact of fisheries on biological resources and marine ecosystem

PS2

1. Aim of pilot study:

   Exploited marine communities are impacted by fisheries and environmental drivers that may lead to changes across the food web. Detecting how marine biodiversity responds to fishing or other factors such as environmental changes require the analysis of long-term data on fish communities and fisheries. A first step is to characterize marine communities (group of interacting species populations occurring together in space and time) and assess how it varies in space and time as well as potential drivers that may affect their structure and abundance. For example, fisheries removals (landings and discards) may lead to changes in marine communities and food webs, by affecting species and size composition. This pilot study aims to identify changes in biodiversity and community changes since 1990 and relate with pressure indicators (e.g. fishing effort). The identification of areas with high levels of biodiversity, highly impacted and/or significant changes in marine communities structure will allow to define data needs in terms of spatial coverage, that may require changes in sampling effort either from fisheries (onboard and market sampling) or research surveys.

2. Duration of pilot study:

   From October 2017 to December 2019

3. Methodology and expected outcomes of pilot study.

   The following data sources will be used:

   - Groundfish surveys data conducted by IPMA (and former institutes) since 1979 along the Portuguese continental coast.
   - Sampling data onboard bottom trawl commercial vessels (landings and discards) since 2004.
   - Landings, logbooks and vessel monitoring systems (VMS) data from trawl commercial vessels available from DGRM since 2004.

   Groundfish survey data will be used to determine and map biodiversity indexes and infer marine communities' structure. Spatio-temporal changes in species composition and spatial distribution of communities will be assessed through multivariate and multi-metric analyses. These changes will be contrasted with information from onboard sampling (landings and discards) to assess the match between the two types of data (fisheries dependent and independent). Pressure indicators (e.g. fishing effort) will be computed using fishing dependent data, particularly landings, logbooks and VMS, and mapped to explore relationships with community results.

Results will highlight communities' changes in space and time that may correlate with fishing pressure indicators and thus, identify sampling and data needs for monitoring the impact of fisheries on biological resources and marine ecosystem.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

The work plan was followed without major deviations. The first stage of the project consisted on the compilation of the data collected during the Portuguese Autumn Groundfish Surveys (PT-PGFS-Q4) since 1979 and its preparation for analysis. The data selected consisted on fish, cephalopods and crustaceans caught from 1990 to 2016. Previous data was considered inadequate for this analysis. Several multivariate approaches were tested to identify communities and follow how they change in space and time. Preliminary results suggest that the community structure change from northern to southern waters and with depth. Further results are expected during 2018.

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.

   The pilot study is in its initial stage and results are preliminary. For this reason, expected outcomes were not yet achieved.

5. Incorporation of results from pilot study into regular sampling by the Member State.

   Results obtained are preliminary. Incorporation of the results obtained into regular sampling are only expected by the end of the pilot study.

Text Box 1G: List of research surveys at sea

TB 1G.1 - Sardine, Anchovy, Horse Mackerel Acoustic Survey – PELAGO

Survey included in Table 10.

1. Objectives of the survey

- To estimate the abundance, biomass and spatial distribution of sardine, anchovy and other small pelagic fishes, by length classes and age groups, presented in the Ibero-Atlantic waters.
- To estimate the spatial distribution of sardine (and other pelagic fish) eggs.
- To map sea surface temperature, salinity and fluorescence.

2. Methodology used on the Portuguese acoustic surveys

Equipment:

Simrad EK 500 - 38 KHz, split beam transducer 8º x 7º (equivalent beam angle: $10\log\psi = -20.2$ dB; pulse duration = 1 ms), calibrated prior to the survey. Data storage and pos-processing software: Movies+

Pelagic trawl (10 m vertical opening) and bottom trawl (NTC) to identify echoes, split acoustic energy and gather biological data. Opportunistic fishing hauls.

CUFES, continuous underway fish egg sampler, plus coupled temperature, salinity and fluorescence sensors.

Sample design:

Parallel systematic grid, 8 nmi apart (west coast), 6 nmi in Algarve; in Cadiz, not parallel, around 8 nm in the middle of the radials. The acoustic survey is made only during day. During night, opportunistic hydrology/plankton/ecology sampling is carried out, when possible. CUFES sampling continuously acquired along the transects.

Abundance estimates:

Survey area is divided into 4 zones: OCN (Caminha to Nazaré), OCS (Nazaré to Cape S. Vicente), ALG (S. Vicente to V. Real Sto. António) and CAD (V. Real to Cape Trafalgar).

The acoustic energy is split by trawl proportion (in number) taking into account the species TS's, if direct energy extraction is not possible.

There are post-stratifications in coherent (length composition, density) areas for each species. Abundance estimation is calculated in number of individuals, by length class, in each coherent area. The hauls are combined in this area, usually without weighting. Biomass estimation is calculated using weight/length relationship. Estimated abundance by age groups is calculated using age/length key, extracted from the otoliths reading.

Manual:

PELAGO survey is coordinated by ICES WGACEGG (http://www.ices.dk/community/groups/Pages/WGACEGG.aspx). ICES manual for Acoustic surveys (Series of ICES Survey Protocols) being finalized.

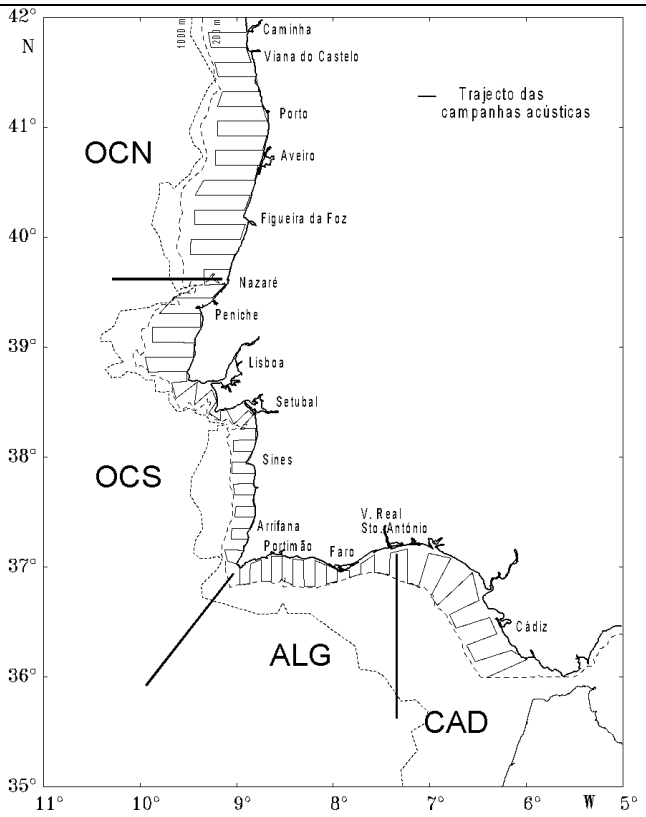

Figure 1G.1.1 - Portuguese acoustic transects and considered areas, for the abundance estimation.

3. For internationally coordinated surveys, describe the participating Member States/ vessels and the relevant international group in charge of planning the survey.
   PELAGO survey is coordinated by ICES WGACEGG (http://www.ices.dk/community/groups/Pages/WGACEGG.aspx

4. Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used.
   No sharing

5. Explain where thresholds apply

   Not applicable

6. Graphical representation (map) showing the positions (locations) of the realized samples.

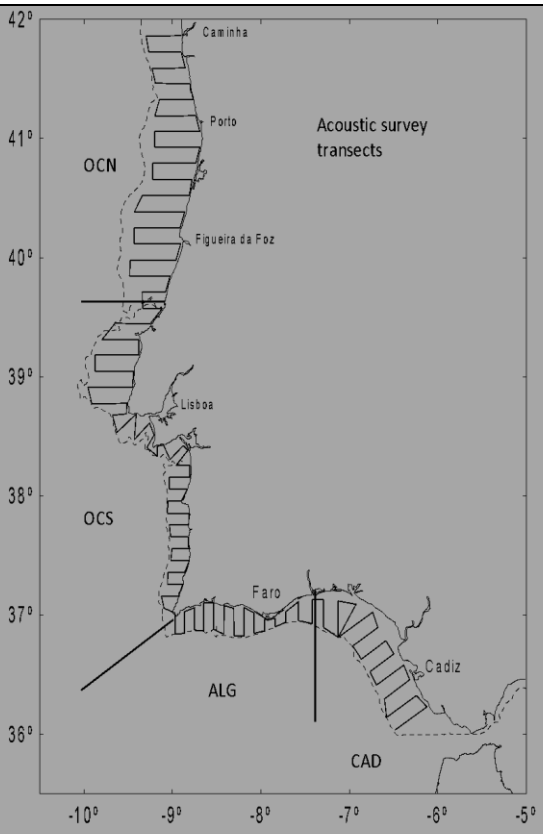

Figure 1G.1.2- Portuguese 2017 acoustic transects and considered areas, for the abundance estimation.

7. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WGACEGG/WGACEGG.pdf

8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Indices used for assessment purposes:

- Abundance and biomass at age for sardine
- Abundance and biomass at age for anchovy

Auxiliary indices for advice:

- Sardine egg abundance distribution
- Anchovy egg abundance distribution

Environmental characterization:

- Temperature distribution
- Salinity distribution
- Fluorescence distribution

9. Extended comments (Tables 1G and 1H)

Since 2016, the echosounder EK500 was replaced by EK60 for the acoustic echo-integration. In the 2017 planning, the indication of this change was missing.

In recent years, the number of fishing hauls has been increased in order to improve the surveying of the pelagic system. Moreover, the decrease of the abundance of the target species has led to the need for extra trawling. In 2017, due to the fact that the two surveys (DEPM and PELAGO) were partially concurrent, additionally contributed to the higher number of hauls undertaken, in comparison to the planned sampling.

The spatial representativeness of horse mackerel and chub mackerel in the fish trawls prevented the assignment of the acoustic energy for these two species in most of the area surveyed. Hence, only biological data is available for these species.

TB 1G.2 - Western IBTS 4th quarter

1. Objectives of the survey:

   The Portuguese groundfish surveys have been conducted since 1979, continuously in autumn, with R/V "Noruega". The main objectives are to estimate the abundance and distribution of the most important commercial species in the Portuguese trawl fishery: hake, horse mackerel and blue whiting. The recruitment indices of abundance and distribution for hake and horse mackerel are also evaluated. Data for other species are collected, for biodiversity purposes.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map):

   The present sampling scheme was implemented in 2005, based on a systematic and stratified random sampling, to facilitate the use of geostatistical models and to overcome the difficulties in the estimation of the variance. It includes depths from 20 to 500 m with a mixed sampling scheme composed by 66 trawl positions distributed over a fixed grid with 5' per 5' miles, corresponding to trawl positions already done, and 30 random trawl positions, with tow duration of 30 minutes. At the end of each haul, a CTD station is performed to collect data on physical parameters.

   The Portuguese surveys cover Division IXa in Portuguese waters. The surveyed area extends from latitude 41°20' N to 36°30' N, and from 20 to 500 m depth. The surveys are carried out with the R/V Noruega, which is a stern trawler of 47.5 m length, 1500 horse power and 495 G.T.R. The used fishing gear is a bottom trawl (type Norwegian Campell Trawl 1800/96 NCT) with a 20 mm codend mesh size. The main characteristic of this gear is the groundrope with bobbins. The mean vertical opening is 4.6 m and the mean horizontal opening between wings and doors is 15.1 m and 45.7 m, respectively. The polyvalent trawl doors are rectangular (2.7 m x 1.58 m) with an area of 3.75 m^2 and weighting 650 Kg.

   Manual:

   PTGFS IBTSQ4 is coordinated by ICES IBTSWG.

   ICES, 2010. Manual for the International Bottom Trawl Surveys in the Western and Southern Areas Revision III Agreed during the meeting of the International Bottom Trawl Survey Working Group 22–26 March 2010, Lisbon. Addendum 2: ICES CM 2010/SSGESST: 06. 58 pp.

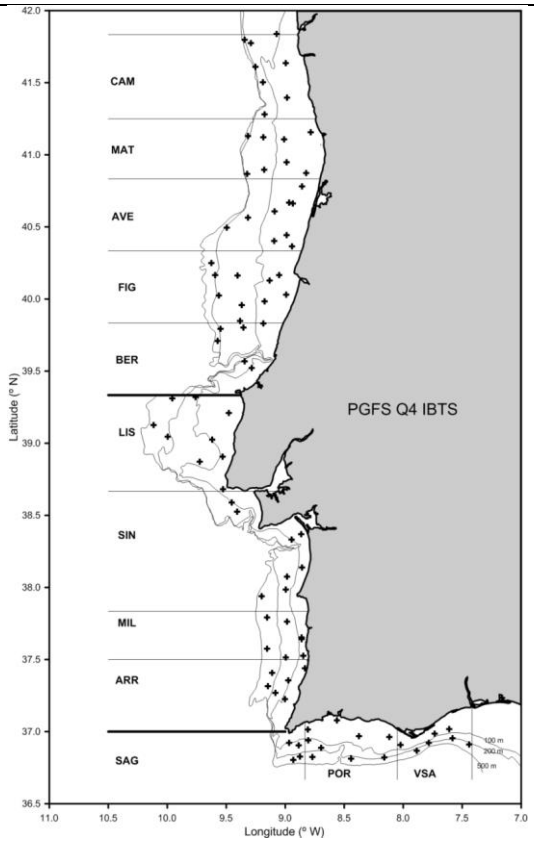

Figure 1G.2.1 - Western IBTS 4th quarter – IBTS Q4. Sampling grid.

3. For internationally coordinated surveys, describe the participating Member States/ vessels and the relevant international group in charge of planning the survey

PTGFS IBTSQ4 is coordinated by ICES IBTSWG.

4. Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used

   Not applicable

5. Explain where thresholds apply:

   Not applicable

6. Graphical representation (map) showing the positions (locations) of the realized samples.

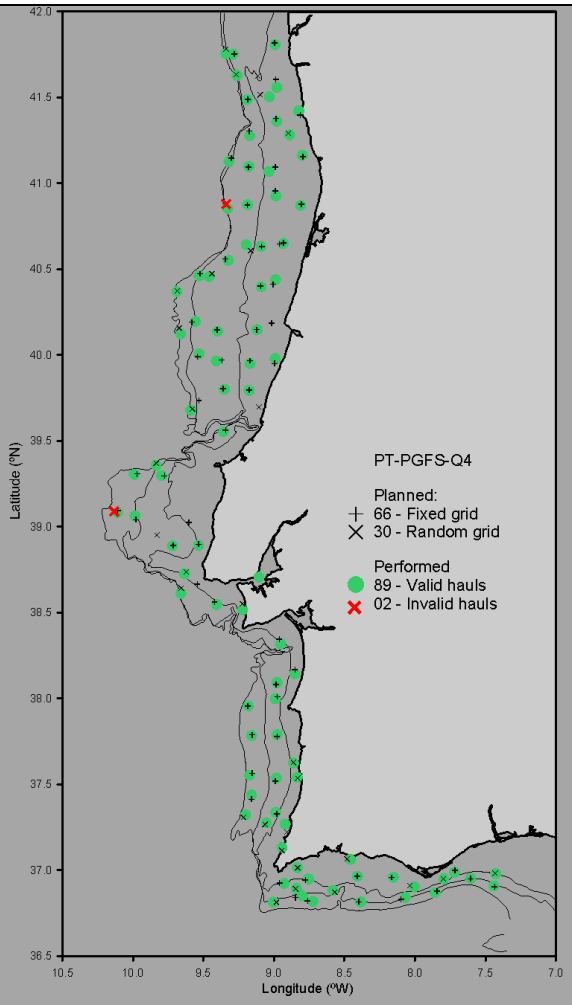

Figure 1G.2.2 - Western IBTS 4th quarter – IBTS Q4. 2017 Sampling grid.

7. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

   PTGFS IBTSQ4 is coordinated by ICES IBTSWG.
   (http://www.ices.dk/community/groups/Pages/IBTSWG.aspx)

8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

   The survey provides data for several data such as indices and abundance estimates to assessment working groups under ICES (WGBIE, WGNEW, WGDEEP, WGEF, WGWIDE, WGCEPH, WGHANSA) and Litter data.

   Biodiversity estimates and contribution to MSFD

9. Extended comments (Tables 1G and 1H):

TB 1G.3 - Nephrops Survey Offshore Portugal NepS (NepS (FU 28-29))

1. Objectives of the survey:

The main objectives of the survey are to estimate the abundance, and to study the distribution and the biological characteristics of the main crustacean species, namely *Nephrops norvegicus* (Norway lobster), *Parapenaeus longirostris* (rose shrimp) and *Aristeus antenn*atus (red shrimp).

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map):

The crustacean surveys are the only independent mean of assessing the status of the Portuguese crustacean resources. Surveys have been carried out since the early 80's using IPMA (formerly IPIMAR) research vessels. These surveys usually take place during the second quarter, generally late May - early July.

The sampling grid was designed to cover the main crustacean fishing grounds within the range of 200 - 750 m. The substrate in these grounds is characterized by muddy sediments composed by different percentages of silt and clay.

Each rectangle has 6.6 minutes of latitude x 5.5 minutes of longitude for the SW coast and vice-versa for the south coast, corresponding approx. to 33 nm^2. The abundance observed at a particular point within the rectangle will reflect the relative abundance of the resource at that geographical area and it is assigned to the centre of the rectangle. The stations may be grouped a *posteriori* in the strata used previously and the results compared with the former surveys.

The grid has been updated to include areas where fishing is known to occur, and to exclude others where the target species do not occur or non trawlable areas, based on the definition of the fishing grounds through VMS fishing records. The new grid is composed by 80 rectangles in total, with 22 in FU 28 and 58 in FU29. Figure 1G.3.1 shows the grid overlaying the fishing grounds, highlighting the changes. The areas deeper than 750 m, where the giant scarlet prawn occurs, are not covered.

- Start time of the haul is defined as the moment when the vertical net-opening and door spread are stable. Stop time is defined as the start of pull back. The haul duration is 30 minutes. Hauls with duration lower than 15 minutes are not considered valid.
- Hauls are carried during daylight at a mean speed of 2.8-3.0 knots.
- Sensors to monitor the trawl net parameters (wings/doors spread, horizontal and vertical openings, depth) are sometimes used and expected to be used on a regular basis from 2015 onwards.

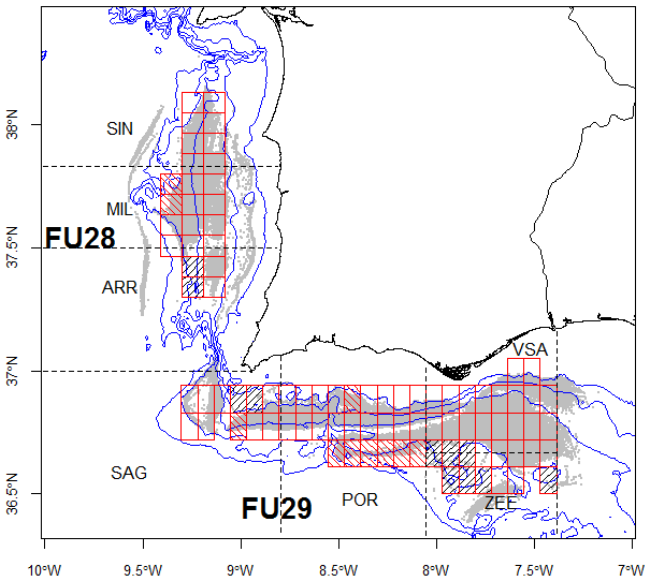

Figure 1G.3.1 - Survey grid in FUs 28 and 29 overlaying the crustacean fishing grounds represented by VMS records (in grey). The red-dashed rectangles were added to the grid survey, the black-dashed rectangles were removed. The sectors used in the previous stratified design are delimited by dashed lines and labelled.

Manual:

NepS (FU 28-29) survey is coordinated by ICES WGNEPS. ICES manual for Nephrops surveys (Series of ICES Survey Protocols) being finalized.

3. For internationally coordinated surveys, describe the participating Member States/ vessels and the relevant international group in charge of planning the survey.

Member State: Portugal; Vessel: R/V NORUEGA

Coordinating and Planning WG: Working Group on Nephrops Surveys (WGNEPS)

4. Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used

No sharing

5. Explain where thresholds apply.

Not applicable

6. Graphical representation (map) showing the positions (locations) of the realized samples.

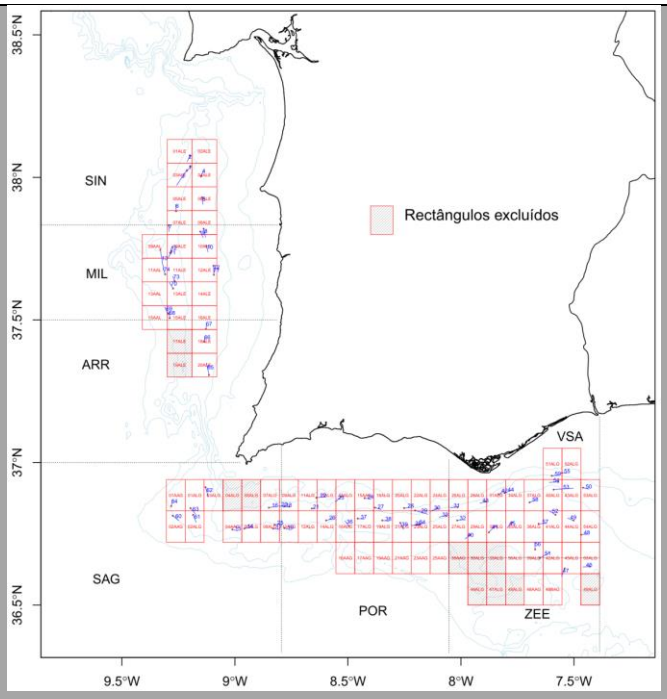

Figure 1G.3.2 – 2017 Survey grid in FUs 28 and 29 overlaying the crustacean fishing grounds represented by VMS records (in grey). The red-dashed rectangles were added to the 2017 grid survey, the black-dashed rectangles were removed. The sectors used in the previous stratified design are delimited by dashed lines and labelled.

7. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WGNEPS/WGNEPS%20Report%202017.pdf

8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

The following survey results are used in WGBIE for trends analysis and parameters estimation:

- Norway lobster biomass and abundance indices,
- sex-ratio
- mean individual weight
- weight – length relationship
- maturity ogive for females

The same indices and parameters are analyzed for deepwater rose shrimp (a relevant stock in national context), and data from other crustaceans and fish by-catch species are collected. This survey also provides data used for the assessment of back anglerfish and megrims.

Biodiversity data and litter composition are routinely collected in this survey and used within the Marine Strategy Framework Directive analyses.

9. Extended comments (Tables 1G and 1H):

In this survey, 74 hauls were carried out, 4 of them were considered not valid due to technical problems in the gear operation and 2 considered replicates. Only 68 hauls (89% of the planned hauls) were used in the analysis. Nevertheless, the main areas and depths have been covered.

TB 1G.4 - Sardine Daily Egg Production Method (DEPM PIL)

1. Objectives of the survey:

Estimate the spawning stock biomass (SSB) of the Atlanto-Iberian sardine stock (ICES VIIIc and IXa), using the Daily Egg Production Method (DEPM).

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map):

The DEPM survey involves vertical ichthyoplankton sampling on fixed stations with a CalVET net. Simultaneously, the auxiliary CUFES system operates underway (between the CalVET stations), collecting plankton samples at approximately 3 m from the surface. Both samplers follow a predefined grid of fixed transects perpendicular to the coast and spaced 8 nm, covering the platform at least until the 200 m isobath (Fig. 1G.4.1). Decisions on the offshore limit of surveying are made, adaptively, depending on the samples obtained by the CUFES system. After hauling, ichthyoplankton samples are preserved, subsequently processed and analysed in laboratory. Concurrently to the plankton sampling with the CalVET and the CUFES, environmental data (temperature and salinity and fluorescence) are recorded. These samples are then used in view of:

- Quantifying and identifying per developmental stage sardine eggs observed over the whole surveyed area;

- Delimiting and estimating the spawning area of sardine;

- Estimating daily egg production.

Simultaneously with the ichthyoplankton sampling, fishing hauls are conducted by pelagic or bottom trawling, opportunistically, following the information provided by the RV echo-sounder. Their number and spatial distribution aim at ensuring a good and homogeneous coverage of the survey area and an adequate representation of the population demography and distribution. Samples collected by the RV are often complemented with samples obtained from the commercial purse-seine fleet at the main landing harbours, during the period of the survey. Immediately after trawling, sardine fish samples are processed onboard the RV, individual biological information is recorded, and biological material is collected and preserved for subsequent histological processing in laboratory.

The collected data and material are used to estimate adult parameters (sex ratio, mean female weight, mean batch fecundity and spawning fraction) within the mature component of the population, and subsequently calculate sardine daily fecundity.

Manual:

DEPM PIL survey is coordinated by ICES WGACEGG

(http://www.ices.dk/community/groups/Pages/WGACEGG.aspx).

ICES manual for DEPM survey (Series of ICES Survey Protocols) being finalized.

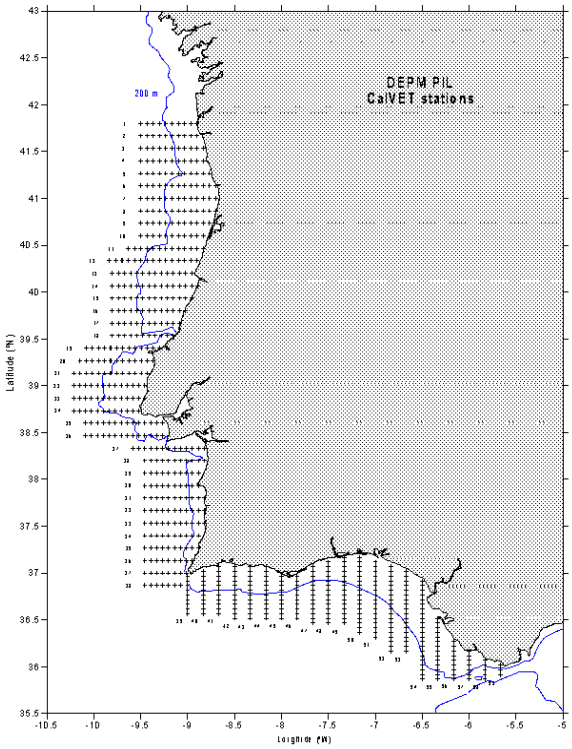

Figure 1G.4.1 – Sardine DEPM (Triennial) - Sampling grid.

3. For internationally coordinated surveys, describe the participating Member States/ vessels and the relevant international group in charge of planning the survey:

Sardine DEPM survey is coordinated internationally under the auspices of the ICES WGACEGG; Portuguese survey carried out jointly with the Spanish survey (from the Instituto Español de Oceanografía, IEO) in order to cover the Atlanto-Iberian sardine stock area (IXa, VIIIc).

4. Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used:

No sharing

5. Explain where thresholds apply.

Not applicable

6. Graphical representation (map) showing the positions (locations) of the realized samples.

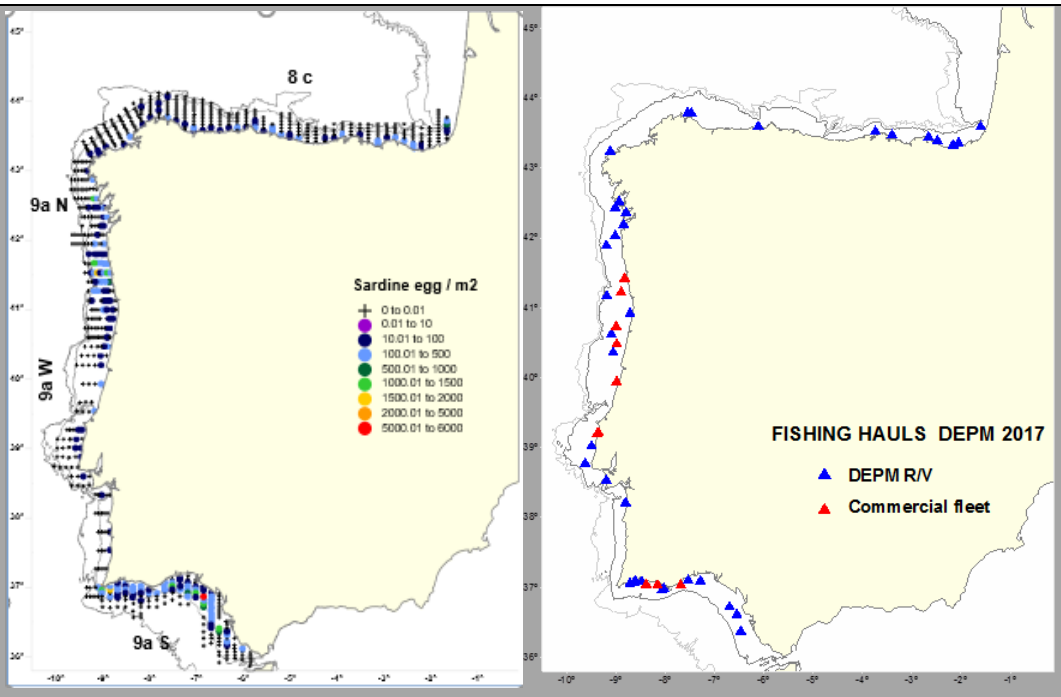

Figure 1G.4.2 – Sardine DEPM survey (PT-DEPM17-PIL) – CalVET sampling and egg abundance (left panel); fishing hauls (right panel).

7. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WGACEGG/WGACEGG.pdf

8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Indices used for assessment purposes:

- Spawning Stock Biomass (SSB) for sardine
- Mean weight and maturity at age for sardine

Auxiliary indices for advice:

- Sardine egg abundance distribution

Environmental characterization:

- Temperature distribution
- Salinity distribution
- Fluorescence distribution

9. Extended comments (Tables 1G and 1H):
Due to logistics constraints the DEPM survey started later than planned and was partially carried out jointly to the PELAGO. Consequently, the number of transects for plankton and CTDF surveying had to be reduced. Hence, the number of samples planned with the CalVET (+CTDF) and CUFES systems were not attained.

TB 1G.5 - International Mackerel and Horse Mackerel Egg Survey (Triennial) (MEGS) - Survey not planned for 2017

TB 1G.6 - Flemish Cap Groundfish survey (FCGS)

1. Objectives of the survey:

   The main objectives of the survey are the estimation of abundance and biomass index of the target species, as well as the knowledge of their population demographic structure and the oceanographic conditions on the Flemish Cap Bank (NAFO Division 3M). For this purpose, the following tasks were implemented:

   - Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, and the collection of otoliths and gonads. For other species only length and length-weight sampling were performed.
   - Observation of the oceanographic conditions on the Bank. The collection of oceanographic data (temperature and salinity) was carried out mainly through the CTD profiling; with a grid-pattern design, placing CTD stations separated 15 nautical miles, both in latitude and longitude, with the aim of covering the whole Bank.
   - Feeding analysis of most abundant species, to be done every two years.
   - Sampling of invertebrates, with special attention to corals and sponges, to allow identification of potentially vulnerable marine ecosystems.

Target species:

- Cod, roughhead grenadier, redfish, american plaice, greenland halibut and northern shrimp.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map).

   - Bottom trawl fishing hauls that last for 30 minutes and are distributed using a stratified random sampling scheme. The used trawling gear is the Lofoten (Vázquez *et al*, 2013);
   - Temperature and salinity profiles are taken with a CTD according to a predefined square grid;
   - The survey starts in the second half of June, and needs 35 days at sea.

   Manual: http://archive.nafo.int/open/studies/s46/S46.pdf

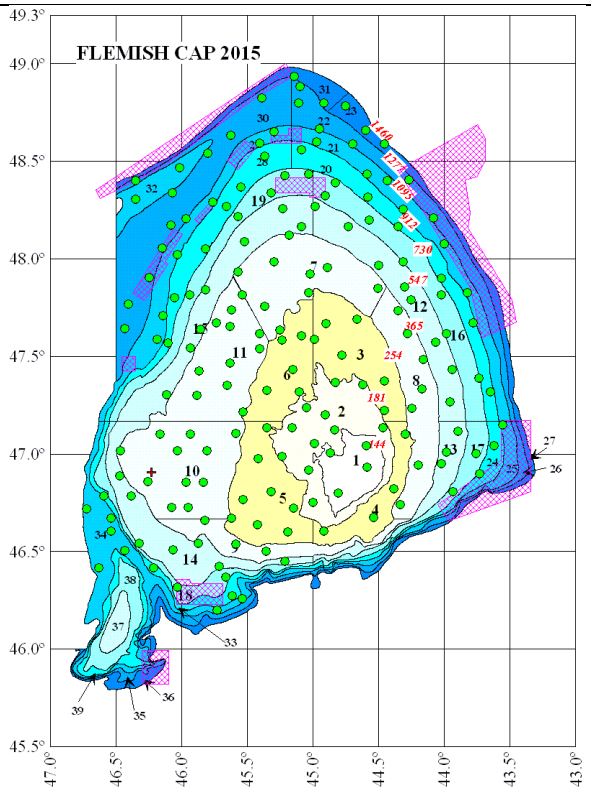

Figure 1G.6.1 - Flemish Cap Groundfish Survey, FCGS (RV Vizconde d'Eza). Sampling grid. Coral and sponge protection areas (red squares); valid hauls (green circles); invalid hauls (red crosses).

References:

Vázquez, A; Casas, J. M. and Alpoim, R. (2013). Protocols of the EU bottom trawl survey of Flemish Cap. NAFO SCR Doc. 13/021. Serial No. N6174. 51pp.

3. For internationally coordinated surveys, describe the participating Member States/ vessels and the relevant international group in charge of planning the survey

   - Spain + Portugal; RV Vizconde de Eza;
   - Portuguese-Spanish surveys in Flemish Cap - coordination meeting for the survey.

4. Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used

   Spain contributes with vessel, staff and samples analysis in laboratory and Portugal contributes with staff and samples analysis in laboratory. There is not signed agreement about task sharing.

5. Explain where thresholds apply

   Not applicable

6. Graphical representation (map) showing the positions (locations) of the realized samples.

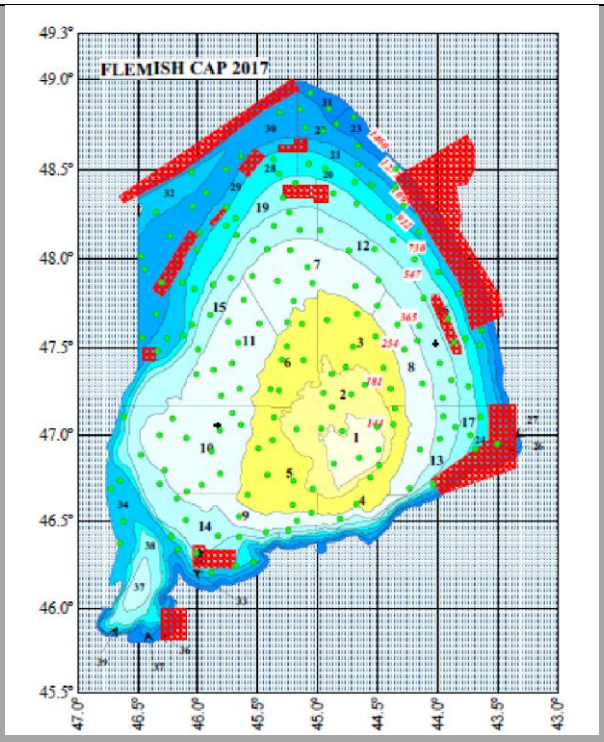

Figure 1G.6.2 - Map of the Flemish Cap Bank (NAFO Div. 3M). Location of the hauls performed (valids in green and nulls in red) during the Flemish Cap Groundfish Survey – 2017.

7. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

   Summary Report of the Flemish Cap International Survey Coordination Meeting (FCCM) 2017: http://www.repositorio.ieo.es/e-ieo/handle/10508/11378

8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

   Survey results, including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, *Roughhead grenadier* and *Greenland halibut*, provide independent information about the stock status of commercial fisheries.

   The results are provided regularly to the NAFO Scientific Council, and they are also the base for many later studies.

   These results are used by the NAFO SC to make an assessment on the state of the resources, which is the key tool for the NAFO Fisheries Commission to take the appropriate management measures. Results are used in the following stocks:

   Cod (Div. 3M), American plaice (Div. 3M), Redfish (Div. 3M), Northern shrimp (Div. 3M), *Greenland halibut* (SA2 and Div, 3KLMNO) together with Canadian surveys, *Roughhead grenadier* (SA2+3) together with Canadian surveys.

   Samples for histological assessment of sexual maturity of cod, redfish, *Greenland halibut* and *Roughhead grenadier* were taken. Oceanography studies continued to take place. Furthermore, results have contributed to the preliminary identification of vulnerable marine ecosystem.

9. Extended comments (Tables 1G and 1H):

The stomach contents sampling was planned biennially by ESP WP 2017-19. Sampling will carry out in 2018. 71 CTD hydrographic stations were carried out, data uploaded into database and used for oceanography studies. The litter items data will be collected as it was planned by ESP WP 2017-19. Data will start to collect from 2018.

TB 1G.7 – ARQDAÇO Survey

1. Objectives of the survey:

   The annual spring bottom longline survey - ARQDAÇO - was established since 1995, targeting demersal and deep water species up to 1200 m depth in the areas near all the nine islands of the archipelago, and various seamounts in the Azores Exclusive Economic Zone. The main aim of the monitoring surveys is to monitor the abundances of the main demersal fishes in Azores, but several campaigns have also explored areas still poorly known in the region, mostly for prospecting purposes, adding to the knowledge on regional environment and species. The applicability of the collected data is related to the support and advice to fishery policy makers, to contribute to the compilation of assessment reports by several working groups, such as the ICES (International Council for the Exploration of the Sea), or regional and national assessments under the framework of the Marine Strategy Framework Directive.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map):

   The ARQDAÇO surveys follow a standardized methodology, using a bottom longline gear similar to that mostly used by the local demersal fishing fleet. Each year, around 34 fishing sets are deployed (Fig 1G.7.1). Data, collected during the surveys, include data on fishing effort and catches by species. On a subsample of fish, biological variables (length, weight, sex, gonadal maturation stage) and samples (otoliths, for age estimation; portions of muscle, for genetic analyses; other tissue for different studies) are collected. During the surveys, a large amount of fishes (mainly Pagellus bogaraveo and Helicolenus dactylopterus) are tagged with traditional spaghetti tags and released. Tagging activity is expected to contribute to the knowledge of the species movements and connectivity among fishing grounds, abundance estimates, mortality and growth rates. Organisms collected as by-catch (such as corals, and other invertebrates) are preserved for further identification and studies. Additionally, oceanographic data are collected using CTDs in half of the fishing sets deployed (i.e. 17 stations; Fig 1G.7.2).

3. For internationally coordinated surveys, describe the participating Member States/ vessels and the relevant international group in charge of planning the survey:

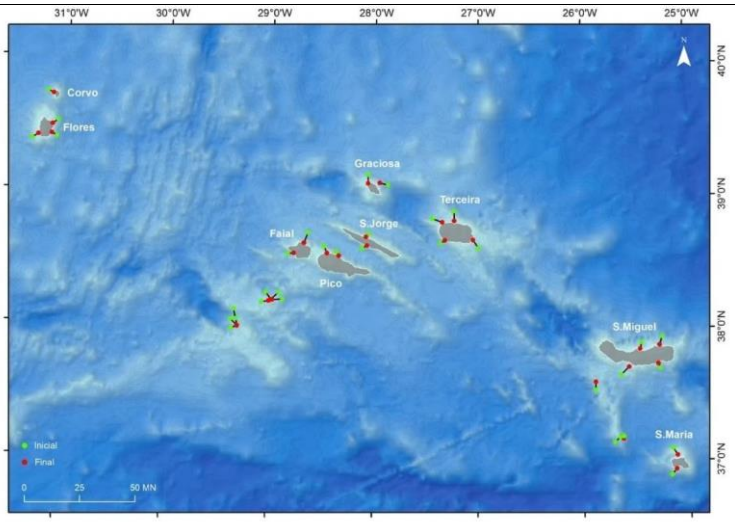

Figure 1G.7.1 – Annual spring bottom longline survey - ARQDAÇO - fishing sets location.

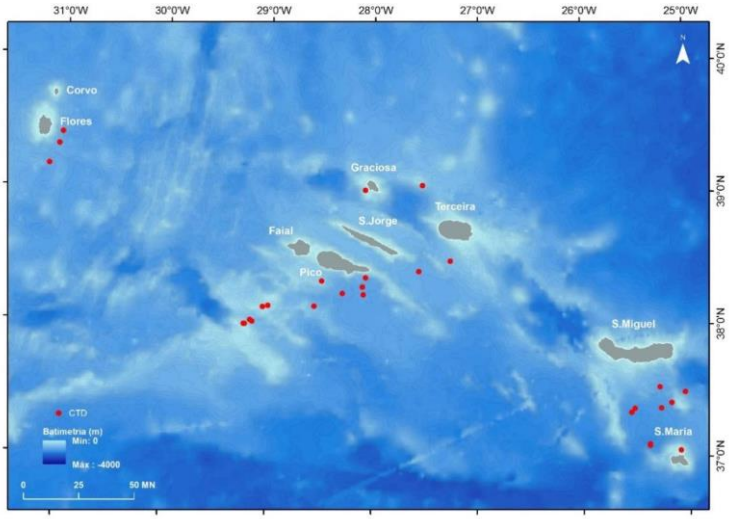

Figure 1G.7.2 – Annual spring bottom longline survey - ARQDAÇO - CTD stations.

4. Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used.

   The surveys have been mainly funded by the Azores Regional Government, but also by national and European entities (i.e. EU-DGXIV, INTERREG).

5. Explain where thresholds apply

   Not applicable

5. Graphical representation (map) showing the positions (locations) of the realized samples.

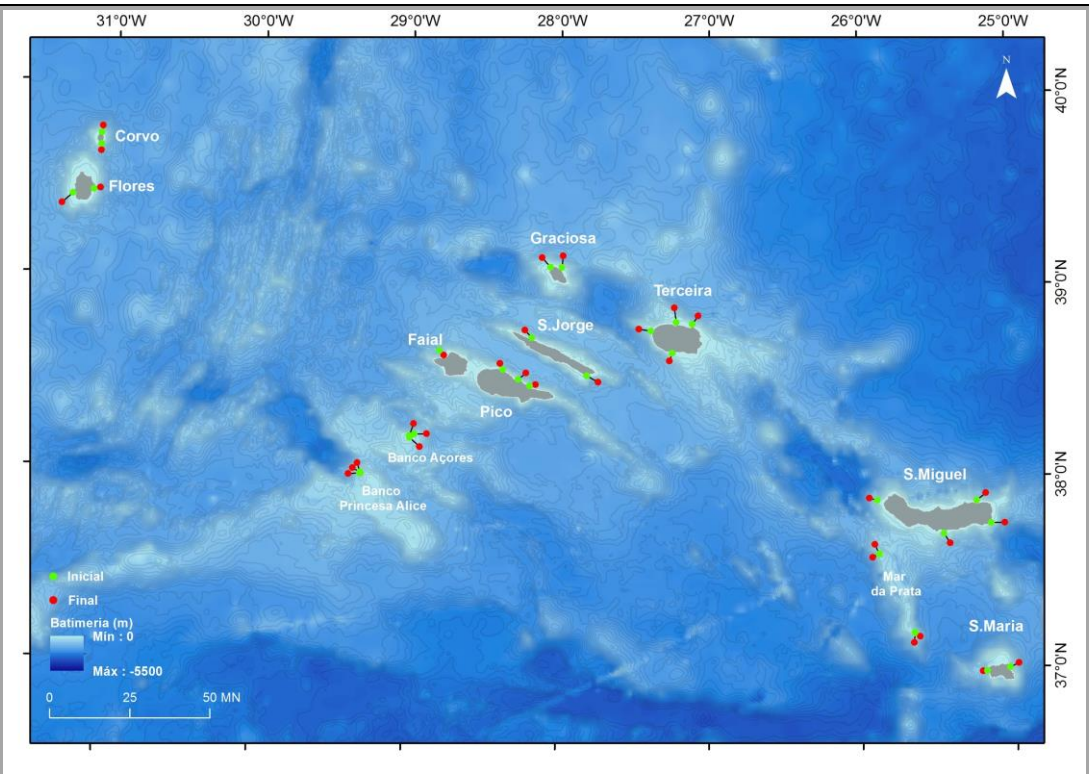

Figure 1G.7.3 – Annual spring bottom longline survey 2017 - ARQDAÇO - fishing sets location.

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.
   ARQDAÇO 2017 cruise report is available by hard copy in the library of the Department Oceanography and Fisheries (University of Azores) since 16/03/2018.

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

   The results are used on an international context as ICES working group (i.e. WGDEEP) and regional context (i.e. to provide scientific advice to the Regional Government, especially on fisheries management and conservation issues). The results of the survey allowed to calculate Catch per Unit of Effort and Relative Population Number (both in number and weight). Also length composition and age composition is calculated (for all individuals and mature/immature individuals).

8. Extended comments (Tables 1G and 1H):

Text Box 2A: Fishing activity variables data collection strategy

1. Description of methodologies used to cross-validate the different sources of data:

For effort, the primary data source is logbooks data and the sales notes are the secondary data source. Frame population comprises all vessels with annual permit to operate.

- In order to improve the data harmonization between partners (Mainland, Azores and Madeira), a refined algorithm for fleet segmentation and metier definition was implemented, being each fishing trip assigned to a metier. The registered fishing trips were collected from different sources, and some issues have been identified (e.g.: trip duplication) that point to the need for further developing the algorithm. This task is foreseen to be accomplished in the short term, aiming for transmission on transversal, economic and biological variables at fleet segment or metier based. The algorithm and methodology will be made available to RCMs, following Recommendation 20 of LM: "Review current algorithms and processes for allocating a trip to a métier based on catch data, provide standard guidelines for it and define a strategy for storing and maintaining national fishery descriptions relative to the defined metiers."
- Regarding landings in national ports, Portuguese administration cross-checks all the information from VMS, logbooks and sales notes in order to filter wrong data (e.g.: trip duration, location of fishing operation), complying with the cross-checks foreseen under the control legislation. The cross-check between landed species (name and weight) and the ones declared in the logbooks is performed on a daily base.
- As far as landings in other MS harbours are concerned, Portugal cross-checks landings data recorded in the logbooks' landing declaration with the landings reported to the Commission by each of those MS, via catch reports. In case of landings or transhipments in third country ports, where sales notes are not available, the cross-checking is made between logbooks' landings, and using VMS data to identify the area of fishing operation. When transhipment takes place, the catch volume by species is computed from T2M documentation.

2. Description of methodologies used to estimate the value of landings:

In Portugal, all vessels landing fresh fish are obliged to sell in first sale. Therefore, data regarding all vessels landing in national ports, including small scale fisheries, are census-like.

The sources of information on landings of fresh or refrigerated fish in national ports are the national designated authorities for that purpose, DOCAPESCA SA and LOTAÇOR E.P., for mainland ports and Azores ports, respectively, and the Regional Directorate DRPM, for Madeira ports.

These entities electronically register all the data from 1st sale, and then send the information to the national administration, accordingly to the rules laid out in the Control regulation.

Regarding fish processed on board, the sources for landing data are logbooks and landing declarations. Landings' live weight by species is computed using processed-live weight conversion factors.

3. Description of methodologies used to estimate the average price (it is recommended to use

weighted averages, trip by trip):

Like it was already referred above, all vessels are obliged to sell the landed fish in the auction places, then data regarding prices are census-like.

4. Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)

For Azores Region a complementary data collection is run with the aim of completing the information for effort variables with a sampling coverage of 5% of the fishing trips.

IMAR/DOP is in charge of information collection concerning the fishing effort, from all harbours where technicians/samplers are located. The information to be collected on effort refers to: days at sea, fishing days, number of fishing trips, number of fishing gears, number of fishing operations, number and size of nets, number of hooks and lines and number of traps.

The main sources of information for gathering these transversal variables are logbooks and inquiries to boat owners present in the harbours at unloading time. These inquiries include all fleet segments, but with increased effort on those that are not obliged to fill a logbook (< 10 meters). For the small scale fleet (boats under 10 meters), questionnaires are distributed by fishermen based on a panel survey methodology, with the purpose of collecting more information of this fleet segment.

5. Deviations from Work Plan methodology used to cross-validate the different sources of data

Not applicable.

Actions to avoid deviations.

Not applicable.

6. Deviations from Work Plan methodology used to estimate the value of landings.

No deviations to report. The estimation of the average price is in accordance with the values estimated on the previous years. Nevertheless we think the process can be improved.

Actions to avoid deviations

Portugal is developing a methodology to improve the estimation of the average price.

7. Deviations from Work Plan methodology used to estimate the average price.

The estimation of the average price is in accordance with the values estimated on the previous years.

Actions to avoid deviations

Portugal is developing a methodology to improve the estimation of the average price in the OFR supra region.

8. Deviations from Work Plan methodology used to plan collection of the complementary data:

There were low achievement rate for the effort variables of small size vessels (0 - < 10m) of fixed

netters, polyvalent 'passive' gears and purse seiners. The main reason is related to the landings of these vessels be disperse in time and space since they occur mostly across the small ports of the islands where they kept the fish in refrigerated warehouses being after transported to the fish market by vans. The absence of the boat master during the sale at fish market in the main island ports hinders the possibility to accomplish inquiries. That explains the deviation from the planned coverage. In the absence of the previous small sizes vessels, samplers at the port end up taking the time to inquire the boat masters of larger vessels explaining the deviation above the expected coverage of purse seiners (10 - < 12m) and vessels using hooks (12 - <18m; 24 - < 40m).

The questionnaires distributed by fishermen based on a panel survey methodology, with the purpose of collecting more information of the small scale fleet (boats under 10 meters) segment was not implemented with the expected success. The achieved response rate was much lower than expected.

Actions to avoid deviations

Some of the actions that have been put in place are related to phone calls performed to the boat masters that were not present during landings in order to obtain effort data, however this action has not been effective. For that reason the use of complementary methods is needed. It is expectable that logbooks specifically designed to smaller vessels, which use fishing techniques that at the moment present low achievement rate of data collection, will produce effect for the future. More effort will take place in order to achieve higher response rates.

Text Box 3A: Population segments for collection of economic and social data for fisheries

1. Description of methodologies used to cross-validate the different sources of data:

   Data sources used for the estimation of economic variables are administrative data, logbooks, sales notes and surveys carried out following a stratified random sampling strategy. For social variables, the data will be collected together with the economic survey adapting the questionnaire form. Each of those sources has as basic unit for the data collection: the vessel. Though the first two sources are census like and the last one is a sample, both relate to the same universe, i.e. the fleet registered on the 1st January of the reference year, therefore the matching of sources is assured. The sources and methods for each variable are listed in Table 3A.

2. Description of methodologies used to estimate the value of landings:

   Different type of data collection was applied per variable and fleet segment. Variables related with fleet operations and fleet characteristics are collected from the national administration database, from sales notes or even logbooks with a census methodology. Concerning economic variables, data were collected by questionnaires.

3. Description of methodologies used to estimate the average price (it is recommended to use weighted averages, trip by trip)

   For Madeira region, economic and social data collection is done by census, while for Azores and mainland a stratified random sampling is applied.

   In order to comply with new demands and to obtain more accurate estimates, Portugal established an uniform fishing fleet segmentation between economic and biological data, based on metier level 6. Allocation of vessels that performed fishing operations in more than one supra region was made according to the criteria of days of activity. In this situation we can find the longline vessels, operating at North Atlantic but also within Other Regions.

   Besides the criteria for assigning a particular vessel to a supra region, it was also required to define criteria to merge some of the fleet segment. All the fleet segments without enough representability to be run independently, are in these circumstances.

   For sample selection the criteria are the sample size by segment (minimum of 30 vessels per segment); number of vessels by segment (census for segments with less than 15 vessels).

4. Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)

   The methodology used for the estimation of most of the variables is based on the imputation of averages per fleet segments. With the raising in importance of the economic results, improvements on the methodology are previewed in order to use more of the available administrative data. The objective is to combine administrative data with surveys answers to modelling, in order to achieve better quality with the available data. This approach has been tested with variable “Energy costs”.

   Other specific methodologies are used for the calculation of variables: capital values, capital costs and FTE.

The value of fixed assets and the capital costs are estimated processing data of the vessel register, and according to the methodology suggested by the study on "evaluation of the capital value, investments and capital costs in the fisheries sector" (No FISH/2005/03).

According to the capital study, the estimation of the capital value (GCS) consisted of three steps:

1. Specification of the composition of the active fleet by age (fleet register).

The specification of the composition of the active fleet by age has been done by processing the fleet register.

2. Estimation of price per unit of capacity (GT).

In order to apply the PIM (perpetual inventory method) and in absence of other possibilities, the price per unit of capacity is estimated having in mind the price for building new vessels (replacement values). Those prices for 2011 were:

- Small scale fleet segment = 21 050,00 euros/GT;
- Polyvalents segment > 12 meters = 47 250,00 euros/GT0,7;
- Trawl segment = 25 820,00 euros/GT0,8;
- Seiner segment = 15 170,00 euros/GT.

3. Calculation of the values of each vintage of the fleet at current prices.

After (1) and (2) we are able to estimate the Gross capital stock, the depreciated replacement value, and all the others variables. Inactive vessels are considered in the evaluation of the capital value and capital costs.

For calculation of FTE, survey information is collected about:

- Number of months of activity;
- Number of days of activity;
- Average number of working hours per day;
- Number of workers per month/gender/type of employment (partial/full time);
- Number of unpaid workers.

The number of days of activity is gathered from logbooks and auctions.

5. Description of methodologies used on data quality:

The sample size for each fleet segment is determined by statistical procedures, targeting the precision level required by DCF for the variable income of the previous year (CV < 5%). To mitigate the non-responses, the CV is increased to 20%.

Before the estimation methodology some quality checks are run. The collected values for each variable are plotted by fleet segment, and for extreme values, a direct contact with the respondent is established.

6. Deviations from Work Plan methodology for selection of data source

Some fleet segments weren't foreseen in the WP as well as a minor number of cases of variables in segments. This was mostly because the chance of paradigm in the way of presentation of the information. In the past there where one table for the segments and another for the economic

variables. This first approach to do this big matrix had some problems of underreporting and over reporting because it was detected also, some segments included in the matrix that had no vessels in the population.

The Guidelines to do WP aren't enough explicit and it would be very helpful to have a helpdesk during the working hours to promote a more efficient clarification of small doubts and also to spread them through the DFC community.

Actions to avoid deviations

Review the matrix and resubmission of the WP

7. Deviations from Work Plan methodology to choose type of data collection

There is very few responses to "other income" and "non-variable cost" and an effort is being done through direct contact to the person who fill the questionnaire in order to clarity the type of response

Actions to avoid deviations

The questionnaire should be easier to understand.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

No deviations.

Actions to avoid deviations

Not applicable.

9. Deviations from Work Plan methodology used for estimation procedures

The methodology to estimate energy consumption was improved and is applied to the segments DTS and HOK, with VL2240m and VL>40m. Firstly, is considered the engine fuel consumption at full power to apply an algorithm developed by the DGRM to estimate the average consumption based on days at sea. After that, knowing the average price of each type of fuel, the cost is calculate per vessel considering the consumption. Additionally, as each vessel has a different ratio, a threshold is applied to the average cost of the fuel estimated for each vessel. This procedure is under development and a methodological document will be elaborated.

Actions to avoid deviations

Not applicable

10. Quality assurance

10.1 Sound methodology

DGRM in line with the best practices concerning quality assurance and applies the sampling procedures in order to get the best compromise between the best data and the burden for the target population.

Some rules are applied to cover the active vessels population when the sample is randomly selected, such as: segments with less than 30 units and sampled 100%; Madeira, once is a small population of vessels, applies a census. On the other hand, as the geographic distribution of the

Azorean Islands makes the inquiries difficult it is used a non-probability.

10.2. Accuracy and reliability

Response rate and Achieved sample rate are provided in Table 3A.

Data collection entry is done for a PHP database where the first data checks, controls and corrections, during the processing of data inputting, are done. After that, variables are plotted and deviations are analyzed once more.

A second phase of validation is the proportionality between some variables (cost structure, etc.), and the last phase is during the estimation procedure when some values still can be considered an outlier.

10.3. Accessibility and Clarity

Are methodological documents publicly available? not yet, as explained in table 5B

Are data stored in databases? Yes

Where can methodological and other documentation be found?

In paper documents and database procedures.

Pilot Study 3: Data on employment by education level and nationality

No pilot study will be applied for data collection on employment by education level and by nationality in 2017. This data will be collected under the aquaculture census operation annually conducted by DGRM.
4. Achievement of the original expected outcomes of pilot study and justification if this was not the case. Not applicable. 5. Incorporation of results from pilot study into regular sampling by the Member State. Not applicable.

Text Box 3B: Population segments for collection of economic and social data for aquaculture

1. Description of methodologies used to choose the different sources of data:

As much as the aquaculture sector is concerned, Portuguese Fisheries Administration acts as the national authority for the production of statistical data. Ever since, all work undertaken within the aquaculture sector is related to the production of data under the European Statistical System.

2. Description of methodologies used to choose the different types of data collection:

Following the publication of Regulation (EC) no. 788/1996, DGRM developed a statistical operation, together with the National Institute for Statistics, performed annually. The sample unit is the establishment and the population comprehends all those establishments that, at the reference year, had legal conditions to undertake any aquaculture activity.

The two operations that supports Aquaculture programme have different target population. The first one, administrative inquiry, has a population comprises by all the aquaculture establishments, regardless of being the first or second activity of the enterprise. The unit of observations is the establishment identified with aquaculture annual license register.

For the second operation, the one supported by National Institute for Statistics, the unit of observation is the enterprise, and will be considered the enterprises with primary activity under NACE Code 03.02, as orientations laid down on Commission Decision.

Relation between both operations is assured by the National Registry of Aquaculture Units and Enterprises, where all the population of enterprises and units are stored, despite of nature of the aquaculture activity (primary or secondary).

As result of different levels of activity and also target population (hatchery and fish units, shellfish units), two kinds of questionnaires were developed, both as census-like operations. The first one, more complete, is set to the universe of hatcheries and all fish farming units and the second questionnaire is developed to collect data on shellfish farming units.

3. Description of methodologies used to choose sampling frame and allocation scheme

Both supporting operations are census like operations, therefore not applicable.

4. Description of methodologies used for estimation procedures

Estimation process for primary variables is supported by estimators of total for census-like information.

To deal with non-responses, a problem mainly concerned with artisanal units for production of bivalve mollusks (clams), the developed methodology is based on the application of raising factors. Each year, based on the collected answers, the average yield (Y) of production, tons per hectare, is estimated. For all non-respondents units, based on their farming area, and applying the annual yield, the total clam production for the reference year is estimated. For non-responses on other variables an imputation of the segment average value is made. This imputation is made only

for variables where values are expected, for other variables a direct contact to the respondent is established in order to confirm the zero value instead of a non-response.

Employment variables, such as FTE will be estimated in accordance with Study Fish/2005/14.

5. Description of methodologies used on data quality

Data collected under the present methodology are subject to a series of validation procedures, in accordance with the rules already evaluated under the Methodological document produced to INE. Both sources are census operations and evaluation of the coverage rate is foreseen. Values by segment are plotted to identify extreme values. For some extreme values, corrections on the dimensions are made (kilos to tons and kilos to grams), for other extreme values a direct contact to the respondent is established in order to confirm them.

6. Deviations from Work Plan methodology for selection of data source

No deviations.

Actions to avoid deviations

Not Applicable.

7. Deviations from Work Plan methodology to choose type of data collection

No deviations.

Actions to avoid deviations

Not Applicable

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

a) In WP, VARIABLES were grouped be segment (Technique/Species Group). The approved WP table doesn't allow to fill the "Frame population" and the "achieved sampled" once this AR-DCMAP table is now the combination of 2 different tables of old AR. Nevertheless, a solution was given by the Commission and so, in the end of the table the desegregated variables per segment were included (in red color) that corresponds to the initial lines of the table where comment (1) was inserted "Once the WP was approved with all the economic variables aggregate, the desegregation "frame population" and "achieved sample" by variable is in the end of the AR table. Data collection done in 2017. As a census is applied no impact on the new segmentation. Data in WP report is according to the DC_MAP segmentation (table 9)."

b) another important remark concerns 3 segments missed in the WP and now included in the AR once there is available data :

- Hatcheries and nurseries /Seabass and Sea bream (1 unit)

- On-bottom/other shellfish (17 units)

- Rafts/Mussels (until now rafts were with longlines)

c) In DCMAP, 4 new variables were created. However, as they were not included in the questionnaire, it is not possible to indicate any value for "frame population". Those variables are:

-Operational subsidies

- Subsidies on investments

- Financial income

- Financial expenditure

Actions to avoid deviations

Resubmission of WP, for 2019, with the new Population segments for the collection of economic and social data for aquaculture.

9. Deviations from Work Plan methodology used for estimation procedures

No deviations. However, DGRM intends to revise the methodology to adjust the production indicators in one of the segments

Actions to avoid deviations

Not applicable

10. Quality assurance

10.1 Sound methodology

The data collection scheme is Census. The methodological document is public both in DGRM and INE web pages. The document was approved by the National Statistics Institute (INE) although this year DGRM is proposing a revision of the methodology to adjust the production indicators in some of the segments.

10.2. Accuracy and reliability

Response rate and Achieved sample rate are provided in Table 3B.

Primary data are inserted in SI2P, the DGRM master database. During the year (data collection period) the Aquaculture Department is responsible to insert all the paper questionnaires in the database. Also during the data collection period, all major errors are checked in the received questionnaires (ex: units, missing data on production box) and when needed a phone contact is done in order to clarify and to correct the information. In May, an intermediate evaluation is done only focused in the production. The information is imported for the "Statistics Schema" and some random tests are done for some variables and the percentage of responses per segment is transmitted to the Aquaculture Department in order to insist with missing responses.

Finally, when the data collection is finished, all the data is updated in the "Statistics Schema". Estimation process for on-bottom/clam is done with the approved methodology of Portuguese NSI . The completeness and data coherence of all variables are analyzed based on SQL-scripts that are run directly in the database and every "strange" value is considered an error and sent to the Aquaculture Department for clarification.

DGRM intends to develop a tool to integrate all the scripts that run independently, in order to be more efficient when the data checks are performed, namely before the next economic aquaculture data call.

For additional information, briefly describe how raw data inputs, intermediate results and outputs are regularly assessed and validated and how errors are identified, documented and dealt with.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes, under revision in 2018 with NSI,

Are data stored in databases? Yes

Where can methodological and other documentation be found?

https://www.dgrm.mm.gov.pt/web/guest/atividade - aquacultura (bullet)

Provide the web link, if documentation is publicly available - done

Pilot Study 4: Environmental data on aquaculture

No pilot study is needed for environmental data on portuguese aquaculture considering chapter V (6.). Actually, Portugal's production represents 0,65% of the total Union aquaculture production in volume and 1,23% in value.

The threshold to be applied is 2,5% of the total Union aquaculture.

(source: Facts and Figures - 2016 EUROSTAT)

Total Aquaculture Production	**EU-28**	**PT**	**%**
Volume (tonnes)	1.211.259	7.874	0,65
Value (1000 euro)	4.014.626	49.266	1,23

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.

Not applicable

5. Incorporation of results from pilot study into regular sampling by the Member State.

Not applicable

Text Box 3C: Population segments for collection of economic and social data for the processing industry

Considering that under Chapter III, 1.1 (d) of Commission Implementing Decision (EU) 2016/1251 of 12 July, social and economic data on the processing industry may be collected on a voluntary basis, Portugal did not include those sets in the Work Plan.

6. Deviations from Work Plan methodology for selection of data source

Not applicable. Data collection may be collected on a voluntary basis and PT established in the WP that will not include processing industry.

Actions to avoid deviations

Not applicable.

7. Deviations from Work Plan methodology to choose type of data collection

Not applicable.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

Not applicable.

Actions to avoid deviations

Not applicable.

9. Deviations from Work Plan methodology used for estimation procedures

Not applicable.

Actions to avoid deviations

Not applicable.

10. Quality assurance

10.1 Sound methodology

Not applicable.

10.2. Accuracy and reliability

Not applicable.

10.3. Accessibility and Clarity

Not applicable.

Text Box 4A: Sampling plan description for biological data

TB 4A.1 - At-market and at-sea sampling (ICES Division IXa)

At-market sampling (ICES Division IXa) – PTM1-FPO_MOL; PTM5-GNS_GTR_DEF; PTM7-LLS_DEF; PTM11-LLS_DWS; PTM14-OTB_DEF; PTM17-OTB_CRU; PTM20-PS_SPF; PTM22-TBB_MCD (in Table 4A)

1.Specification of purposes

The objective of at-market sampling is to obtain length distributions of fish landed at auctions by Portuguese vessels operating in ICES Division IXa.

2.Design

Population: Lengths of fish landed by Portuguese vessels operating in ICES Division IXa.

Target population: Lengths of fish landed at auction (= port) by Portuguese vessels licensed to operate in ICES Division IXa.

Study population: Lengths of fish at port from a subset of vessels from a fleet segment, based on a combination of gear licences and the main species landed in previous year.

Sampling frame: List of ports*day for each fleet segment(*).

Stratification type: Spatial – ports; Temporal – quarters. Stratification is used to improve sampling coverage through the year and in the Portuguese coast.

Sampling effort: Fixed by previous allocation where a weight/value criteria is used. Spatio-temporal allocation is proportional to landings (from previous year) in each port*quarter combination.

Primary Sampling Unit (PSU): Auction*day.

Description:

a) The Portuguese fleet is stratified by fleet, auction and quarter. Following the DCF requirements [EU Commission Decision (2016/1251)], less significant fleets are not sampled (e.g. dredges, beach-seines) and sampling effort is established as number of trips. Annual sampling effort is fixed by the DCF National Sampling Plan that sets number of trips to be sampled in each fleet (≈ métier). Sampling effort is allocated to auctions and quarters proportionally to last year's landings.

b) For each fleet, the visit dates in each auction*quarter are spread somewhat systematically throughout the quarter in a way that covers all week-days where the fleet is active.

c) In every auction*visit_date, observers attempt to sample a predefined number of vessel_sale_events, that are haphazardly selected from a list of all landings awaiting auction. This list includes the name of each vessel and the commercial species, commercial category and weight of each of its boxes. Eachvessel_sale_event generally corresponds to the landings of one fishing trip. A minor proportion of vessel_sale_events may not be present in the selection list at selection time when sampling starts.

d) In each vessel_sale_event, the observers aim to sample boxes from every commercial species and commercial category.

e) Within each commercial category, the observers select 1 box haphazardly. When there are very few fish from a scientific species inside the box, observers take more boxes until the length composition of the size category is well defined.

f) When different species are present within a box, observers sample them all.

During 2017, fish length measurements will be also recorded in some auctions, using on an experimental basis an electronic system composed by a local unit for automatic image acquisition of fish boxes and a remote database to record the processed images (Fishmetrics), which allows to conclude fish length measurements at a later stage.

3.Expected execution difficulties

a) Vessels arriving to port after the auction has started, with large amounts of landings/species/categories meaning no time to sample the complete trip. (e.g.: OTB_DEF).

b) Shipmasters not giving permission for observers to sample fish from their vessels.

c) Some commercial species may not be available for sampling if they have been subjected to previously fixed sale contract. Sometimes observers do not have time to sample all commercial species, so they select the more important species.

4.Data archiving and Quality assurance procedure

Database is programmed in Oracle and contains internal routines for the detection of basic errors (e.g.: errors in dates). Also, quarterly checks are performed using R and SQL routines.

5.Analysis methods

Most of the stocks are assessed within ICES Assessment Working Groups. Data preparation and stock assessment methods are defined in benchmarking processes and described in the species "stock annex".

References

ICES. 2015. Report of the workshop on developing the RDB data format for design based sampling and estimation (WKRDB 2014-1), 27-31 October 2014, Aberdeen, Scotland, United-Kingdom. ICES CM 2014\ACOM:68. 98 pp

(*) There are 9 mutually exclusive vessel lists (based on fishing licenses and previous catch) that approximate the métiers selected for sampling at DCF level.

At-sea sampling (ICES Division IXa)- PTS3-GNS_GTR_DEF; PTS9-LLS_DWS; PTS12-OTB_DEF; PTS15-OTB_CRU; PTS18-PS_SPF; TBB_MCD (in Table 4A)

1.Specification of purposes

The objective of at-sea sampling is to obtain catch (discards + landings) composition, volume, lengths and age of fish captured by Portuguese vessels operating in ICES Division IXa.

2.Design

Population: Lengths of fish captured by the Portuguese vessels operating in ICES Division IXa (within species).

Target population: Lengths of fish captured by the Portuguese vessels > 12m that operate in ICES Division IXa (within species).

Study population: Lengths of fish captured by a subset of Portuguese vessels > 18m that operate in ICES Division IXa (within species). The subset is composed of several fleet segments selected based on species landings. The subset does not encompass the full target population (i.e., some fleet segments are not sampled).

Sampling frame: List of cooperative vessels for each fleet segment/métier.

Stratification type: Spatial – ports (Northwest, Southwest and South); Temporal – quarters.

Sampling effort: Sampling effort defined at a trip basis, where the number of trips to sample OTB_CRU and OTB_DEF was obtained from a Neyman allocation which is considered valid for the entire DCF period (OTB_CRU: 12 trips and OTB_DEF: 27 trips). For the other metiers, the sampling effort established was at least one per month (LLS_DWS, TBB_MCD: 12 trips each) and 2 per month (GNS_GTR, PS_SPF: 24 trips). Within each métier, sampling effort distribution in space and time is proportional to effort or landings.

Primary Sampling Unit (PSU): Trip.

Description:

Vessels selection for trip sampling is quasi-random from within a set of cooperative vessels.

Haul selection is systematic (odd or even hauls) after a random choice of the starting haul (first or second). Catch volume is estimated independently from skipper's opinion. It is obtained from the relative proportion between discards: retained weight in a sample from catch and raised by total landings. The number of specimens per species and the length composition are collected in fixed gears instead of weights, In what concerns to onboard sampling strategy, observers follow crew's criteria to sort landings and discards when they are in deck. The onboard sampling procedure differs between active (OTB, TBB and PS) and fixed gears (GNS, GTR, LLS_DWS) (Prista *et al.*, 2012; Jardim *et al.* 2012, Feijó *et al*, 2012).

3.Expected execution difficulties

a) For some fleets (GNS_GTR) there are a large number of smaller vessels that cannot take observers onboard.

b) Increased refusal rate for on-board observers from TBB_MCD vessels.

c) Trips from vessels licensed for multiple gears other than GNS and GTR (e.g. FPO, LLS), result in a multiplicity of species that can be targeted per fishing trip, making it particularly difficult to provide robust estimates for species at a metier basis.

d) Logistic difficulties in transportation of observers to certain ports.

4.Data archiving & Quality assurance procedure

Database is programmed in Oracle and contains internal routines for the detection of basic errors (e.g., errors in dates). Data recorded refers to general trip information (location, haul number, retained weight by species), sample information by fraction (retained, discarded) and species, namely weight, number of specimens and length composition. Quality checks are carried out for all sampled fleet segments but, in what concerns to trawl fleet segment, a semi-automated R quality assurance procedure was designed and the entire trawl database is checked for additional undetected errors.

5.Analysis methods

Estimates at fleet level have only been provided for OTB_CRU and OTB_DEF, where vessel lists and fishing behaviour have proven fairly consistent through time, and where sampling dates back to

2004. In other métiers, sampling and estimation have proven more difficult and have not yet been reported. This is particularly the case of GNS_ GTR (sampling dating back to 2009), and reasons for that are referred in "Expected execution difficulties".

References

Prista, N.; Jardim, E.; Fernandes, A.C.; Silva, D.; Ferreira, A. L.; Abreu, P.; Fernandes, P., 2012. Manual de procedimentos a bordo: artes fundeadas.***Relat. Cient. Téc. Inst. Invest. Pescas Mar*, nº 56,** 23 p. + Anexos.

Jardim, E.; Prista, N.; Fernandes, A.C.; Silva, D.; Ferreira, A. L.; Abreu, P.; Fernandes, P., 2012. Manual de procedimentos a bordo: arrasto de fundo com portas.***Relat. Cient. Téc. Inst. Invest. Pescas Mar*, nº 55,** 20 p. + Anexos

Feijó, D.; Marçalo, A.; Wise, L.; Silva, A., 2012. Protocolo de Amostragem a Bordo da Pescado Cerco. ***Relat. Cient. Téc. IPIMAR, Série digital* (http://inrb.pt/ipimar) nº 57,** 11 p + X Anexos.

2. Deviations from the Work Plan

a) According to planned, apart from the following exceptions:

-In the Schemes / Stratum ID codes listed below, the number of sampled PSU was higher than planned since at a given auction x day, while observers are waiting to sample several schemes, time is used to sample other schemes with no additional cost.

"Pots and traps for octopuses: At-market / PTM1 - FPO_MOL (main ports)"

"Gill and trammel nets for demersal fish: At-market / PTM5 - GNS_GTR_DEF (main ports)"

"Longline for demersal fish: At-market / PTM7 - LLS_DEF (main ports)"

"Trawlers for demersal fish: At-market / PTM14 - OTB_DEF"

"Purse seiners for sardine and other small pelagic fish: At-market / PTM20- PS_SPF"

"Beam trawl for shrimps: At-market / PTM22 - TBB_MCD (3 main ports)"

- In the Scheme / Stratum ID code "Longline for black scabbardfish: At-market / PTM11 - LLS_DWS (1port)" the number of sampled PSU was higher than planned to increase the effective sample size to provide data to WGDEEP. No additional cost since sampling was done on the same "auction x day" as other schemes while observers are waiting to sample several schemes.

- In the Scheme / Stratum ID code "Beam trawl for shrimps: At-sea / PTS21 - TBB_MCD" the number of sampled PSU was zero since vessel refusal rate for onboard sampling was very high and vessel length overall is small which greatly limits the weather conditions under which onboard sampling can be performed.

- In the Scheme / Stratum ID codes listed below the number of planned PSU was lower than planned since vessel refusal rate for onboard sampling was high, and weather conditions limited onboard sampling.

"Gill and trammel nets for demersal fish: At-sea / PTS3 - GNS_GTR_DEF (vessel length > 12m)"

"Trawlers for crustaceans: At-sea / PTS15 - OTB_CRU (vessel length > 12m)"

b) In the Schemes for Sampling at-sea and at-market, the "Average Number of PSU during the reference years" may differ from the "Total number of PSU in the sampling year" due to the yearly dynamics of the fishing fleets.

c) Moreover, in the Schemes for Sampling at-market, the "Average Number of PSU" (auction x day) during the reference years may differ largely from the "Total number of PSU in the

sampling year", since the fleet segmentation methodology differed between the Work Plan and the Annual Report.

3. Action to avoid deviations

a) The deviations in sampling at-market referred above are cases of sampled PSU above planned PSU (auction days). But we achieved the number of number of sampled trips (secondary sampling unit) envisaged. The minimum planned number of auction days to be sampled will be reevaluated and adjusted if needed. It is expected that the outcome of EU project FishPi2 and ICES WKBIOPTIM in which we are involved will provide guidance on the optimization of sampling effort and intensity.
The deviations in sampling at-sea referred above are cases of sampled PSU below planned PSU especially since vessel refusal rate for onboard sampling was high. Efforts will be made to decrease vessel refusal rate through outreach actions dedicated to fishers and fishers' associations, but the outcome cannot be guaranteed as it ultimately depends on vessel acceptance to take observers onboard.

b) No action planned.

c) There is an ongoing effort to improve fleet segmentation methodologies (e.g. we were involved in DCF Metier Workshop: Sub-group of the RCGs - North Sea and Eastern Arctic and North Atlantic).

Text Box 4A.2: IOTC

TB 4A.2 - At-sea sampling (IOTC longline)

At-sea sampling (IOTC longline) - PTS26 - LLD_LPF (in Table 4A)

1.Specification of purposes

The objective of at-sea sampling is to obtain the species composition and length distribution of total catches (discards + landings) from the Portuguese longline vessels operating in the IOTC area.

2.Design

Population: Fish captured by the Portuguese longline vessels operating in the IOTC area.

Target population: Fish captured by the Portuguese longline vessels operating mainly in the SW Indian Ocean (IOTC area).

Study population: Fish captured by the Portuguese longline vessels operating in the IOTC area.

Sampling frame: List of cooperative vessels.

Stratification type: No stratification. Most of the effort of the Portuguese pelagic longline fleet in the IOTC area is in the South and Southwest Indian Ocean.

Sampling effort: Sampling effort distribution in space and time is proportional to effort or landings. The goal is to cover a minimum of 5% of fishing effort, as recommended by IOTC.

Primary Sampling Unit (PSU): Trip.

Description:

Vessel selection is quasi-random from within a set of cooperative vessels. The observer identifies, measures and determines the sex of every specimen from every haul. The observer also registers whether the specimen is alive or dead when captured and discarded (in case discard happens). All interactions with vulnerable fauna (e.g. sea-birds, sea-turtles and marine mammals) are recorded, as well as the conditions when they are released.

3.Expected execution difficulties

Decreasing number of vessels with capacity and willing to carry observers on board. Some vessels of the fleet moving to Pacific Ocean in recent years.

4.Data archiving and Quality assurance procedure

Data are stored locally at IPMA. Quality control to meet IOTC requirements is carried out before data are submitted to IOTC. All data are public at the IOTC Secretariat and website.

5.Analysis methods

Stocks of the main IOTC species are assessed regularly by the Scientific Committee (SC) of IOTC. The methods are defined and applied according to the SC work. The frequency of the stock assessments is predefined according to the SC schedule of assessments and requests from the IOTC Commission.

2. Deviations from the Work Plan

No deviations.

3. Action to avoid deviations

No deviations.

Text Box 4A.3: NAFO

TB 4A.3 - At-sea sampling (NAFO; NEAFC; Norwegian and Svalbard waters)

At-sea sampling (NAFO; NEAFC; Norwegian and Svalbard waters): PTS30 - OTB_DEF; PTS28 - OTB_DEF; PTS29 - OTM_SPF (in Table 4A)

1.Specification of purposes

The objective of the at-sea sampling is to obtain catch (unsorted catches) composition, volume, positions, effort, lengths and biological parameters of Portuguese vessels operating in NAFO Subarea 3 and ICES Divisions I; II.

2.Design

Population: Portuguese vessels operating in NAFO Subarea 3 and ICES Divisions I; II.

Target population: Active vessels fishing in the area with logistical conditions (crew space/slot) for carrying out scientific sampling on board.

Sampling frame: Cooperative vessels.

Stratification type: Spatial (by Division).

Sampling effort: Sampling effort is dependent both on companies/skippers cooperation and availability of a nurseman within the crew.

Primary Sampling Unit (PSU): Trip.

Description:

Vessels selection is quasi-random from within a set of cooperative vessels. The Portuguese vessels are factory vessels that are obliged in NAFO to carry out a Compliance Observer Programme. This implies not only the accommodation facilities for this observer extra crew, but prevents the income of another observer (scientific) from outside. In practice, this obligation constrain the performance of scientific sampling to the more adequate skills within the crew, who is, by the nature of his professional background and the all round tasks he performs, the nurseman of the vessel.

Haul selection is random. For each sampled haul, representative samples of target or priority species (as those under moratorium), along with another from the most abundant by-catch, are sorted. This task is performed by one person (the nurseman) under a tight fishing haul schedule, leaving no room to collect samples of less abundant and/or non commercial fish. The fisheries in Eastern Arctic fishing grounds are composed by almost clean target catches with few by-catches, difficult to collect within usual large volumes of total catch.

Sampling for each species is random; each sample is taken from the haul catch before any rejections. The sample length is made by sex (exception for cod) consisting in recording the sample weight and collecting all individual lengths. A subsample from length sampling is taken to collect biological data.

3.Expected execution difficulties

Fishing strategy of cooperative companies is highly variable and dependent of unpredicted market opportunities. This may partly jeopardize the yearly sampling design in one or both regulatory areas.

4.Data archiving and Quality assurance procedure

The NEAFC, Norwegian and Svalbard waters data are stored in a local data base and upload in the international data bases FishFrame and Intercatch. NAFO data are stored in a local data base and submitted to quality check to meet NAFO requirements, and are further validated by NAFO.

5.Analysis methods

Estimates at fleet level have been provided to NAFO and the relevant ICES working groups.

References

Vargas, J.; Alpoim, R.; Santos, E. e Ávila de Melo, A. M. (2016) – NAFO Portuguese Research Report for 2015. NAFO SCS Doc. 16/09, Serial N6555, 45 pp.

2. Deviations from the Work Plan

In the Scheme / Stratum ID code "Trawlers for demersal fish: At-sea / PTS28 - OTB_DEF" the number of sampled PSU was zero instead of the planned one. In 2017, like in 2015, Portuguese cod fishery was not sampled on ICES Divisions I and II. Our National Sampling Programme on board is based on the nurse from the vessels to be monitored on NAFO, since their presence on board is mandatory on North West Atlantic trips. But that is not the case for North East Atlantic (partly due to shorter trips closer to shore) and so most Portuguese vessels fishing on ICES divisions don´t take a nurse abroad. In order to meet the objectives of our National Sampling Program, the solution has been in recent years to contract the services of a company that provide experienced observers to work on board on behalf of either scientific or control national programmes. But on 2017, and despite our efforts, we were not able to put a scientific observer on any of the vessels with cod quotas on either ICES Divisions.

3. Action to avoid deviations

For the deviation referred above, we make our best efforts to put a scientific observer on vessels with cod quotas on either ICES Divisions, but the outcome cannot be guaranteed as it ultimately depends on vessel acceptance to take observers onboard.

Text Box 4A.4: ICES Division X

TB 4A.4 - At market and at sea sampling

At market sampling (ICES Division X): AZM1 - LHP_FIF_<10m; AZM2 - LHP_FIF_>10m; AZM6 - LLS_DEF_<12m; AZM7 - LLS_DEF_1218; AZM8 - LLS_DEF_>18m; AZM14 – LHP_CEP; AZM18 – PS_SPF; AZM22 – GNS_FIF; AZM27 – FPO; AZM37 - LHP_DWS_<10m ; AZM38 - LHP_DWS _>10m ; AZM43 - LLS_DWS _<12m ; AZM44 - LLS_DWS _1218 ; AZM45 - LLS_DWS_>18m (in Table 4A)

1.Specification of purposes

The objective of at market sampling is to obtain length frequency distributions of fish landed at auctions by Azorean vessels operating in ICES Division X.

2.Design

Population: lengths of fish landed by Azorean vessels operating in ICES Division X;

Target population: lengths of fish landed at auction (=port) by the Azorean vessels licensed to operate in ICES Division X;

Study population: lengths of fish at port from a subset of vessels from a fleet segment/métier based on the result from the analysis through the algorithm developed and runned for previous year landings;

Sampling frame: vessels (using the different fishing techniques) operating from the main Azorean ports;

Stratification type: spatially (ports) and temporally (quarters) in order to improve sampling coverage through the year and in the main Azorean ports;

Sampling effort: in each fleet segment/métier sampling effort is fixed by previous allocation where a weight criteria is used. Spatio-temporal allocation is proportional to landings (from previous year) in each port*quarter combination;

Primary Sampling Unit (PSU): port x day.

Description

The sampling design is stratified multistage:

a) The Azorean fleet is stratified by fleet segment, métier and time. Sampling effort is established as number of trips expected to be sampled in each fleet (≈métier) and allocated to auctions and quarters proportionally to last year's landings;

b) In every auction*visit_date, samplers attempt to sample a predefined number of vessel_sale_events. Each vessel_sale_event corresponds to the landings of one fishing trip. Samplers randomly select the vessel_sale_events from vessels present at the harbor;

c) In each vessel_sale_event, the samplers aim to sample boxes from every commercial species and commercial category. This way, concurrent sampling scheme is applied, although sometimes the coverage of all species is not possible.

d) Within each commercial category samplers randomly select boxes to be sampled aiming for a minimum number of 50 fishes;

e) A fishing effort related questionnaire is also performed to the shipmaster of the vessel selected for sampling.

In an experimental basis during 2017, length measurements will also be recorded in some auctions using an electronic system composed by a local unit for automatic image acquisition of fish boxes and a remote database to record the processed images using Fishmetrics system.

3.Expected execution difficulties

a) Vessels arriving to port after the auction has started. If there is a large amount of landings/species/categories, there is no time to sample the complete trip;

b) Shipmasters don´t give permission for samplers to measure fish from their vessels;

c) Previously fixed sale contracts for some species, prevents samplers access to fish.

4.Data archiving and Quality assurance procedure

At market sampling database (PRAI) is programmed in MySQL and contains internal routines for the detection of basic errors (e.g., errors in dates, species codes). Routines for checking of errors are also implemented.

Quality checks and validation procedures are implemented: (1) All samples are checked by a coordinator before the input of data; (2) All data introduced in database is checked for syntax errors; (3) A random check of 10% of the data is executed by inspecting the registered data for logical errors; (4) Length distribution and effort samples are then connected with the market landings for future cross examinations.

5.Analysis methods

Is dependent on stock coordinators needs, the purposes of the analysis or specific recommendations from RFMO's.

<u>At sea sampling (ICES Division X)</u>: AZS4 - LHP_FIF_>10m; AZS10 - LLS_DEF _<12m; AZ11 - LLS_DEF _1218; AZS12 - LLS_DEF _>18m; AZS16 - LHP_CEP; AZS20 - PS_SPF; AZS23 - GNS_FIF; AZS28 – FPO; AZS40 - LHP_DWS _>10m ; AZS47 - LLS_DWS _<12m ; AZS48 - LLS_DWS _1218 ; AZS49 - LLS_DWS _>18m (in Table 4A)

1.Specification of purposes

The objective of the at sea sampling is to obtain all catch fractions specific composition (including discards), both in number and volume, lengths and age of Azorean vessels operating in ICES Division X.

2. Design

<u>Population</u>: lengths of fish captured by the Azorean vessels operating in ICES Division X (within species);

<u>Target population:</u> lengths of fish captured by the Azorean vessels of all length class that operate in ICES Division X (within species), except for Handliners targeting tuna (pole and line);

<u>Study population:</u> lengths of fish captured by a subset of Azorean vessels within each length class/métier that operate in ICES Division X (within species). The subset is composed of several fleets segments selected based on species landings. The list of vessels for each fleet segment/métier is updated annually based on a combination of the result from the analysis through the algorithm developed and runned for previous year landings and a list of cooperative vessels;

Sampling frame: list of cooperative vessels >10m for each fleet segment/métier that are willing and have logistics conditions (space and safety equipment) to take observers onboard operating from the main Azorean ports;

Stratification type: métier, vessel length class, spatial (ports) and temporal (quarters);

Sampling effort: within each fleet segment/métier, sampling effort distribution in space and time is proportional to effort or landings;

Primary Sampling Unit (PSU): trip.

Description:

Vessels selection is quasi-random from a set of cooperative vessels within each fleet length class/métier. For 2017, the following metiers and sampling effort (number of trips) objectives are set: LHP_FIF (n=6 trips), LLS_DEF (n=48 trips), LHP_CEP (n=9 trips), PS_SPF (n=9 trips), GNS_FIF (n=12 trips), FPO (n=6 trips) and LLD_LPF (n=6 trips).

At sea sampling for discards purposes (length distribution and volume) is conducted by scientific observers accommodated voluntarily on board selected vessels (by métier and length class).

The Azores at sea observer scheme collects comprehensive data on species composition and length composition of all retained and discarded components of the catch on a haul-by-haul basis. All interactions with vulnerable fauna (e.g. sea-birds, sea-turtles and marine mammals) are recorded, as well as the conditions when they are released. Landings from vessels with an observer on board will be sampled by the samplers present at the landing port. Non-responses and refusal rates are recorded.

3.Expected execution difficulties

Problems will occur regarding the access of the scientific observers on board fishing vessels that, either do not present the necessary conditions to take one extra person or refuse to accept them. Sampling targets depends critically on the goodwill of the fishing industry to at sea sampling. Main difficulties will occur at the level of smaller vessels that cannot take observers on board.

4.Data archiving & Quality assurance procedure

Discards database is programmed in MySQL and contains general trip information (vessel information, date, location, haul number, landed weight by species), along with sample information by catch fraction (retained, discarded) and species, namely weight, number of specimens and length composition.

Quality checks and validation procedures are implemented: (1) All samples are checked by a coordinator before the input of data; (2) All data introduced in database is checked for syntax errors; (3) A random check of 10% of the data is executed by inspecting the registered data for logical errors; (4) Length distribution and effort samples are then connected with the market landings for future cross examinations.

5.Analysis methods

Estimates at fleet level have only been provided for LLS_DEF where sampling dates back to 2004.

Deviation from the sampling plan according to Article 5 paragraph (3) of the Decision (EU) 2016/1701:

2. Deviations from the Work Plan

Due to major inconsistencies in the Portuguese WP 2017, WP 2018 (approved) was used (with COM endorsement) for compliance of the AR2017. This brings difficulties because schemes were added in WP 2018, namely hand lines and longlines targeting deep-water species, with the purpose of attending the demands of 2016/2336 EU Regulation. These schemes added are very similar to regular hand lines and longline schemes targeting fin fish and demersal fish.

With this adding the number planned of PSU for regular schemes should be divided for both regular and (new) deep-water schemes, but that didn't happened. The sampler/observer has no way of knowing from the start, the exact scheme to be sampled, once the attribution of the métier is done by the deep-water species Regulation (plus 8% of listed deep-water species).

A failure in the samplers' team and the inability of the team to move to smaller ports also contributed to some deviations from the Work Plan.

Some deviations are caused by natural fluctuations of quantities landed when compared with the reference years.

Azores at sea sampling was not carried out under the DCF due to non-contracting of the service. Achieved results refer to the boarding of observers in the remit of the DiscardLess, SponGES and COSTA projects, which, although based on previous work carried out within the DCF, did not take into account planned targets in the WP.

At market sampling (ICES Division X)

Shortfalls

- In the schemes AZM1 - LHP_FIF _<10m; AZM37 - LHP_DWS_<10m; AZM2 - LHP_FIF _>10m; AZM38 - LHP_DWS _>10m; AZM6 - LLS_DEF _<12m; AZM7 - LLS_DEF _1218; AZM45 - LLS_DWS_>18m the planned number of PSU was not reached, mostly due to implementation of deep-water species Reg. demands.
- In scheme AZM14 - LHP_CEP a failure in the samplers team resulted in non-compliance with the number of PSU (port * day) planned.
- Scheme AZM27 - FPO - Failures in the samplers' team made impossible the team to move to small ports. Or, in ports with sampler, the catch of this stratum arrives in transport vans and is immediately sold - often these kind of catch has to be marketed alive.
- AZM24 - LHP_LPF _<12m - In general, there was a large decrease in LPF catches in 2017 in the Azores. This resulted in a decrease in the number of PSUs, but mainly in a decrease in the number of fish, which made the landing process much faster and increased the difficulty of obtaining samples, especially for small vessels (<12m).
- AZM29 - LLD_LPF - Number of PSU decreased in 2017 and also the majority of sales are "direct sales", which mean fish don't pass through the auction market, it goes directly to containers.

Oversampling

- In scheme AZM43 - LLS_DWS _<12m the number of PSU increase (almost double of port*days) in 2017. Due the similarity with AZM6 - LLS_DEF _<12m scheme is very difficult to know the exact scheme that is being sampled.

At sea sampling (ICES Division X)

Shortfalls

- Schemes AZS10 - LLS_DEF _<12m; AZS4 - LHP_FIF _>10m; AZS47 - LLS_DWS _<12m; AZS16 - LHP_CEP; AZS20 - PS_SPF; AZS23 - GNS_FIF; AZS28 - FPO were not targeted of onboard sampling by the above mentioned projects.
- AZS48 - LLS_DWS _1218 number of PSU planned not fully achieved (83%) due to high refusal rate for onboard sampling.

3. Action to avoid deviations

Given the similarity of the regular hand lines and longline schemes with the deep-water species schemes, these schemes should be merged in the future or at least the planned number of PSU of each of these schemes needs to be readjusted.

A different approach must be conducted to those schemes that sell in major ports but landings occur in minor ports (catch arrives to major ports by transport vans).

Efforts will be undertaken in order to implement the onboard sampling programme in 2018 in the remit of the DCF.

Text Box 4A.5: CECAF 34.1.2.

TB 4A.5 - At-market and at-sea sampling

At-market sampling (CECAF 34.1.2.)- DWF1_ M1; SPF1_ M2; MOL1_ M4 (in Table 4A)

1.Specification of purposes

The objective of at-market sampling is to obtain length distributions of fish landed at auctions by Madeiran vessels operating in CECAF 34.1.2. and CECAF 34.2.0.

2. Sampling Design

Population: Lengths of fish landed by the Madeiran vessels operating in CECAF 34.1.2. and CECAF 34.2.0.(Within species).

Target population: Lengths of fish landed at auction (= port) by the Madeiran vessels operating in CECAF 34.1.2. and CECAF 34.2.0.(Within species).

Study population: Lengths of fish landed by a subset of the Madeiran active vessels which operate in CECAF 34.1.2. and CECAF 34.2.0. (Within species). The subset is composed of several fleet segments selected based on species landings. The list of vessels for each fleet segment is updated annually based on a combination of gear licenses and the main species landed in the previous year.

Sampling frame: list of ports*day for each fleet segment.

Stratification type: Spatial – ports; Temporal – months. Stratification is used to improve sampling coverage through the year and in Madeira island.

Sampling effort: Within each métier, sampling effort distribution in space and time is proportional to effort or landings in each port*month combination.

Primary Sampling Unit (PSU): trip.

Description:

The sampling design is stratified multistage, with trip as the Primary Sampling Unit (PSU).

a) The Madeiran fleet is stratified by fleet segment/métier, trip and month. Following the DCF requirements [EU Commission Decision (2010/93/EU) and sampling effort is established as number of trips. Annual sampling effort is fixed by the DCF National Sampling Plan that sets the number of trips expected to be sampled in each fleet (≈ métier).

b) For each fleet segment/métier, the visit dates in each auction*month are spread somewhat systematically throughout the month in a way that covers all week-days where the fleet is active.

c) In every auction*visit_date, observers attempt to sample a predefined number of vessel_sale_events. Each vessel_sale_event generally corresponds to the landings of one fishing trip. To select the vessel_sale_events that are to be sampled, observers obtain a list of all landings awaiting auction. The list generally includes the name of each vessel and the commercial species, commercial category and weight of each of its boxes. A vessel_sale_event is selected haphazardly from the list.

d) In each vessel_sale_event, the observers aim to sample boxes from every commercial species and commercial category.

e) Within each commercial category, the observers select 1 box haphazardly. However, sometimes there are <100 fish from a scientific species inside the box, so observers take several boxes until they reach the required number.

f) Within each box, different species may be present, and observers select all of them to sample.

3.Expected execution difficulties

a) Vessels arriving to the port after the auction has started. If they have a large amount of landings/species/categories, there is no time to sample the complete trips.

b) Shipmasters do not give permission for observers to sample fish from their vessels.

c) Sometimes observers do not have time to sample all commercial species, so they select the more important species.

4.Data bases & Quality assurance procedure

The database in EXCEL contains general trip information (vessel information, date, location, landed weight by species), along with sample information by species, namely weight, number of specimens and length composition.

Quality checks and validation procedures are implemented: (1) All samples are checked by a coordinator before the input of data (2) All data introduced in database is checked for errors and outliers; (3) A random check of 10% of the data is executed by inspecting the registered data for logical errors; (4) Length distribution and effort samples are then connected with the logbooks for future cross examinations.

At-sea sampling (CECAF 34.1.2.)- DWF2_ M1; SPF2_ M2; (in Table 4A)

1.Objectives

The main objectives of the" at-sea sampling programme" is to identify and characterize the catches fractions specific composition (including discards), both in number and volume and lengths and age, of Madeira registered vessels operating in CECAF 34.1.2. and CECAF 34.2.0.

2.Sampling Design

Population: Lengths of fishes captured by the Madeiran vessels operating in CECAF 34.1.2. and CECAF 34.2.0. (Within species).

Target population: Lengths of fish captured by the Madeiran vessels of all length classes that operate in CECAF 34.1.2. and CECAF 34.2.0. (Within species).

Study population: Lengths of fish captured by a subset of the Madeiran active vessels within each length class that operate in CECAF 34.1.2. and CECAF 34.2.0. (Within species). The subset is composed of several fleet segments selected based on species landings. The list of vessels for each fleet segment is updated annually based on a combination of gear licenses and the main species landed in the previous year.

Sampling frame: List of cooperative vessels for each fleet segment/métier that are willing and have logistics (space and conditions) to take observers onboard.

Stratification type: vessel length class, métier and spatial (fishing grounds).

Sampling effort: Within each métier, sampling effort distribution in space and time is proportional to effort or landings.

Primary Sampling Unit (PSU): Trip

Description:

Vessels selection is quasi-random within a set of cooperative vessels. Every year, the following métiers and sampling effort objectives are set: LLD_DWF (n=30 trips), and PS_SPF (n=60 trips). Within each métier, sampling effort distribution in space and time is proportional to effort or landings.

A multiannual programme (2017-2019) will be implemented contracting an outsource service to implement the Madeira observers on board programme.

At-sea sampling is conducted by one scientific observer, accommodated voluntarily on board by the captain.

Every haul of a trip is selected for sampling and for each fishing operation data to be recorded includes: (i) type, and technical characteristics of the gear and fishing operations; (ii) geographical location of fishing sets; (iii) species composition of the total catch (retained and discarded), and landings (collected at the fish auction following the trip) in number and biomass; (iv) lengths of retained (subsample), discards (*census*) and landings (subsample); (v) sex for elasmobranchs and crustaceans; (vi) reason for discarding each individual; (vii) the condition when discarded (alive/dead) and (viii) destiny of the retained fraction of the catch that might not be landed. Interactions with vulnerable fauna (e.g. sea-birds, sea-turtles and marine mammals) are also recorded.

The Madeira at-sea observer programme will collect comprehensive data on species composition and length composition of all retained and discarded components on a haul-by-haul basis, and therefore provides Scheme 1 concurrent sampling of Group 1 – 3 species. Landings from vessels with an observer on board, in specific trips will be sampled by the sampling technicians present at the landing harbour.

The target population is the total number of fishing trips, of a given metier, in a given time period, in Madeira fishing grounds.

3.Expected execution difficulties

Problems will occur regarding the access of the scientific observers on board fishing vessels that, either do not present the necessary conditions to take one extra person or refuse to accept them. Sampling targets depends critically on the goodwill of the fishing industry to at-sea sampling. Main difficulties will occur at the level of smaller vessels that cannot take observers on board.

4.Data bases & Quality assurance procedure

The database in EXCEL contains general trip information (vessel information, date, location, haul number, retained weight by species), along with sample information by fraction (retained, discarded) and species, namely weight, number of specimens and length composition.

Quality checks and validation procedures are implemented: (1) All samples are checked by a coordinator before the input of data (2) All data introduced in database is checked for errors and outliers; (3) A random check of 10% of the data is executed by inspecting the registered data for logical errors; (4) Length distribution and effort samples are then connected with the market landings for future cross examinations.

Biological variables sampling (CECAF 34.1.2.)

Biological variables sampling are performed (at the Madeira fisheries laboratory), to obtain stock related variables including biometry, age, sex-ratio and sexual maturity of fish landed and sold in auctions by the Madeiran registered vessels operating in the CECAF 34.1.2. & CECAF 34.2.0. Areas.

Sampling for biological variables is independent of at-market sampling. Commercial sampling for biological variables (length, weight, age, sex ratio and maturity) is performed monthly by purchasing fish samples from selected ports at Madeira. Fish from each sample are randomly selected per length class (5 individuals/2, 5 or 10cm length class, depending on the species).

Biological sampling follows standardized protocols depending on the species. Length-weight relationship, age-length-key and maturity ogive are estimated in time intervals indicated in Table 1B.

Deviation from the sampling plan according to Article 5 paragraph (3) of the Decision (EU) 2016/1701:

2. Deviations from the Work Plan

In Madeira, CECAF 34.1.2. Deviations from the work plan were registered in the stratum DWF2_ M1 and LPF2_ M3. Coverage of the at sea sampling was not achieved. This was due to administrative delays in the implementation of the observer on board programme.

3. Action to avoid deviations

Hopefully, the implementation of a multiannual programme will be accomplished by the second semester of 2018, allowing the observer programme to be fully executed during 2019. The budget is already included in the Investment and Development Plan of the Autonomous Region of Madeira (PIDDAR).

Text Box 4A.6.: ICCAT

TB 4A.6 - At-market and at-sea sampling in ICCAT

At-market sampling (ICCAT – BFT58, Azores grounds and CECAF Division 34.1.2.)

At-market sampling in ICCAT is performed at Portugal mainland, Azores and Madeira ports. Sampling strategy used in each zone is described in table below:

At-market sampling	PT_Mainland		Azores	Madeira
Stratum ID Code (Table 4A)	PTM25 - LLD_LPF (longline)	PTM27 - FPN_LPF (tuna traps)	AZM24 - LHP_LPF _<12m; AZM25 - LHP_LPF _>12m (poles and lines); AZM29 – LLD_LPF (longline)	LPF1_ M3 (poles and lines)
Zone/Area	ICCAT	ICCAT - BFT58	ICCAT –Azores grounds	ICCAT – CECAF 34.1.2
1-Specification of purposes	Obtain length distributions of fish landed at auctions			
2-Design				
Population	Lengths of fish landed by Portuguese vessels in each zone/area			
Target population	Lengths of fish landed at auction (=port) in each zone/area			
Study population	Lengths of fish captured by Portuguese vessels operating in each zone/area and landed in selected ports for sampling			
Sampling frame	All vessels landing in each selected port for sampling			
Stratification type	None	Temporal (quarters) (*)	Spatial (ports) and temporal (quarters) (*)	None
Sampling effort	All vessels landing in port are sampled	Fixed number of sampling days per quarter are defined proportionally to number of landing days per quarter	Fixed by previous allocation using a weight criteria. Spatio-temporal allocation proportional to landings in previous year in each port*quarter combination	Samplers randomly measure 50 individuals per species present in the harbor, following a predefined scheme
Primary sampling unit	Auction*day (in specific ports)		Trip	
Description	In each vessel_sale_event, the observers aim to individually measure and/or weight each specimen from every commercial species and commercial category. Some	Visit dates in each auction*quarter are spread somewhat systematically throughout the quarter in a way that covers all week-days where the tuna trap is active. In every auction*visit_date, observers attempt to sample a predefined	Seasonal fishery (May-September), where for every auction*visit_date,samplers aim to randomly sample a predefined number of vessel_sale_events, from vessels present at the harbor, which generally corresponds to the landings of one fishing trip. Samplers aim to sample boxes from every species and commercial category (at a minimum number of 50 fishes to be measured	In each vessel_sale_event, the observers aim to individually measure each specimen from every commercial species and commercial category.

	commercial species may not be available for sampling if they are frozen and packaged.	number of vessel_sale_events. Each vessel_sale_event generally corresponds to the landings of one fishing event at the tuna trap.	and/or weighted), applying concurrent sampling scheme A fishing effort related questionnaire is also performed to the shipmaster of the vessel selected for sampling.	
3-Expected execution difficulties	Some commercial species are landed frozen and packaged: only total landed weight is taken.	During the fishing season, after tuna quota is closed, fishing activity suspends until all tunas are sold. In some years it is difficult to carry out all planned sampling days.	Difficulties maybe raised by the fishing industry operators concerning fish access and handling. In these situations only the total landed weight is taken.	-
4-Data archiving and Quality assurance procedure	Data stored locally at IPMA.		Data is archived at IMAR/DOP´s local database designed to accommodate this type of information.	Data is archived at DSI/DRP local database designed to accommodate this type of information.
	Quality control to meet ICCAT requirements carried out before data are submitted to ICCAT, including: (1) All samples are checked by a coordinator before the input of data; (2) All data introduced in the database is checked for syntax errors; (3) A random check of 10% of the data is executed by inspecting the registered data for logical errors, like for example, type of data and values range of the variables; (4) Length distributions are then connected with the market landings for future cross examinations. All data is public at ICCAT Secretariat and website.			
5-Analysis procedures	Stocks of the main ICCAT species are assessed regularly by the Scientific Committee for Research and Statistics (SCRS) of ICCAT. The methods are defined and applied according to the SCRS work. The frequency of the stock assessments is predefined according to the SCRS schedule of assessments and requests from the ICCAT Commission.			

(*) Stratification used to improve sampling coverage.

<u>At-sea sampling (ICCAT longline)</u> - PTS26 - LLD_LPF; AZS31 – LLD_LPF (in Table 4A)

1.Specification of purposes

The objective of at-sea sampling is to obtain the species composition and length distribution of total catches (targeted and bycatch species, including landed catch and discards) from the Portuguese longline vessels operating in the ICCAT area.

2.Design

<u>Population</u>: Fish captured by the Portuguese longline vessels operating in the ICCAT area.

Target population: Fish captured by the Portuguese longline vessels in the main areas of operation of the Portuguese pelagic longline fleet, specifically in the Equatorial, Tropical Northeast, and Temperate Northeast Atlantic (ICCAT area).
Study population: Fish captured by the Portuguese longline vessels operating in the ICCAT area.
Sampling frame: List of cooperative vessels that are willing and have logistics (space and conditions) to take observers onboard.
Stratification type: Sampling stratified by areas/fleet components, covering the main areas of operation (Equatorial/Tropical and Temperate regions) and fleet components (Fresh and Freezer vessels).
Sampling effort: Sampling effort distribution in space and time is proportional to effort or landings. The goal is to cover a minimum of 5% of the total fishing effort, as currently recommended by ICCAT.
Primary Sampling Unit (PSU): Trip.

Description:
Vessels selection is quasi-random from within a set of cooperative vessels. The observer identifies, measures and determines the sex of every specimen from every haul. The observer also registers whether the specimen is alive or dead when captured and discarded (in case discard happens). All interactions with vulnerable fauna (e.g. sea-birds, sea-turtles and marine mammals) are recorded, as well as the conditions when they are released.

3.Expected execution difficulties

Increased number of vessels operating with skippers that do not allow observers on board.

4.Data archiving and Quality assurance procedure

Data are stored locally at IPMA and IMAR/DOP. Quality control to meet ICCAT requirements is carried out before data are submitted to ICCAT. All data are public at the ICCAT Secretariat and website.

5.Analysis methods

Stocks of the main ICCAT species are assessed regularly by the Scientific Committee for Research and Statistics (SCRS) of ICCAT. The methods are defined and applied according to the SCRS work. The frequency of the stock assessments is predefined according to the SCRS schedule of assessments and requests from the ICCAT Commission.

At-sea sampling (ICCAT Baitboat_CECAF 34.1.2.) LPF2_M3 (in Table 4A)

1.Objectives

The main objectives of the" at-sea sampling programme" is to identify species composition (including discards), both in number, weight and lengths of specimens of Madeira active vessels catches which operate in CECAF 34.1.2. and CECAF 34.2.0.

2.Sampling Design

Population: Lengths of fishes captured by the Madeiran vessels operating in CECAF 34.1.2. and CECAF 34.2.0. (Within species).

Target population: Lengths of fish captured by the Madeira tuna vessels of all length classes that operate in CECAF 34.1.2. and CECAF 34.2.0. (Within species).

Study population: Lengths of tuna captured by a subset of the Madeiran active vessels within each length class that operates in CECAF 34.1.2. and CECAF 34.2.0. (Within species). The subset is composed of several fleet segments selected based on species landings. The list of vessels for each fleet segment is updated annually based on a combination of gear licenses and the main species landed in the previous year.

Sampling frame: List of cooperative vessels that are willing and have logistics (space and conditions) to take observers onboard.

Stratification type: vessel length class, métier and spatial (fishing grounds).

Sampling effort: Within each métier, sampling effort distribution in space and time is proportional to effort or landings.

Primary Sampling Unit (PSU): Trip

Description:

Vessels selection is quasi-random within a set of cooperative vessels. Every year, the following métiers and sampling effort objectives are set: LHP_LPF (n=50 trips) . Within each métier, sampling effort distribution in space and time is proportional to effort or landings.

A multiannual programme (2017-2019) will be implemented contracting an outsource service to implement the Madeira observers on board programme.

At-sea sampling is conducted by one scientific observer, accommodated voluntarily on board by the captain.

Every haul of a trip is selected for sampling and for each fishing operation data to be recorded includes: (i) type, and technical characteristics of the gear and fishing operations; (ii) geographical location of fishing sets; (iii) species composition of the total catch (retained and discarded), and landings (collected at the fish auction following the trip) in number and biomass; (iv) lengths of retained (subsample), discards (*census*) and landings (subsample); (v) reason for discarding each individual; (vi) the condition when discarded (alive/dead) and (vii) destiny of the retained fraction of the catch that might not be landed. Interactions with vulnerable fauna (e.g. sea-birds, sea-turtles and marine mammals) are also recorded.

The Madeira at-sea observer programme will collect comprehensive data on species composition and length composition of all retained and discarded components on a haul-by-haul basis, and therefore provides Scheme 1 concurrent sampling of Group 1 – 3 species. Landings from vessels with an observer on board, in specific trips will be sampled by the sampling technicians present at the landing harbour.

The target population is the total number of fishing trips, of a given metier, in a given time period, in Madeira fishing grounds.

3.Expected execution difficulties

Problems will occur regarding the access of the scientific observers on board fishing vessels that, either do not present the necessary conditions to take one extra person or refuse to accept them. Sampling targets depends critically on the goodwill of the fishing industry to at-sea sampling. Main difficulties will occur at the level of smaller vessels that cannot take observers on board.

4.Data bases & Quality assurance procedure

The database in EXCEL contains general trip information (vessel information, date, location, haul number, retained weight by species), along with sample information by fraction (retained, discarded) and species, namely weight, number of specimens and length composition.
Quality checks and validation procedures are implemented: (1) All samples are checked by a coordinator before the input of data (2) All data introduced in database is checked for errors and outliers; (3) A random check of 10% of the data is executed by inspecting the registered data for logical errors; (4) Length distribution and effort samples are then connected with the market landings for future cross examinations.

Biological variables sampling (ICCAT)

Biological variables sampling are performed (at the laboratory), to obtain stock related variables including, weight, sex-ratio and sexual maturity of fish landed and sold in auctions by the Madeiran vessels operating in the ICCAT area.

Most of the stocks are assessed within ICCAT Assessment Working Groups. Data preparation and stock assessment methods are defined by SCRS and described in the species work plans. Sampling for biological variables is independent of at-market sampling. Commercial sampling for biological variables (weight sex ratio and maturity) is performed annually for selected species by purchasing. Each individual is selected per length class (5 individuals/5 cm length class). Length-weight relationship and maturity ogive are estimated in time intervals indicated in Table 1B.

2. Deviations from the Work Plan

- In the Scheme / Stratum ID Code “Longline for swordfish: At-sea / PTS24 - LLD_LPF” the number of sampled PSU was higher than planned PSU since ICCAT recommends an increase in sampling effort.

- In the Scheme / Stratum ID Code “Longline for swordfish: At-market / PTM25 - LLD_LPF (1 port)” the number of sampled PSU was higher than planned PSU ICCAT recommends an increase in sampling effort.

- In the Scheme / Stratum ID Code “Drifting Longline at Market / AZM29 - LLD_LPF” the number of PSU decreased in 2017 and "direct selling" occurs adding difficulties in sampling this scheme.

- In the Scheme / Stratum ID Code “Pole and line for tuna at Market / AZM24 - LHP_LPF _<12m” a decrease in LPF catches in 2017 in the Azores, resulted in a decrease in the number of PSUs and in the number of fish, making the landing process much faster and increased the difficulty of obtaining samples.

3. Action to avoid deviations

The minimum planned number of PSU to be sampled will be reevaluated and adjusted if needed.

Text Box 5A: Quality assurance framework for biological data

TB 5A.1 - ICES Division IXa

1. Evidence of data quality assurance

   As proposed in the work plan. No relevant changes.

2. Sampling design

   No constraints.

3. Sampling implementation

   No constraints.

4. Data capture

   "Are quality checks to validate detailed data documented?" - N

   As proposed in the work plan, documentation will be available during 2019.

5. Data Storage

   No constraints.

6. Data processing

   "Are processes to evaluate data accuracy (bias and precision) documented?" - N

   "Are the editing and imputation methods documented?" - N

   As proposed in the work plan, documentation will be available during 2019.

TB 5A.2 - IOTC

1. Evidence of data quality assurance

   As proposed in the work plan. No relevant changes.

2. Sampling design

   "Is the sampling design documented?" – N

   As proposed in the work plan, data is submitted to quality check to meet IOTC requirements and is validated by IOTC.

3. Sampling implementation

   No constraints.

4. Data capture

   "Are quality checks to validate detailed data documented?" – N

   As proposed in the work plan, data is submitted to quality check to meet IOTC requirements and is validated by IOTC.

5. Data Storage

No constraints.

6. Data processing

"Are processes to evaluate data accuracy (bias and precision) documented?" –N

"Are the editing and imputation methods documented?" – N

As proposed in the work plan, data is submitted to quality check to meet IOTC requirements and is validated by IOTC.

TB 5A.3 - NEAFC (ICES Division I-II)

1. Evidence of data quality assurance

As proposed in the work plan. No relevant changes.

2. Sampling design

"Is the sampling design documented?" – N

As proposed in the work plan, documentation will be available during 2019.

3. Sampling implementation

"Are non-responses and refusals recorded?" – N

As proposed in the work plan, documentation will be available during 2019.

4. Data capture

"Are quality checks to validate detailed data documented?" - N

As proposed in the work plan, documentation will be available during 2019.

5. Data Storage

No constraints.

6. Data processing

"Are processes to evaluate data accuracy (bias and precision) documented?" - N

"Are the editing and imputation methods documented?" - N

As proposed in the work plan, documentation will be available during 2019.

TB 5A.4 - NAFO (FAO area 21)

1. Evidence of data quality assurance

As proposed in the work plan. No relevant changes.

2. Sampling design

"Is the sampling design documented?" – N

As proposed in the work plan, data is submitted to quality check to meet NAFO requirements and is validated by NAFO.

3. Sampling implementation

"Are non-responses and refusals recorded?" – N

As proposed in the work plan, data is submitted to quality check to meet NAFO requirements and is validated by NAFO.

4. Data capture

"Are quality checks to validate detailed data documented?" – N

As proposed in the work plan, data is submitted to quality check to meet NAFO requirements and is validated by NAFO.

5. Data Storage

No constraints.

6. Data processing

"Are processes to evaluate data accuracy (bias and precision) documented?" - N

"Are the editing and imputation methods documented?" - N

As proposed in the work plan, data is submitted to quality check to meet NAFO requirements and is validated by NAFO.

TB 5A.5 - ICCAT

1. Evidence of data quality assurance

As proposed in the work plan. No relevant changes.

2. Sampling design

"Is the sampling design documented?" – Y / N

As proposed in the work plan, data is submitted to quality check to meet ICCAT requirements and is validated by ICCAT.

3. Sampling implementation

"Are non-responses and refusals recorded?" – Y / N

As proposed in the work plan, data is submitted to quality check to meet ICCAT requirements and is validated by ICCAT.

4. Data capture

"Are quality checks to validate detailed data documented?" – Y / N

As proposed in the work plan, data is submitted to quality check to meet ICCAT requirements and is validated by ICCAT.

5. Data Storage

No constraints.

6. Data processing

"Are processes to evaluate data accuracy (bias and precision) documented?" – Y / N

"Are the editing and imputation methods documented?" – Y / N

As proposed in the work plan, data is submitted to quality check to meet ICCAT requirements and is validated by ICCAT.

TB 5A.6 - ICES area X

1. Evidence of data quality assurance

All sampling schemes as proposed in the work plan. No relevant changes.

Main constraints in those sections of Table 5A where "N" is indicated were:

a) sampling schemes Cephalopods at sea, Drifting Longline at sea, Pots and traps at sea, Set gillnets at sea and Small pelagic at sea - sampling design not documented due to non-contracting of the service for at sea sampling regarding these schemes;
b) all at market sampling schemes - non-responses and refusals not recorded since, apart from pontual situations connected to new management policies that goes into effect, samplers always have access to landings once these resolve themselves in a short period;
c) all sampling schemes - quality checks to validate detailed data not documented due to lack of availability from the computer programmer technician responsible for this task;
d) all sampling schemes - processes to evaluate data accuracy (bias and precision) not documented due lack of availability from the computer programmer technician responsible for this task;
e) all sampling schemes - editing and imputation methods not documented due to lack of availability from the computer programmer technician responsible for this task;

Documentation on sampling design is still an internal working paper due to lack of an assigned web manager in charge for dissemination of public information.

2. Sampling design

Sampling design documentation will be made available in 2019 due to the context of transition of technical competences in the collection of biological data for the Azores.

3. Sampling implementation

No constraints.

4. Data capture

As proposed in the WP, documentation will be available during 2018.

5. Data Storage

No constraints.

6. Data processing

As proposed in the WP, documentation will be available during 2018.

Text Box 5B: Quality assurance framework for socioeconomic data

1. Evidence of data quality assurance

   No changes were made in data collection methodologies in all sectors of activity since it was considered that data quality was already guaranteed with the models in practice.

2. Section P3 Impartiality and objectiveness

   Nothing to report.

3. Section P4 Confidentiality

   DCF partners are public institutions that follow administrative law on confidentiality. However commitment to reinforce the confidentiality of the data supplied is being done, based on the confidentiality policy of the fisheries administration.

4. Section P5 Sound methodology

   Nothing to report.

5. Section P6 Appropriate statistical procedures

   Nothing to report. (There are no international standards defined for socioeconomic data collection nor methodologies defined at regional or EU level.)

6. Section P7 Non-excessive burden on respondents

   Nothing to report.

7. Section P8 Cost effectiveness

   Nothing to report.

8. Section P9 Relevance

   Nothing to report.

9. Section P10 Accuracy and reliability

   Nothing to report.

10. Section P11 Timeliness and punctuality

    Nothing to report.

11. Section P12 coherence and comparability

Nothing to report.

12. Section P13 Accessibility and Clarity

Are methodological documents publicly available?

Methodological documentation will be updated until the end of the year 2019. DGRM intends to subcontract experts to elaborate methodological documents.