
ANNUAL REPORT – 2014

PORTUGUESE PROGRAMME FOR THE COLLECTION OF FISHERIES DATA

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I. GENERAL FRAMEWORK

This report gives the results of the Portuguese National Programme (NP) for the collection of fisheries data in 2014 under the *Commission Regulation (665/2008)* and *Commission Decision (2010/93/EC) adopting a multi annual Community programme pursuant to Council Regulation (EC) No 199/2008 establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy*, hereafter referred to as “DCF”.

The format of this report is structured following the most recent guidelines from the Commission¹. The Annual Report (AR) structured in a number of modules. In the following chapters a description is given of the activities related to the DCF that have been carried out by Portugal.

No major methodological changes appeared during 2014 and the data collection could be undertaken with only some adjustments which are explained in the report.

Where relevant, reference has been made to the organisation responsible for the information. In the results per area:

- i) The mainland sub-area of the Portuguese EEZ corresponds to ICES Sub-area IX and, when referring to local fishing, to ICES Division IXa.
- ii) The Azores Grounds of the Portuguese EEZ corresponds to ICES Sub-area X.
- iii) The Madeira sub-area of the Portuguese EEZ corresponds to CECAF Division 34.1.2.

A comprehensive and updated list of the derogations valid for 2014 is provided in table I.A.1. There are no bilateral or multilateral agreements in force.

Derogation for sampling 43 required stocks in ICES Sub-area X is also mentioned in table I.A.1. Due to the fact of no fishery occurring in this region and, according to the exceptions rules in the Commission Decision 2010/93/EC, the species for which stock-related variables collection was asked for derogation are: *Anguilla anguilla*, *Argentina spp.*, *Argyrosomus regius*, *Auxis rochei*, *Cancer pagurus*, *Carcharhinus falciformis*, *Centrophorus squamosus*, *Centroscymnus coelolepis*, *Centroscymnus crepidater*, *Cetorhinus maximus*, *Coryphaenoides rupestris*, *Deania calcea*, *Dicentrarchus labrax*, *Euthynnus alletteratus*, *Galeus melastomus*, *Homarus gammarus*, *Hoplostethus atlanticus*, *Istiophoridae*, *Lamna nasus*, *Loligo vulgaris*, *Merlangius merlangus*, *Microchirus variegatus*, *Microstomus kitt*, *Molva molva*, *Myliobatis aquila*, *Pandalus spp.*, *Pleuronectes platessa*, *Pollachius pollachius*, *Psetta maxima*, *Pteroplatytrygon violacea*, *Raja montagui*, *Raja naevus*, *Rajidae*, *Salmo salar*, *Scophthalmus rhombus*, *Sepia officinalis*, *Shark-like Selachii*, *Squalus acanthias*, *Squatina squatina*, *Thunnus albacares*, *Thunnus thynnus*, *Trachurus trachurus* and *Trisopterus spp.*.

¹ *Guidelines for Submission of Annual Reports on the National Data Collection Programmes under Council Regulation (EC) 199/2008, Commission Regulation (EC) 665/2008 and Commission Decision 2010/93/EU*, version 2 (26.2.2015).

II. NATIONAL DATA COLLECTION ORGANISATION

II.A. National Correspondent and Participating Institutes

National Correspondent

The National correspondent representing Portugal is:

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Participating Institutes

There are five organizations/institutes involved in the planning and implementation of the Portuguese Programme for the Collection of Fisheries Data:

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IPMA is the Portuguese Institute responsible for on-shore and at-sea sampling for the Mainland fleet operating in the Iberian Fishing Ground and exploiting stocks assessed by ICCAT as well as on-board sampling (unsorted catches) for NAFO Areas and North Sea and Eastern Artic. IPMA is also responsible for conducting scientific surveys in the Iberian Fishing Ground and participates on the Flemish Cap Groundfish Survey.

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RAA is responsible for gathering data related with Economic variables in the Autonomous Region of Azores.

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IMAR/DOP is an Institute of Marine Research within the Department of Oceanography and Fisheries from the University of the Azores which is responsible for the collection of scientific data under the Data Collection Framework, namely Metier and Stock-related variables, also data related to transversal variables (Effort and Landings). IMAR/DOP is also responsible for the provision of scientific advice for the fisheries sector of the Autonomous Region of the Azores.

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The collection of data from the fisheries sector of the Autonomous Region of Madeira, in the framework of this programme, is carried out by the Madeira Service Directorate of Fisheries Research and Development (DSIDP), which is a branch of the Regional Directorate of Fisheries of Madeira from the Environment and Natural Resources Secretary of the Regional Government of Madeira.

A website has been established to inform involved partners, the EU Commission and the public about the Portuguese implementation of the EU Data Collection framework in accordance with Commission Regulation (EC) 665/2008 article 8(2). The website is under DGRM webpage (<http://www.dgrm.min-agricultura.pt/xportal/pnrd>)

On 11 March 2014, a national co-ordination meeting took place. The main subjects were:

- Data Collection 2014 (annual budget and budget for each partner under the new OP);
- Transitional period and EU co-funding;
- Technical and Financial Report 2013 (dates, rules, tables and financial Finforms);
- New DC _ MAP (stakeholders meeting 15Jan2014);
- Other matters- Data calls (internal circuit of information).

II.B. Regional and International Coordination

II.B.1. Attendance of International Meetings

Table II.B.1. indicates which meetings have been attended by Portuguese representatives during 2014. Portugal has ensured its participation in the relevant meetings and workshops for international co-ordination.

In 2014, IMAR/DOP was the responsible institution for organizing and hosting at Horta (Azores) two meetings: the Planning Group on Commercial Catches, Discards and Biological Sampling (PGCCDBS) from

17 to 21 February 2014 and the 11th Regional Coordination Meeting of the North Atlantic 2014 (RCM North Atlantic 2014) from 22 to 26 September 2014.

II.B.2. Follow-up of Regional and International Recommendations

All recommendations and the agreements from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III. MODULE OF EVALUATION OF THE FISHING SECTOR

III.A. General Description of the Fishing Sector

The national fishing fleet is extremely diverse, differing between zones. This is related to the activities carried out and the fishing technology used in each zone. It is dominated in numbers by small wooden vessels, most of which are open decked. This reflects the fundamentally artisanal nature of the activity, which is nevertheless extremely important for a significant part of the coastal communities.

In terms of national distribution, the fishing fleet is distributed between 45 Registration Ports. Of these, 27 are Port Authorities and 18 are Maritime Delegations. On Mainland are located 32 of the main ports, 11 are in the Autonomous Region of the Azores and 2 are in the Autonomous Region of Madeira.

The national waters can be divided into three large fishing zones: the sub-area of the EEZ of the Mainland and those of the Autonomous Regions of the Azores and Madeira.

The sub-area of the EEZ of the Mainland has a narrow continental shelf and is located in a transitional area in terms of productivity, which in turn controls production. The sub-area is characterised by a great variety of species, none of which, however are abundant. On the Mainland, fishing activities are carried out on grounds close to the coast, and they exploit a small group of species (sardine, horse mackerel, mackerel, chub mackerel, hake, silver scabbard fish, octopus and clams).

The Autonomous Regions of the Azores and Madeira are characterized by a narrow (or absent) continental shelf. Given their oceanic nature, the fishing fleet tend to distributed through different islands coasts and seamounts which make the Azores and Madeira a particular case in Portuguese fisheries. In the Azores, the blackspot seabream is the most important demersal species, while in Madeira the black scabbard fish is the most important.

Mainland

Fisheries in ICES sub-areas I, II, XII, XIV, NAFO Div. 1F and Sub-area 3

In 2014 the Portuguese fleet operating in the traditional grounds of both Divisions I and II, was composed by 5 trawlers using a bottom trawl gear. The fishery in the international waters of Div. IIa was carried out by 3 trawler fishing with a pelagic trawl gear.

The Portuguese fleet operating in the Irminger Sea, Norway and Svalbard (5 ships were in operation in 2014) also operated in the NAFO area (12 ships in 2014). This fleet uses bottom trawling techniques

Fisheries in ICES Sub-areas I and II (Norway and Svalbard) and international waters (Div.IIa)

In 2014, the Portuguese nominal catches recorded 3,894 ton: 3,024 ton proceeding from the Division IIa and 870 ton proceeding from the Division IIb.

For the period from 1993 till 2014, cod (*Gadus morhua*) is the most important species in the catches, with the exception of 1993 in Division IIa. In the recent years, more than 60% of the fishing effort has been deployed in Norway zone (Division IIa), corresponding to a same percentage in catch allocation (not including the new fishery in the “Banana Hole” zone).

Sebastes Mentella fishery in ICES Div. XII, XIVb and NAFO Div. 1 F

The redfish Portuguese trawl pelagic fishery in the area started in 1994, at first in the Irminger Sea but now is wide spread till NAFO divisions 1F, 2H, 2J and 3K. In 2014 there was no activity in those areas.

Fishery in the NAFO Area

In 2014, the Portuguese nominal catches proceeding from NAFO Regulatory Area have reached 20 170 ton, an increase of 2312 ton comparing to 2013.

Redfish continues to be by far the most important species in the Portuguese commercial catches from NAFO Area, representing near 50% in recent years (9 929 ton in 2014) of the overall catch, followed by Codfish, with catches of 5 584 ton and Greenland Halibut, with catches of 2 114 ton.

In 2014 the fishing effort was 1 551 fishing days.

Fishery in the Mediterranean and Black Sea

In 2014, the Portuguese nominal catches totaled 100 tons, 73% of which was shrimp, 21% big pelagic fishes and 5% demersal fishes. There were 5 vessels operating in this area, ranging 35 to 224 GT.

Most vessels operating in this area operates mainly in the Atlantic Ocean. Only 2 vessels operate exclusively in the Mediterranean. These 2 vessels uses exclusively traps and catches only shrimp.

In 2014 the fishing effort was 393 fishing days.

There was no activity in the Black Sea.

Fishery in the WECAFC

In 2014 there was no activity in the area.

Bottom Trawl Fishery in Div. IXa

The bottom trawl fishery comprises two fleet components e.g., the trawl fleet catching demersal fish (65-mm mesh size) and the bottom trawl fleet directed at crustaceans (≥ 55 mm mesh size for shrimps and above 70 mm for Norway lobster). In 2014 about 79 vessels operate in this fishery, 25 of which are licensed for crustaceans.

The catches of this trawl fishery represents 16 % of the total landed in Div. IXa (Portuguese coast).

The trawl fleet component targeting fish (hake, horse mackerel, axillary sea breams, pouting, octopus, squids, blue whiting) operates off the entire Portuguese coast mainly at depths between 100 and 250 m and during all the year.

The fleet targeting crustaceans (Norway lobster and rose shrimp) operates mainly in the Southwest and South in deeper waters, from 100 to 800 m. This fishery takes place throughout the year, with the highest landings usually being made in the spring and summer.

Artisanal Fishery in Div IXa

The artisanal fishery is composed of a large number (around 6300) of small boats, operating mainly inshore and using a variety of gears as gillnets and trammel nets (the majority), purse seine, beam trawls, longlines, traps, pots and dredges. Some of these boats are licensed for more than one type of gear (with permission to a maximum of five gears).

Often it is used several different gears in the same trip and depending of the species availability this fishery use also different gears by season. The main species landed are hake, pouting, sole, cuttlefish and anglerfish from gillnets and trammel nets, sardine, horse mackerel and mackerel from purse seine, hake, conger, skates and black scabardfish from longlines, octopus from traps and pots, bivalves from dredges and coastal shrimps from beam trawl.

The large number of small boats (< 12 m) involved in this fishery has a mean GT of 1,5 and an average of 18 KW engine power.

The artisanal fishery represents 20% and 34% in weight and value, respectively, of the total commercial species sold in auctions in 2014

Purse-seine fishery in Div IXa

The purse-seine fishery, traditionally the most important in landings volume (in 2014 it greatly reduced its catches due to legal limitations on the activity and was exceeded by the trawler fishery), is composed of around 145 purse seines with a total catch of 47 327 t in 2014. This fleet targets mainly sardine, which constitutes 31% of their landings in 2014, using a mesh size of 16 mm. With the introduction, in 2012, of specific legislation restricting sardine catches, the importance of this species has been reducing, by comparison with 2011, where catches of sardine was responsible for 63% of total catches. Sardine catches were replaced by Chub Mackerel catches, specie whose catches increased substantially in importance in 2012, from 28% to 51% of total catches. Other target species are horse mackerel and Spanish mackerel.

The black scabbardfish long-line fishery in Div. IXa

In 2014, 18 deep-water longline vessels were routinely targeting the Black scabbard fish (*Aphanopus carbo*) in a limited area (hard grounds along canyon slopes off Sesimbra, South of Lisbon). Landings of Black scabbard fish amounted to 2 098 ton. This fishery started in 1983 at Sesimbra port. Associated with the capture of Black scabbard fish other deep-water sharks important to the incomes generated by this fishing activity are also captured, namely Portuguese dogfish (*Centroscymsus coelestis*) and Leafscale Gulper shark (*Centrophorus squamosus*).

The Swordfish Fishery in Atlantic Ocean

There is a drifting longline fishery directed to the swordfish in Atlantic Ocean involving 21 vessels with a mean GT of 133, an average of 302 kW engine power and a mean overall length of 22 meters. The main landing ports for swordfish in mainland west coast are Sesimbra (about 23% of the total catch in 2013) and Peniche (about 76% of the total catch in 2014).

The Surface Longline Fishery in Indian Ocean

In 2014 the Portuguese longline fishery in Indian Ocean (East and West) comprised 11 vessels, ranging from 177 to 593 GT. Target species were Swordfish and Blue shark.

This fleet activity's outcome has a total catch of around 2 480 ton. From those, about 48% were Swordfish and 18% were Blue shark, approximately 1 266 ton and 472 ton, in that order.

Catches in the fishing area were landed in African ports, namely Mozambique, Namibia and South Africa.

The Surface Longline Fishery in Pacific Ocean

In 2014 the Portuguese longline fishery in Indian Ocean (East and West) comprised by 1 vessel. Target species were Swordfish and Blue shark.

This fleet activity's outcome has a total catch of around 860 ton. From those, about 37% were Black Marlin (BLM), 21% were Blue shark (BSH), 18% were Kitefin shark (SCK) and 11% were Shortfin mako (SMA).

Catches in the fishing area were landed in Fiji and French Polynesia ports, namely Suva and Papeete.

Autonomous Region of the Azores (Div. Xa and CECAF 34.2.0)

The majority of Azorean fishing activity, data collection and sampling are concentrated in the ICES Sub-area X, where vessels are committed to demersal, pelagic, deep-water, tuna and other highly migratory fishes. The ecosystem is a seamount type with fishing operations occurring in all available areas (coastal and seamounts within the Azorean EEZ) usually limited to 1000 m depth, catching species from different assemblages, mostly on the 200-600 m strata (intermediate strata where the most commercially important species occur). On the other hand, some vessels may occasionally conduct some fishing operations within the portion of CECAF 34.2.0 that belongs to Azorean EEZ. No sampling scheme is programmed for those catches since they are usually of small amounts and are landed mixed with catches from ICES area X, which are sampled at landing.

An algorithm was constructed to detect the potential main fishing gear per landing trip, based on target species or species composition and all the methodological procedures for the identification of the Azorean metiers are described in Annex III.

In conclusion, fishing activities in the Autonomous Region of the Azores can be divided into 4 main categories which include six metiers.

Purse seine fishery for small pelagic fishes

PS_SPF metier is defined by the use of fishing gear purse seine nets targeting the blue jack mackerel (*T. picturatus*). This fishery occurs mainly at inshore areas all year round. Currently, 40 vessels use this metier; being the 10 – 12m segment the main contributor in terms of landings.

Pole-and-line fishery for large pelagic species

LHP_LPF metier is defined by pole and line gear type targeting tuna species [i.e bigeye tuna (*T. obesus*), skipjack tuna (*K. pelamis*) and albacore (*T. alalunga*)]. Tuna vessels operate from coastal to offshore areas during April to October. Currently, 80 vessels ranging a great variety of overall size use this metier however, the 12 – 18m and > 24m segments are the main contributors in terms of landings.

Hook fishery for demersal and coastal species

LLS_DEF metier is defined by the fishing gear set longline being of multispecies character targeting a high variety of demersal species as blackspot seabream (*P. bogaraveo*) and bluemouth (*H. dactylopterus*). This gear is used all year round at 3NM from shore comprising the islands slope (> 3MN) and offshore banks. Currently, around 100 vessels use this gear; however the 10 – 12m segment is the main contributor in terms of landings.

LHP_FIF metier is defined by handlines gears. Currently, 260 vessels use this metier; being the 0 – 10m segment the main contributor in terms of landings. This gear are used at inshore areas, however, an important component of the fishery also occur at offshore banks. This fishing gear is used all year round targeting demersal species as blackspot seabream (*P. bogaraveo*), red porgy (*P. pagrus*), fork-beard (*P. phycis*), but during the summer months also target coastal pelagic species as jacks (e.g *Seriola rivoliana*), Atlantic bonito (*sarda sarda*) and barracuda (*Sphyrna viridensis*).

LHP_CEP metier is defined by squid jigging fishing gear being highly selective for its target species *Loligo forbesi*. Currently, 50 vessels use this gear but it's the fleet 0 – 10m and 10 – 12m segments which are the main contributors in terms of landings. Squid fishery occurred in the islands slope, all year round although with a decreasing of effort and catch during the summer months.

Fixed netters fishery for coastal species

GNS_FIF metier is defined by gear type of gill nets targeting finfish. This fishery occurs in inshore areas with a marked seasonality (i.e. summer months) targeting mainly the demersal species parrot fish (*Sparisoma cretense*) but also coastal pelagic species (e.g. yellowmouth barracuda, jacks, atlantic bonito). Currently, 45 vessels use this metier; being the 0 – 10m segment the main contributor in terms of landings.

These fisheries are all inter-related, since the same vessel can use two or more fishing gears. The demersal and tuna fisheries represent a high economic value for the Autonomous Region of the Azores. The deep-water fishery for demersal species in the Azores is a multispecies and multigear fishery, where several types of hooks and lines gears are used by the local fleet. The dynamic of the demersal fishery seems to be driven by the main target species, the blackspot seabream (*Pagellus bogaraveo*). However, other commercially important species are also landed and the target species seems to change seasonally according to abundance, species vulnerability, management policies, and market demands. The fishery is clearly a typical small scale one, predominating small vessels (vessels <12m represent 90% of the total fleet) using mainly traditional bottom longline and several types of hand lines.

In 2014 statistical information on fish landings shows a decreased (c. 3800 t) in catches from the Autonomous Region of the Azores when compared to 2013. This tendency is mainly due to a reduction in the tuna catches, which diminished by almost 4300 tons. Even though the 2014 landings decreased tendency was not so apparent due to some raise from demersal and small pelagic species.

Autonomous Region of Madeira (CECAF 34.1.2)

The bio-geographical conditions of the archipelago of Madeira, e.g. narrow insular shelf, oligotrophic waters and steep incline of the slope, have always imposed severe limitations on fishing, since the reduced biomass of the populations of the available fishing species, particularly in the neritic zone (to a depth of around 200m) forced the Madeira fishing fleet, operating inside the Madeira Economic Exclusive Zone (CECAF 34.1.2), to concentrate on exploiting deepwater and/or migratory resources.

The greater relative weight in the landings of this sector belongs to the mixed fishery of two sympatric species black scabbard fish *Aphanopus carbo* (Lowe, 1839) and the intermediate scabbard fish *A. intermedius* Parin, 1983. These benthopelagic species are captured with drifting long lines at meso and bathypelagic zones. Also important are the large migratory pelagic species (Tuna), captured by bait boats using pole and line. The dominant species in this group are: *Thunnus obesus* (Lowe, 1839), bigeye tuna, and *Katsuwonus pelamis* (Linnaeus, 1758), skipjack tuna, among others.

On a decreasing scale of commercial importance, we find the small coastal pelagic species (locally called “ruama”), notably: *Trachurus picturatus* (Bowdich, 1825) (horse mackerel) and *Scomber colias* (Gmelin, 1789) (chub or common mackerel), mostly caught by purse seiners, out of a total of around one hundred marine species commercially exploited in this region.

Despite their small commercial importance when compared to the species mentioned above, the demersal species even so have an important role in the socio-economic context of fishing in Madeira. These species, which have a high commercial value, are fished using multispecific techniques by a number of small boats mostly operating with bottom long lines, traps and hand lines.

There is also a small, in terms of unloadings, but fairly important fishery in terms of value and fishing effort, of gastropod molluscs (limpets) carried out by small boats through scuba diving in the subtidal zone.

The Madeira fisheries sector does not comprise any Industrial fishery targeting species for the production of fish meal, fish oil, etc.

The Madeira fishing fleet is mostly composed by small artisanal boats (under 12 m) representing around 67% of the total number of the active fleet.

Overall, in 2014 statistical information on fish landings in all Madeira fishing ports showed an increase (c. 3342 t and 5771 K€) in the Autonomous Region of Madeira compared to 2013. This tendency was mainly due to an important increase in the catches of the albacore tuna.

III.B. Economic Variables

III.B. Baltic Sea (ICES areas III b-d), North Sea (ICES areas IIIa, IV and VIId) and Eastern Arctic (ICES areas I and II), and North Atlantic (ICES areas V-XIV and NAFO areas)

III.B.1. Achievements: Results and Deviation from NP Proposal

Mainland

As stated in our NP 2011- 2013 the collection of economic data defined in DCF was achieved through a survey, applied to a statistical sample, by means of random stratified sampling method.

The reference year was 2013 and the target population was composed of vessels with registered activity and vessels with special licenses that may not have registered activity (exemption of landings on auctions), withdrawn from the national Vessel Register. If in the survey a vessel owner states that the vessel didn't have any activity and the vessel has no landings or logbooks then it is considered inactive. Inactive vessels are not part of the annual survey.

The questionnaire was drafted and (e-)mailed directly to the owners of the selected vessels and to producer's organizations and associatives.

The differences between strata regarding NP are due to the activity of the vessels and to the changes in the fleet. NP numbers and strata are estimates based on licensing. When we take in consideration the activity of the vessels, as stated in DCF regulation, some reallocations between fleet segments occur and with them the needs of possible clustering also changes. Clustering was maintained as stable as possible over the years.

Clustering was made for segments with less than 3 vessels, accordingly to the confidentiality rules. Segments can be clustered when they are similar to each other. The segments were considered similar to each other by an analysis on the landings from logbooks and sales notes. The analysis compared the average value of landings per vessel for each segment to be clustered. If the values are of the same order of magnitude (usually differences less than 150% from each other) then the segments were considered similar. The segments to be clustered have the same main gear and belong either to the same vessel length class or, if not possible, to an adjacent vessel length class.

The number of sample units per stratum and the coverage rate is reported in Table III.B.1.

The inquiry process for the reference year was completely carried out.

Calculation of capital values and capital costs

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

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 (e.g. per 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 = 21 050,00euros/GT
- Polyvalents segment > 12 meters = 47 250,00euros/GT^{0,7}
- Trawl segment = 25 820,00 euros/GT^{0,8}
- 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.

Calculation of FTE

The following procedure was used to calculate FTE:

From the 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

Administrative data:

- Number of days of activity, from logbooks and auctions

G – Gender (M/F)

T – Type of employment (Partial/Full)

DA – Days of activity

WH – Average working hours

NUL – Number of unpaid labourers

If a vessel answers the survey:

1. Calculate the monthly average or workers (per gender and type of employment), $AVGw(G,T)$
2. $FTE\ national(G) = AVGw(G,Full\ time) + AVGw(G,Partial\ time) \times [\min(8,WH)/8]$
3. $FTE\ harmonized(G) = FTE\ national(G) \times DA \times WH / 2000$

If a vessel doesn't answers the survey:

$AVGFTE(G)$ – Average number of FTE of the fleet segment(per gender)

$AVGWH$ – Average of working hours of the fleet segment

$AVGNUL$ – Average of unpaid labourers of the fleet segment

1. $FTE\ national(G) = AVGFTE(G)$
2. $FTE\ harmonized(G) = FTE(G) \times AVGWH \times DA$
3. $NUL = AVGNUL$

To calculate imputed value of unpaid labour:

If the vessel answer the survey:

Number of unpaid labourers x Crew Wages/Total FTE

If the vessel didn't answer the survey:

Average number of unpaid labourers x Average Crew Wages per FTE of the fleet segment

Obs: If vessels answer the survey partially, the average of the fleet segment is used on the missing items

Autonomous Region of the Azores (Div.X)

In 2014, fleet economic data was collected in the Autonomous Region of the Azores following the methodologies described in the National Plan. Frame population was determined from the total population based on the fleet register and licensing for the reference year (2013). The frame population of active vessels was stratified into segments based on size and island.

A random sample was formed from each segment and the national questionnaire mailed to the professional associations based in each island of the Azores.

A total of 107 questionnaires were conducted, 50 for the segment $0 < 7$ m, 32 for the segment $7 < 10$ m, 14 for the segment $10 < 12$ m, 9 for the segment $12 < 18$ m and 2 for the segment $24 < 40$ m. All primary data was stored in Si2P using the application developed by DGRM.

We used the database register fleet, for the fleet variables and questionnaires for the others variables, with exception for the variables belong to the Group of Variables: Capital Costs and Capital Value, which were estimated according to the proposed PIM methodology. In what concern this group of variables we should refer that the price per unit of capacity is the price per unit of capacity of a new vessel, e.g. replacement price.

III.B.2. Data quality: Results and Deviation from NP Proposal

Mainland, Azores and Madeira

There is a special effort to get consistent results for some economic parameters like: financial position in what concern the small scale fisheries. The information to calculate those variables was collected, however due to non consistent responses the results are not trustable.

The sample size for each fleet segment is determined by statistical procedure and targeting the precision level required by DCF for the variable income of the previous year (usually $CV < 5\%$).

The methodology used since the beginning of the DCF is based on averages of the fleet segments. However fleet vessels inside the DCF segment are not homogeneous. To minimize this problem further segmentation has been applied but with limited results. With the raising in importance of the economic results, namely on the balance report, the greater complexity of the processes and the growing needs on the amount, diversity and quality of information and the feeling that quality of the results needs improving in order so that the estimates may be used, it was decided to undergo a deep revision of the methods and procedures in place to collect, aggregate and estimate the variable values of the fleet. An analysis of the results of the surveys over the years shows significant variations in the answers to the survey. The same vessels can have, from year to year, huge variations for some variables that were expected to remain relatively stable, as fixed costs. The conclusion was that on different years the respondents use different interpretations for the same questions (with the possibility

of different respondents (e.g. accountants) on different years for the same vessels). Adding to the low number of answers, the variations (and bias) of the estimators may be substantial. The new methodology developed makes use of administrative data, combined with answers from the surveys and some modelling in order to achieve better quality with the available data. Variability is still high, as the base sample data also have high variability, but is mitigated to the previous knowledge from the administrative auxiliary variables and is lower than the variability achieved with the old methodology. It should be noticed that, after taking into consideration the errors on the sample data, they still reflect the variability of the target population, as it should from a statistical point of view. On a well succeeded statistical operation, highly heterogeneous population will be reflected on a highly variable sample data. The revision process is very resource intensive a time consuming and in some cases the achieved results show that there are still room for improvement. The work begun this year will continue on the near future, with further experiences on new methodologies in order to achieve better results on the next year.

III.B.3. Follow-up of Regional and International recommendations

Not applicable

III.B.4. Actions to avoid shortfalls

New methodology was developed in order to improve the quality of the estimates and the stability and consistency of the time series. From the analysis of the answers to the surveys over the years it was noticed inconsistencies and misinterpretations of what was actually asked. One of the things was that the instructions were not being read by the respondents. The questionnaire was changed in order to reduce the possibility of misunderstanding and the instructions were merged into it. The calendar for 2015 was anticipated in order to have the results sooner and therefore more time to do the analysis and calculate the estimates. Work on improved methodologies will continue on 2015, based on the results achieved this year.

Autonomous Region of the Azores (Div.X)

The same methodology described for mainland was also applied to Azores and Madeira's fleet.

III.B. Other Regions

III.B.1. Achievements: Results and Deviation from NP Proposal

Autonomous Region of Madeira (CECAF 34.1.2)

In 2014, data for this module was collected in the Madeira region following the methodologies described in the National Plan for this year. Population segments considered for the collection of economic data resulted from the Universe of the registered vessels and its distribution is included at a national level in Table III.B.1. The acquisition of economic data was made by census aiming the total population based on the fleet register and licensing for the reference year (2013). A questionnaire was mailed to each individual boat owners or official accountant and the percentage of coverage achieved is indicated in this Table for each of the population segments.

The form prepared for national use was adapted and used in active vessels both in the census survey. Source of the data required in the case of non-active vessels was the fleet register. A total of 90 inquires to the active vessels were conducted, 60 for the segment 0<12 m, 24 for the segment 12<24 m and 6 for the segment 24<40 m. All primary data was stored in Si2P using the application developed by DGRM.

The objectives set for 2013 were partially achieved concerning the acquisition of data. (Table III.B.1.). In average, considering all segments, the response rate achieved 62%.

The methodology for the calculation of the estimates is the same for mainland, Azores and Madeira.

III.B.2. Data quality: Results and Deviation from NP Proposal

Autonomous Region of Madeira (CECAF 34.1.2)

Not applicable.

III.B.3. Follow-up of Regional and International recommendations

Not applicable.

III.B.4. Actions to avoid shortfalls

Autonomous Region of Madeira (CECAF 34.1.2)

Due to some doubts arising from answers to the inquiries, especially in the case of small vessels (under 10 m), validation of data was made in the case of the variables where administrative data exists. This validation allows to increase the reliability of the answers through the crosschecking of the responses to the survey versus recorded data from vessel activity, e.g., income with landings and fuel volume.

Although the need to answer the questionnaires is emphasized, no official legislation is in force at this moment, to make mandatory questionnaire replies. The Regional Directorate of Madeira is now preparing such legislation to avoid the absence of responses.

III.C. Metier-related Variables

Tables III.C.3, III.C.4, III.C.5 and III.C.6 present the information collected during 2014.

Autonomous Region of the Azores (Div. Xa)

IMAR/DOP is responsible for the collection of this information in ICES Division Xa and in pole and line fishery which targets tuna (ICCAT). All identified metiers for which fishing activity was recorded during the reference period are indicated in Table III.C.1. Reference period in Table III.C.1 was updated using the average values of the two previous years (2012 and 2013). Information used for ranking the metiers through landings and value was obtained from sales notes (census), while for effort the number of days at sea was obtained from sales notes and logbooks (census) as well as from inquiries (probability based survey).

With exception of a new identified metier LLD_DWS_0_0_0, which targets black scabbard fish, all the metiers identified after updating the reference values with the 2 previous years of the sampling year, were the same as indicated in the NP2014-2016. Through the application of the ranking system based on effort, landings, discards and value variables, the metiers selected for sampling in ICES area X continues to be gillnets, handlines targeting squid, handlines targeting finfish, pole-lines targeting tuna, set longlines for demersal fishes and purse seiners targeting small pelagic fishes. Handlines targeting finfish were not identified for sampling through discards.

In the past, handlines and pole-lines gear types were incorrectly assigned by the acronym LHM-Handlines and pole-lines (mechanised). This situation was corrected in AR2014 (text and tables), since handlines and pole-lines used by Azorean fleet are all hand-operated.

Sampling strategy continues to be concurrent 'metier based' sampling strategy through probability sample survey data collection scheme (Table III.C.4).

Autonomous Region of Madeira (CECAF 34.1.2)

Madeira is responsible for collecting information of local vessels operating around the archipelago (CECAF 34.1.2) and also of tuna fishery data of that fishing area (ICCAT).

Mainland

IPMA is responsible to collect and analyse the biological data from ICES Division IXa, ICES Sub areas XII, XIV and I, II, NAFO area and the long-line fleet targeting swordfish (ICCAT and IOTC).

GENERAL REMARKS

The description below should be considered along the following sampling strategies:

Concurrent sampling at sea: Samples of a trip drawn by an observer on board of a fishing vessel.

Concurrent sampling at market: Samples of a trip drawn in the harbor.

Total: Sum of all trips.

III.C. North Sea and Eastern Arctic (ICES areas I, II)

III.C.1. Achievements: Results and Deviation from NP Proposal

Depending on the fishing behaviour of the fleet operating in ICES areas I and II and in NAFO Regulatory Area (NRA), several reasons imply deviations on the collection of metier-related variables:

- (a) Sampling is carried out by observers who remain on board throughout the period of the fishing trip, which can last from 2 to 3 months, with likely short notice changes in the fishing behaviour and operation area. Since 1995 the crew male nurses were trained to collect samples during the fishing trip;
- (b) Once an observer is on-board, the entire trip is being sampled (i.e. sampling does not stop after a few hauls or fishing days, but lasts until the end of that trip);
- (c) 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 under a short time constraint and cannot collide with fish processing;
- (d) As length sampling is performed on board, the reason for over-sampling is often that all fish of a once randomly chosen sub-sample has to be measured. This oversampling doesn't incur in additional costs. However, minor additional costs occur in the home laboratory in form of additional staff time for sampling processing;
- (e) The stock-based variables are obtained from sampling at sea in order to obtain data representative of the population. Sampling achievement is therefore totally dependent on the catches of the species.

Two fisheries were selected either by landings, effort or value.

PTIA

OTB_DEF_>=120_0_0

Target species: *Gadus morhua*

Sampled metiers: OTB_DEF_>=130_0_0

Concurrent sampling at sea: 2/2 (100%)
Concurrent sampling at market: not planned
Total: 2/2 (100%)

PT2A

OTM_DEF_100-119_0_0

Target species: *Sebastes mentella*

Sampled metiers: OTM_DEF_100-119_0_0

Concurrent sampling at sea: 0/1 (0%)

Concurrent sampling at market: not planned

Total: 0/1 (0%)

Reason for shortfall: during 2014, cod (**PT1A OTB_DEF_>=120_0_0**) was the primary target of the Portuguese fleet operating in the North Sea and Eastern Arctic areas. The cooperative vessels didn't have fishing activity with this metier. On-board sampling was not carried.

LENGTH COMPOSITION:

Table III.C.6 provide the achievements on length sampling of unsorted catches by metier and species. Concurrent sampling at sea has not been applied in this region. The fisheries in the Eastern Arctic fishing grounds are composed by almost clean catches of target species (cod and redfish) with few by-catches, which are difficult to sort out and to sample under time constraints. On-board sampling conditions (explained on the remarks above) leave no room to collect samples of less abundant and/or non commercial fish. For this reason, table III.C.6 includes no other species than those planned in the relevant NP.

Sebastes mentella: Deviation on sampling intensity for length compositions is due to the absence of fishing activity with the metier OTM_DEF_100-119_0_0. In 2014, as in previous years, no length compositions or stock-related variables were collected for *Sebastes mentella*. *Gadus morhua* was the primary target of the Portuguese collaborative vessels operating in the Eastern Arctic areas. *Sebastes mentella* catches were rather small, turning length sampling unfeasible within the time frame of fish processing once the haul is on deck.

Hippoglossoides platessoides*, *Reinhardtius hippoglossoides* and *Sebastes marinus: The species is a by-catch. Planned minimum number of fish to be measured/aged at national level cannot be planned in advance.

III.C.2. Data Quality: Results and Deviation from NP Proposal

Deviations and reasons for deviations are explained under section III.C.1.

Portugal has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators. It became evident that the COST tools were not suitable for the Portuguese sampling design and that an evaluation on if and how the COST tools can be used are still required.

Different quality control assessment analysis (quarterly and annual) are implemented on the data base. The checks assure the type of data and the range of the variables are correct. Checks on national data processing include monitoring achievements, trend analysis, quality indicators and non-response rates.

III.C.3. Follow-up of Regional and International Recommendations

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III.C.4. Actions to Avoid Shortfalls

No action possible to reduce uncertainty of fleet activity. To avoid shortfalls Portugal is always trying to reach a wide participation of vessels which have not been sampled by observers before. This will enhance sampling coverage on fishing behaviour and operation area. To ensure that the planned length sampling is

covering, as much as possible, the full range of expected lengths for each species with a good ratio cost/benefit, IPMA is developing an approach to set a minimum sampling effort on board to the Portuguese NAFO and NEAFC main fisheries. This approach is under implementation and in the near future will be presented to the relevant working groups.

III.C. North Atlantic

III.C.1. Achievements: results and deviation from NP proposal

NAFO Areas, Iceland, Greenland and Irminger Sea

Two fisheries were selected either by landings, effort or value.

PT1B

OTB_MDD_130-219_0_0

Target species: *Reinhardtius hippoglossoides*

Sampled metiers: OTB_MDD_130-219_0_0

Concurrent sampling at sea: 5/4 (125%)

Concurrent sampling at market: not planned

Total: 5/4 (125%)

PT2B

OTM_DEF_100-129_0_0

Target species: *Gadus morhua*, *Melanogrammus aeglefinus* and *Sebastes mentella*

Sampled metiers: OTM_DEF_100-129_0_0

Concurrent sampling at sea: 0/1 (0%)

Concurrent sampling at market: not planned

Total: 0/1 (0%)

Reason shortfall: due to lack of quota there was no fishing activity in Iceland, Greenland and Irminger Sea area. The cooperative vessels operated exclusively in North Sea and Eastern Arctic areas.

LENGTH COMPOSITION:

Table III.C.6 provide the achievements on length sampling of unsorted catches by metier and species. Despite the conditions on-board, concurrent sampling at sea has been applied in NRA during 2014.

Length sampling is performed during observer trips. Once an observer is onboard, the entire trip is sampled (i.e. sampling does not stop after a few hauls or fishing days, but lasts until the end of that trip). More, catch composition may constrain the sampling achievements. These are the reasons behind the variation in length sampling achievements among years (*Glyptocephalus cynoglossus*, *Hippoglossoides platessoides*, *Raja spp.*, *Macrouridae*).

Gadus morhua was the main target species for the Portuguese fisheries activities in NRA. As length sampling is performed on board, the reason for over sampling is that all fish of a randomly chosen sub-sample has to be measured.

Sebastes mentella, **Iceland, Greenland and Irminger Sea area:** length sampling has not been achieved due to the lack of activity with the metier OTM_DEF_100-129_0_0.

Iberian Fishing Ground (ICES sub-area IXa)

GENERAL REMARKS

Most Portuguese non-pelagic fisheries in the Iberian fishing ground are typically mixed fisheries that catch a wide variety of species, reflecting the biological diversity of the areas they exploit. Portuguese multi-gear fleets use a diversity of gears that allow exploitation of ecological communities in different habitat types, depths, and substrata (Duarte et al., 2009).

The coastal mixed-species multi-gear Portuguese fleet comprises medium-sized (>12 m) vessels, using a diversity of passive gears (Duarte et al., 2009), often operated during the same fishing trip. On-board sampling procedures allow catch determination by haul and fishing gear. However, on market sampling of multi-gear fishing trips, landing disaggregation by metier is not feasible.

Table III.C.3 includes the total number of trips during the sampling year and the achieved number of sampled trips by metier. Although a mixed fisheries activities targeting mixed species are not part of the Portuguese sampling strategy (table III.C.4), it is often part of the sampling achievements (table III.C.3). Results and deviations are detailed below under the relevant sampling frame description.

The status of a scientific observer on board of a Portuguese fishing vessel still is a guest status. Article 11(3) of Council Regulation 199/2008 stipulates that scientific observers shall be accepted onboard, which did however not improve this situation. The possibility for sampling depends on the hospitality of ship owners and companies. Based on the present situation, random sampling of the fleet is still difficult and might be not optimal in future (even if a new legal basis for onboard sampling is in place), since there will remain some excuses to refuse an observer (eg maximum safe manning). Thus, the Portuguese on-board sampling programme in the Iberian Fishing Ground is based on a quasi-random sampling of cooperative commercial vessels of a fleet segment between 12 and 40 meters.

A main overall reason for deviations from what was planned is that it sometimes can be difficult to predict fishing pattern or changes in fishing pattern. Besides the bad weather conditions over the first quarter of the year, concurrent sampling at sea has only minor shortfalls.

PT3

FYC_CAT_0_0_0

Target species: *Anguilla anguilla*

Sampled metiers: FYC_CAT_0_0_0

Concurrent sampling at sea: not planned

Concurrent sampling at market: 24/44 (55%)

Total: 24/44 (55%)

Reason for shortfall: fishing trips performed with fyke nets are not landed directly in the auction, but directly sold to regular traders. Sampling scheme depends on collaborative eel fishermen and on prior information about fishing events.

PT4

FPO_MOL_0_0_0

Target species: *Octopus vulgaris*

Sampled metiers: FPO_MOL_0_0_0

Concurrent sampling at sea: not planned

Concurrent sampling at market: 280/180 (156%)

Total: 280/180 (156%)

Reason for exceeding: once the observers are at the market, while waiting to sample the targeted frames, time is used to sample an accessory number of trips with no additional costs.

PT5

GNS_DEF_80-99_0_0, GNS_DEF_60-79_0_0 and GNS_DEF_>=100_0_0

Target species: *Merluccius merluccius* (all metiers), *Pagellus acarne* and other *Sparidae* (only GNS_DEF_80-99_0_0), *Trisopterus luscus* (only GNS_DEF_60-79_0_0);

Sampled metiers: GNS_DEF_80-99_0_0, GNS_DEF_60-79_0_0 and GNS_DEF_>=100_0_0.

GTR_DEF_80-99_0_0 and GTR_DEF_>=100_0_0

Target species: *Sepia officinalis*, *Solea spp.*, *Rajidae* and *Lophius spp* (only GTR_DEF_>=100_0_0)

Sampled metiers: GTR_DEF_80-99_0_0 and GTR_DEF_>=100_0_0.

Concurrent sampling at sea: 23/24 (96%)

Concurrent sampling at market: 514/312 (165%)

Total: 537/336 (160%)

Reason for exceeding: see explanation above regarding sampling frame PT4.

PT6

LLS_DEF_0_0_0

Target species: *Merluccius merluccius*, *Conger spp*, *Pagellus spp*.

Sampled metiers: LLS_DEF_0_0_0. Additionally to those metiers selected by the DCF ranking algorithm, the metier "longliners targeting demersal species" (LLS_DEF_0_0_0) was also selected to be sampled in Div. IXa. This metier targets largest individuals than the other metiers, which are particularly relevant in the case of hake, subject to a recovery plan. The sizes caught by this metier have a large contribution to the estimates of SSB and their absence from catch-at-age matrices can bias this parameter.

Concurrent sampling at sea: not planned

Concurrent sampling at market: 100/48 (208%)

Total: 100/48 (208%)

Reason for exceeding: see explanation above regarding sampling frame PT4.

PT7

LLS_DWS_0_0_0

Target species: *Aphanopus carbo*, *Centroscymnus coelolepsis*, *Centrophorus squamosus*.

Sampled metiers: LLS_DWS_0_0_0

Concurrent sampling at sea: 2/12 (17%)

Concurrent sampling at market: 53/48 (110%)

Total: 24/60 (40%)

Reason for shortfall: Regarding on-board sampling, the number of vessels prepared to take observers on board is much reduced when compared with the whole fleet. Additionally, some vessel owners are not willing to take observer by arguing lack of space on-board and other logistic reasons.

PT8

OTB_DEF_>=55_0_0

Target species: *Merluccius merluccius*, *Trachurus spp*, *Lophius spp* and *Micromesistius poutassou*.

Sampled metiers: OTB_DEF_>=55_0_0.

Concurrent sampling at sea: 24/27 (89%)

Concurrent sampling at market: 131/144 (94%)

Total: 155/171 (91%)

PT9

OTB_CRU_>=55_0_0

Target species: *Nephrops norvegicus* (OTB_CRU_>=70_0_0), *Parapenaeus longirostris*, *Aristeus antennatus* (OTB_CRU_55-59_0_0) and *Micromesistius poutassou*.

Sampled metiers: OTB_CRU_>=70_0_0 and OTB_CRU_55-59_0_0. Crustacean trawlers are invariably licensed for two different mesh size, 55-59 mm targeting shrimps and >= 70 mm targeting Norway lobster.

Concurrent sampling at sea: 10/12 (83%)

Concurrent sampling at market: 73/96 (76%)

Total: 83/108 (77%)

Reason for shortfall: A number of crustacean trawls do not sell directly at the market, but have contracts with buyers. Others land crustaceans in frozen blocks. Therefore, besides the permanence of the observer at market, the chances to perform crustaceans sampling at the auction is dependent on crustaceans landings. Regarding concurrent sampling at sea, the reason for shortfall are the constraints to get on-board explained above, under the “General Remarks”.

PT10

PS_SPF_0_0_0

Target species: *Sardina pilchardus*, *Trachurus spp*, *Scomber colias*.

Sampled metiers: PS_SPF_>=16_0_0.

Concurrent sampling at sea: 19/24 (79%)

Concurrent sampling at market: 177/84 (211%)

Total: 196/108 (181%)

Reason for shortfall (at sea): bad weather conditions over the first quarter of the year has impaired at sea sampling. Additionally, sardine purse seine fishery was suspended in ICES divisions VIIIc and IXa from September to December 2014 and most of the purse seine fleet temporarily suspended activity.

Reason for exceeding (market sampling): during 2014 logistic issues concerning the placement of observers were solved and the purse seine fleet started to be sampled in Sesimbra and Olhão ports, increasing the overall sampling intensity. Besides the bad weather conditions over the first quarter, landings sampling could be performed on-shore.

PT11

TBB_CRU_<55_0_0

Target species: *Palaemonidae*.

Sampled metiers: TBB_CRU_<55_0_0

Concurrent sampling at sea: 6/12 (50%)

Concurrent sampling at market: 18/12 (150%)

Total: 24/24 (100%)

Reason for shortfall: according to *Palaemonidae* availability, beam trawl fleet might reduce the fishing activity throughout the year. This fishery is based on seasonality national regulations. Taking into account the rules applied specifically to beam trawl fleet, which prevent license transferring beam trawl license between vessel's and owners, the number of beam trawl vessels has been undergoing significant reductions. Thus, each year, there are significantly less available vessels to take observers on board. Moreover, some of the few vessels' owners refused to take observer due to lack of space and other logistic reasons indicated by the ship owners.

MIX MIS_MIS_0_0_0

This sampling frame is not considered for planning purposes/sampling strategy (table III.C.4). The Portuguese fleet using fixed gears is designated by polyvalent fleet. In general, this fleet operates with a range of different gears, including gill and trammel nets, hooks, longlines, traps and pots. Vessels may change fishing gears seasonally which may be related, in some areas, to seasonal changes in abundance of certain species or groups of species. Many vessels use simultaneously two or more gears in the same area or in different areas, turning more complex metier identification during the sampling survey. This multi-gear fleet operates along the Portuguese coast (ICES Division IXa) and catches a great diversity of benthonic, demersal and pelagic species (fish, shellfish, cephalopods and crustacean).

Whilst individual fishermen head out to sea to search for grounds which yield the fish they are permitted to land and using a range of gear for which they are licensed to, they can actually end up filling different gears with a range of different fish species that share seawater space and prey resources with each other. As this fleet is part of the target population, they are often sampled on shore. If a great diversity of species is observed and observers are unable to split landings by metiers, then the trip is identified as MIS_MIS_0_0_0.

Most of this multi-gear fleet is composed by vessels smaller than 12 m. From the survey point of view, these vessels have no ability to take observers on-board. Thus, sampling at sea, often required to obtain reliable information on position, total catch characteristics and discards, is not possible.

Concurrent sampling at sea: not planned

Concurrent sampling at market: 275/not planned

Total: 275/not planned

LENGTH COMPOSITION:

When sampling a fishing trip, the species are sampled concurrently according to defined sampling schemes indicated in table III.C.4. Concurrent sampling requires the simultaneous sampling of all or a predefined assemblage of species (sampling schemes 1, 2 or 3) in a vessel's catches or landings, aiming at the characterisation of target species and/or assemblages and selection patterns of distinct species.

Resulting from concurrent sampling implementation, 238 different species were sampled and the overall achieved length sampling of catches in the Iberian fishing ground was 377 221 individuals (table III.C.6).

Sampling intensities are in line with the explanations given above regarding the sampled trips by métier and necessarily depend on the retained catches and/or landings and on the discards. Furthermore, length sampling follows a general rule of collecting a minimum number of 100 fish per length class and area. In several cases, this rule leads to exceeding the achieved number of fish measured at national level. As sampling achievements are totally dependent on the catches and/or landings of the species, this may also lead to reduction in length sampling in terms of number of individuals. That is the case of *Lepidorhombus boscii*, *Raja brachyura*, *Raja clavata* and *Raja montagui*,

Anguilla anguilla is not sold directly at the market, but directly through regular contacts with buyers. Sampling intensity depends on species availability but, especially, on collaborative fishermen.

Lophius budegassa and *Lophius piscatorius*: between 2012 and 2014 IPMA conducted a pilot study on the Portuguese trammel nets fishery targeting anglerfish, *Lophius budegassa* and *Lophius piscatorius* in ICES division IXa (Annex 1). This study allowed for an increasing in the number of individuals measured.

Micromesistius poutassou: due to changes on the market demand for fish, only a few directed blue whiting fishing trips were observed. Therefore, length measurements could only be derived from by-catches in other fisheries.

Sardina pilchardus: sardine purse seine fishery was suspended in ICES divisions VIIIc and IXa from September to December 2014. This is the reason behind reduction in the number of individuals measured when compared to the length sampling achievements in 2013.

Azores Grounds (ICES Div. Xa)

Sampling of GNS_FIF_>=100_0_0 resulted in 58 trips sampled, reflecting 64% of the trips planned (table III.C.3). During 2014 there was no sampler in Pico island collecting data for the programme. Since this island complies the biggest number of vessels fishing with gillnets, an extra effort was implemented through visiting Santa Maria's harbours, once this is the island with more expression in gillnet fishery of all the others without regular data collection.

Sampling of all the other métiers has some degree of oversampling, but this does not entail extra costs to the data collection programme.

DOP/IMAR was not able to conduct the discards observer sampling programme due to the current national difficult economic situation. The shortage of national funding and the late payments of tranches from previous years, do not allow institutes to conduct their obligations in the way they committed to. The lack of funds prevented the implementation of the discard programme, which was a big constrain in achieving planned objectives regarding métier-related variables.

The concurrent sampling strategy of commercial catches results in a large list of species being sampled, more precisely, 78 different species were sampled during 2014 (table III.C.6), representing a total of 86.795 specimens. Although not selected, sampling occurs for gear types such as FPO_CRU, FPO_FIF, LLD_DWS and LLD_LPF. Regarding pots and traps the aim is to collect length sampling of *Mullus surmuletus*, as for drifting longlines targeting deep-water species the objective is to measure *Aphanopus spp.* and the sampling of drifting longlines targeting large pelagic fishes is intended to obtain length samples of *Xiphias gladius* and *Prionace glauca*.

Regarding the planned number of fish to be measured/aged at national level, oversampling occurred due to an increase in the volume of landings reflected in a higher number of specimens' sampled, namely for *Phycis phycis*, *Trachurus picturatus* and *Sparidae*. The verified shortcomings have different reasons according to species:

- a) *Aphanopus spp.*: the dependency of this fishery from local government financial incentives determines its activity. In 2014, only 32 trips occurred representing a decrease of 70% in the total volume landed;
- b) *Aspitrigla cuculus*, *Mullus surmuletus*, *Molva dypterygia*, *Phycis blennoides* and *Zeus faber*: landings quantities are very low and consequently its availability for sampling;
- c) *Centrophorus granulosus* and *Dalatias licha*: once for these species TAC is zero, no samples are available at the market;
- d) *Polyprion americanus*, *Conger conger* and *Helicolenus dactylopterus*: overestimated planned number of fish to be measured and presence of gutted fish at landings;
- e) *Pagellus bogaraveo*: the lack of both one sampler in the staff and the discards sampling programme;
- f) *Octopus vulgaris*: the metier (FPO_MOL) targeting this species was not selected for sampling, this way individuals sampled are a consequence of the concurrent sampling strategy;
- g) *Beryx spp.*: The early shutdown of the fishery due to national quota achievement, reduced the fishing season to 6 months, and it's reflected in the low number of specimens sampled. Again, the lack of at-sea sampling has implication on the numbers achieved, since it consists on the second most discarded species;
- h) *Raja clavata*: most of the specimens landed are processed on board, only the wings are landed. The discarding at sea it's also a common practice for this species. Access to whole fish is unpredictable.

III.C.2. Data Quality: results and deviation from NP proposal

NAFO Areas, Iceland, Greenland and Irminger Sea

See section III.C.2 for Supra-region North Sea and Eastern Arctic (ICES areas I, II).

Iberian Fishing Ground (ICES sub-area IXa)

Deviations and reasons for deviations are explained under section III.C.1.

Different quality control assessment analysis (quarterly and annual) are implemented on the data base. The checks assure the type of data and the range of the variables are correct.

R scripts perform quarterly checks on all commercial sampling data logged by the observers into the database. Each observer checks his/her data and gets feedback on quality results. Checks are run sequentially and until observer data is free of major errors.

For both, on-board and market sampling data, a random check of 10% of the data per year is executed by inspecting the sample forms and the registered data. On this procedure observers check each other's field logs against database value. When systematic biases are found, all observer records are checked. Additionally R scripts perform annual checks on all data logged by the observers into the database.

Portugal has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators. It became evident that the COST tools were not suitable for the Portuguese sampling design and that an evaluation on if and how the COST tools can be used are still required.

Azores Grounds (ICES Div. Xa)

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 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.

III.C.3. Follow-up of Regional and International Recommendations

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III.C.4. Actions to avoid shortfalls

NAFO Areas, Iceland, Greenland and Irminger Sea

See section III.C.4 for supra-region North Sea and Eastern Arctic (ICES areas I, II).

Iberian Fishing Ground (ICES sub-area IXa)

Concerning on-board sampling, the strategy is conditioned by the good will of the skippers to cooperate with IPMA. Although Council Regulation 199/2008 states that vessel owners “shall take observers on board” this situation remains to be difficult for several metiers. Portugal is making an effort to increase the participation of vessels in the national sampling programme by disclosing information about the DCF on the sampling sites and fisheries organizations.

Influenced by current consequences of the fishery policy, fishermen often decline from assisting the DCF. Additionally, a large number of vessels are not prepared to take observers on board. Other deviations occurred because of short notice changes in the fishing behaviour.

One of the main reasons for deviations from the planned is that it is sometimes difficult to predict spatial and temporal fishing patterns for some metiers. The problem can be reduced by implementation of robust sampling frames where the metiers can be seen as domains instead of strata. This is something that Portugal is already working on, including the identification of proper sampling frames, probability based ways to select primary sampling units and documentation of non-responses.

From 17 to 20 November 2014 was held at IPMA the Workshop on Sampling Design and Optimization (WKSDO), chaired by Cristina Silva and Manuela Azevedo (IPMA-PT) and Jon H. Vølstad (IMR-NO). The

workshop focus on the analysis of the current Portuguese sampling designs under the Data Collection Framework with the aim to optimize the current market sampling design to estimate the species length composition of landings, the onboard sampling for catches and the biological sampling for growth and maturity. The workshop took into account the initiated review process of EU fisheries data collection for stock assessment and management (DCF). During the workshop several approaches and methods were analysed and discussed, resulting in a set of guidelines and recommendations for future work which are relevant to ensure a high quality and optimized future data collection programme. For further details please check the link below: <https://www.ipma.pt/resources.www/docs/publicacoes.site/rel-cientif-tecnicas/Reln2-IPMA.pdf>

Azores Grounds (ICES Div. Xa)

In order to improve the sampling program, constant adjustments are made. Even though, some bias can occur, due to some obstacle raised by the fishing industry operators (e.g fish handling).

To achieve the number of trips to be sampled for metier GNS_FIF_>=100_0_0, regular visits to Pico and Santa Maria islands are planned in order to address this shortcoming.

Some sampling at sea is expected to be accomplished as soon as cash flow turns out to be a reality. The importance of on-board sampling was proved to be of extreme importance on obtaining precious information, either for catch determination in fishing trips with multi-gear or as a source for complementing length composition for most species (commercial or not) caught in Azores. For *C. granulosus* and *D. licha*, the implementation of the discard observer program will fulfil this gap of information. Once the funding problem is overtaken the collection of discard data will continue.

Efforts will be employed to overcome the lack of a sampler in the data collection programme, in order to raise the number of sampled trips and thus the number of specimens measured.

Sampling of *Aphanopus spp.* will be intensified as soon as fishing and landings are more regular.

III.C. Other Regions

III.C.1. Achievements: results and deviation from NP proposal

ICCAT

PT12

LLD_LPF_0_0_0 (SWO)

Target species: *Xiphias gladius*, *Prionace glauca*

Sampled metiers: LLD_LPF_0_0_0

Concurrent sampling at sea: 9/6 (150%)

Concurrent sampling at market: 36/36 (100%)

Total: 45/42 (107%)

Reason for exceeding: Conservative planning. The placement of additional observers in Peniche, the main landing port for longliners targeting large pelagic fish, increased sampling intensity at sea for short duration trips.

PT14

FPN_LPF_0_0_0 (BFT)

Target species: *Thunnus thynnus*.

Sampled métiers: FPN_LPF_0_0_0

Concurrent sampling at sea: 56/24 (233%)

Concurrent sampling at market: 33/24 (138%)

Total: 89/48 (185%)

Reason for exceeding: according to fish availability, the trap activity varies considerably among seasons. Under national regulations, each tuna harvesting must be monitored by a scientific observer. Taking advantage of this obligation, sampling is, in fact, a census.

LENGTH COMPOSITION:

Table III.C.6 provide the achievements on length sampling of catches, retained catches and discards by métier and species. Obtained data refer to unsorted catches, retained catches and/or landings and discards.

Length sampling intensities is conditional to the concurrent sampling characteristics and depends on the landings and catch composition. Most of the measurements are taken on observer trips, once an observer is onboard, the entire trip is sampled (i.e. sampling does not stop after a few hauls or fishing days, but lasts until the end of that trip). Therefore, volume of catches, catch composition and quota restrictions may constrain the sampling intensities. These are the reasons behind the variation in length sampling achievements among years and highlight the difficulties to plan in advance the minimum number of individuals to be measured/aged at national level (*Thunnus albacares*, *Thunnus obesus*, *Isurus oxyrinchus*, *Prionace glauca* and *Xiphias gladius*).

Auxis rochei, *Euthynnus alletteratus*, *Sarda sarda*: these species are a by-catch. The minimum number of fish to be measured/aged at national level cannot be planned in advance.

Istiophoridae: reduced catches and quota restrictions are the reasons for shortfall.

Lamna nasus: the catch of this species is banned in European fisheries.

Thunnus thynnus: length sampling achievements depend upon the census enforced by legal provisions. Taking advantage on scientific observer's presence during each tuna harvesting, all individuals are measured. This effort has no costs to IPMA.

IOTC

PT13 LLD_LPF_0_0_0

Target species: *Xiphias gladius*, *Prionace glauca*

Sampled métiers: LLD_LPF_0_0_0

Concurrent sampling at sea: 1/2 (50%)

Concurrent sampling at market: not planned

Total: 1/2 (50%)

Reason for shortfall: the number of vessels operating in this region has been greatly reduced in the last year.

LENGTH COMPOSITION:

Table III.C.6 provide the achievements on length sampling of catches, retained catches and discards by métier and species. Obtained data refer to unsorted catches and discards.

Length sampling intensities is conditional to the concurrent sampling characteristics and depends on the catch composition. All the measurements are taken on observer trips, once an observer is onboard, the entire trip is sampled (i.e. sampling does not stop after a few hauls or fishing days, but lasts until the end of that trip). The volume of catches and catch composition are the reasons behind the variation in length sampling achievements among years (*Prionace glauca*, *Thunnus alalunga*, *Thunnus albacores* and *Xiphias gladius*)

Carcharhinus falciformis, *Isurus oxyrinchus*, *Thunnus obesus*: these species are a by-catch. The minimum number of fish to be measured/aged at national level cannot be planned in advance.

Autonomous Region of the Azores (ICCAT)

Besides the drastic reduction of LHP_LPF trips, oversampling occurred due to the extra sampling effort imposed in order to achieve the planned number of fish to be measured/aged at national level. This does not entail extra costs to the data collection programme.

According to each tuna species sampled, oversampling was verified for *T. obesus* and *K. pelamis* while for the remaining 2 species (*T. albacares*, *T. alalunga*), the number of samples taken was not enough to reach the planned number of fish to be measured. The high number of bigeye tuna measured was due to the lack of other tuna species to sample in harbours where resident samplers have access and, likewise, to the fact that it was the under 20m fishing fleet that performed the majority of the landings sampled. Also, the lack of a resident sampler in Pico Island, where the majority of tuna are landed for industry raw material, had great influence in the numbers obtained.

All tuna species recorded a decrease of about 60% in volume landed in 2014. Exception made for *T. alalunga*, all the others registered breaks in landings between 47% (*T. obesus*) and 83% (*T. albacares*).

No Sampling of *Squaliformes* took place since the only data source for these species used to be the discard sampling programme once the majority of these species have TAC zero in the region. The lack of the discards program during 2014 prevented length composition sampling of these species.

Despite not being a metier selected for sampling through the ranking system, 7 trips of LLD_LPF were sampled. Sampling of drifting longlines targeting large pelagic fishes is intended to obtain length samples of *Xiphias gladius*, *Isurus oxyrinchus* and *Prionace glauca* but, whole fish access is unpredictable. Besides this, individuals sampled are a consequence of an opportunistic behaviour from them regarding other fishing gear types (LHP_FIF, LHP_LPF, LLS_DEF).

Autonomous Region of Madeira (CECAF area 34.1.2)

Procedures to assign each individual fishing trip to a specific metier were conducted using the methodology described in the NP 2011_2013. The selection of the metiers was achieved using effort (fishing days), landings and the value of the landings from the reference years (2008-2009). Results from this selection are presented in Table III.C.1.

Results of the implementation of the sampling of metiers are presented in Table III.C.3 and the metier sampling strategy employed is in Table III.C.4. These tables present the expected samples by metier (in accordance with the NP) and its achievement during 2014.

Achievement by metier:

LLD_DWF_0_0_0 (Drifting longlines deep-water)

Concurrent sampling of a total of 70 fishing trips was planned (22 in the sea and 48 on shore). A total of 58 fishing trips were sampled on shore (83%). The oversampling in the fishing trips on shore was implemented to compensate for the impossibility of having observers on board.

PS_SPF_16_0_0 (Purse seine nets coastal)

Concurrent sampling of a total of 48 fishing trips was planned (16 in the sea and 32 on shore). A total of 44 fishing trips were sampled on shore (92%). The oversampling in the fishing trips on shore was implemented to compensate for the impossibility of having observers on board.

LHP_LPF_0_0_0 (Pole and line)

Concurrent sampling of a total of 32 fishing trips was planned (11 in the sea and 21 on shore). A total of 180 fishing trips were sampled on shore (>100%). The oversampling in the fishing trips on shore was implemented to compensate for the impossibility of having observers on board. Also, in this metier, oversampling was adopted in response to the unusual volume of catches of *Thunnus alalunga* during this year.

LLS_FIF_0_0_0 (Bottom set longline)

Concurrent sampling of a total of 46 fishing trips was planned on shore. A total of 39 fishing trips were sampled on shore (85%).

MISC_MOL_0_0_0 (scuba diving)

Concurrent sampling of a total of 36 fishing trips was planned on shore. A total of 7 fishing trips were sampled on shore (19%). While the landings of the other métiers are concentrated mostly in the fishing harbours of Funchal and Caniçal, this metier, composed by a few fishing vessels mainly targeting limpets through scuba diving, is very difficult to cover by the sampling teams due to the dispersion of the landings in small ports around Madeira and Porto Santo.

LHM_LPF_0_0_0; LHM_FIF_0_0_0 (Hand lines)

Concurrent sampling of a total of respectively 6 and 18 fishing trips on shore. A total of 10 and 3 fishing trips were sampled on shore (>100 and 17% respectively).

Concerning the Table III.C.6., achievement of the length sampling of landings by metier and species is presented. No length sampling of discards or unsorted catches was done due to the already mentioned fact of the non implementation of the programme of observers on board.

During the implementation of the concurrent sampling programme in 2014, a total of 35.567 fishes were sampled, belonging to 51 different species. In the most captured species of the Madeira fisheries, length sampling of : *A. carbo*, *T. obesus*, *T. allaklunga*, *K. pellamis*, *S. colias*, *T. picturatus*, *P. phycis* and *P. pagrus* comprised respectively: 5784, 4718, 3563, 4969, 4116, 5090, 1581 and 1405 fishes.

III.C.2. Data Quality: results and deviation from NP proposal

ICCAT

Deviations and reasons for deviations are explained in section III.C.1.

Portugal has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators. It became evident that the COST tools were not suitable for the Portuguese sampling design and that an evaluation on if and how the COST tools can be used are still required.

Different quality control assessment analysis (quarterly and annual) are implemented on the data base. The checks assure the type of data and the range of the variables are correct. Checks on national data processing include monitoring achievements, trend analysis, quality indicators and non-response rates.

IOTC

See section III.C.2 above for supra region Other Regions (ICCAT)

Autonomous Region of the Azores (ICCAT)

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 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.

Autonomous Region of Madeira (CECAF area 34.1.2)

Analysis of the fulfilment of the sampling objectives set for 2014 in the above mentioned tables show that the overall coverage was in accordance with these objectives. However, like in the previous years, a different situation result for the trips sampled on shore in comparison with the trips sampled on board (see Table III.C.3.). There was a good coverage of trip landings on shore, in general over passing the initial number of trips planned (exceeding 100% in some metiers). The oversampling achieved in the coverage of trip landings on shore was intended to overcome the impossibility, in 2014, of implementing the plan of observers onboard due to administrative and budgetary constraints.

III.C.3. Follow-up of Regional and International Recommendations

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III.C.4. Actions to avoid shortfalls

ICCAT

IPMA is always enhancing communication with stakeholders in order to minimize difficulties raised by the fishing industry operators and trying to reach its wide participation, including self-sampling cooperation.

IOTC

See section III.C.4 above for supra region Other Regions (ICCAT).

Autonomous Region of the Azores (ICCAT)

Once the discards sampling programme is back on track, length compositions of *Squaliformes* will be accomplished, as soon as this constraint no longer presents an economic issue for the region.

Efforts will be enforced but still, difficulties will remain in sampling of *I. oxyrinchus*, *P. glauca* and *X. gladius* since it continues to be a non-selected metier for sampling through the ranking system strategy, landings are very scarce and the demanded sampling effort that results of the concurrent sampling strategy implemented leaves no space for sampling these species.

Autonomous Region of Madeira (CECAF area 34.1.2)

As it was done in previous years, to overcome the difficulty of collecting information of the fisheries onboard we made a considerable effort, using the technical resources from the institution, in the collection of

information and concurrent sampling made in the fishing piers during the unloading of fish (this implied an increased utilization of our own personnel due to the fact that most of the unloading of fish, namely the demersal species from the metier LLS_FIF_0_0_0 occur during the night) and also the cross references with logbooks.

The implementation of the annual plan of observers will be resumed as soon as the Region overcome the budgetary and administrative constraints. At this time, there are good prospects for the program resumes during 2015.

III.D. Recreational fisheries

III.D.North Atlantic (ICES areas V-XIV and NAFO areas)

III.D.1. Achievements: results and deviation from NP proposal

Recreational fisheries in Portugal are limited to areas IX.a and X.

The national law applicable to recreational fishing was changed in 2014, regulating the accidental catch of salmon, European Eel and Sharks (*Carcharodon carcharias*, *Cetorhinus maximus*, *Lamna nasus*, *Helexanchus griseus*, *Carcharinus falciformis*, *Carcharinus longimanus*, *Alopias superciliosus*), which if caught, must be released outright. This means the ban on fishing for salmon by recreational fishermen is kept and reinforced.

With regard to fishing for sea bass by recreational fishermen, as mentioned before, based on scientific study conducted in 2011, is not to expect a significant impact of fishery carried aboard maritime tourist boats. However, concerning onshore fishing, it is possible that this impact is greater and for this reason it is planned to conduct surveys to licensees of recreational fishing in 2015.

III.D.2. Data quality: results and deviation from NP proposal

In 2014 estimates were based on the maritime-touristic operators. Surveys to the licensees of recreational fishing were not possible during this year as the new system was being implemented.

III.D.3 Follow-up of Regional and international recommendations

No relevant recommendations applicable.

III.D.4. Actions to avoid shortfalls

In early 2014, in order to make it possible to carry out surveys in a comprehensive manner, was published national law which requires the introduction of a contact telephone number at the time the license is issued. Is also being developed an internet application that allowed DGRM to collect and process information concerning the activity performed by recreational fishermen, based on voluntary participation and surveys, which will assess the impact of fishing on the various fish populations.

The referred national law also seek to simplify the licensing process and to create a channel of communication through SMS between the administration and fishermen that allows sending notices, swiftly and automatically, concerning closed seasons, fishing seasons, management measures applicable to certain species or other relevant information. The new is already in place and the first surveys are expected in 2015.

III.D. Other Regions (CECAF, ICCAT, IOTC)

III.D.1. Achievements: results and deviation from NP proposal

In 2014 there were no recreational fisheries in CECAF, ICCAT and IOTC areas directed to the species mentioned in appendix 4, table 3.

III.D.2. Data quality: results and deviation from NP proposal

There are no deviations from the NP proposal.

III.D.3 Follow-up of Regional and international recommendations

Not applicable.

III.D.4. Actions to avoid shortfalls

In early 2014, in order to make it possible to carry out surveys in a comprehensive manner, was published national law which requires the introduction of a contact telephone number at the time the license is issued. Is also being developed an internet application that allowed DGRM to collect and process information concerning the activity performed by recreational fishermen, based on voluntary participation and surveys, which will assess the impact of fishing on the various fish populations.

The referred national law also seek to simplify the licensing process and to create a channel of communication through SMS between the administration and fishermen that allows sending notices, swiftly and automatically, concerning closed seasons, fishing seasons, management measures applicable to certain species or other relevant information.

III.E. Stock-related variables

III.E. North Sea and Eastern Arctic (ICES areas I, II)

III.E.1. Achievements: results and deviation from NP proposal

GENERAL REMAKS

Stock-related data is collected in connection with sampling of commercial sources (observer trips). All stocks sampled during 2014 for biological variables, age, length, weight and sex are gathered in table III.E.3, which provides an overview over the species by region/fishing ground/area/stock.

The need to sample on board of freezer trawlers and trawlers with processing units and the need to sample demersal species which are landed as partly or processed products, imply that the collection of metier-related variables (section III.C), as well as the collection of stock-related variables (section III.E), should be handled only at-sea. This provides the possibility to sample unsorted catches and to take otoliths and samples for length, weight and sex. Beyond the “General Remarks” described under the section “III.C.1. North Sea and Eastern Arctic (ICES areas I, II)”, several other reasons imply deviations from the NP on the collection of stock-related variables:

- (a) The majority of stock-based variables are obtained from sampling at sea in order to obtain data representative of the population. Sampling achievement is therefore totally dependent on the catches of the species;

- (b) There is general rule for observers to collect stock-based variables of 10 fish per length class and area. If only very few length classes occur during a fishing trip, this rule can lead to a deviation from the planned;
- (c) Otoliths were only taken but not read. Effort is in place to increase age reading through the training of a technician. However, taking into account primarily the age data needs for analytical assessment, the target are the NAFO stocks on Sub Area 3, with special focus on Flemish Cap cod. The Portuguese catch of Arctic cod in ICES areas I, II is below 1% of the overall annual catch. Commercial age length keys (ALK) are built with age reads from the bulk of the catch, taken by the major fleets in this fishery (Norway and Russia). Portugal does not provide an ALK;
- (d) Since one fishing trip lasts, on average, four months it is practically impossible to collect and store gonads on board. The toxicity and volatility of storage organic compounds is not compatible with hygiene and food safety requirements for the fisheries sector. Thus, maturity data is not collected;
- (e) The indications of the planned minimum numbers of individuals to be measured for the different variables are based on experiences with the Portuguese sampling scheme until 2008. Even with the possibilities to adjust the numbers within the updates for the programme it is not always possible to predict accurately if these planned numbers are reachable and realistic.

Gadus morhua was the primary target of the Portuguese fleet operating in the North Sea and Eastern Arctic areas and the cooperative vessels didn't have fishing activity with the métier OTM_DEF_100-119_0_0. This is the reason why no stock-related variables were collected for *Sebastes mentella*.

The use of scales on-board is conditioned by vessel's facilities and by the weather conditions. This is the reason for *Gadus morhua* weight @length undersampling

III.E.2. Data Quality: Results and deviation from NP proposal

Deviations and reasons for deviations are explained in section III.C.1.

Portugal has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators. It became evident that the COST tools were not suitable for the Portuguese sampling design and that an evaluation on if and how the COST tools can be used are still required.

Different quality control assessment analysis (quarterly and annual) are implemented on the data base. The checks assure the type of data and the range of the variables are correct. Checks on national data processing include monitoring achievements, trend analysis, quality indicators and non-response rates.

III.E.3. Follow-up of Regional and international recommendations

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III.E.4. Actions to avoid shortfalls

As mentioned before, the fleet operating in ICES areas I and II also operates in NAFO area. In both regions sampling is carried out by samplers who remain on board throughout the period of the fishing trip, which can last from 2 to 3 months with likely short notice changes in the fishing behaviour and operation area. To avoid shortfalls Portugal is always trying to reach a wide participation of vessels which have not been sampled by observers before.

III.E. North Atlantic

NAFO Areas and Iceland, Greenland and Irminger Sea

In the NAFO Regulatory Area, species such as *Hippoglossoides platessoides* and *Glyptocephalus cynoglossus* and *Gadus morhua* (except for division 3M) have TAC 0. Therefore, the planned minimum number of individuals to be measured at a national level cannot be planned in advance.

Raja spp. (SA 3), *Reinhardtius hippoglossoides* (NAFO 3KLMNO) *Sebastes spp.* (NAFO areas): Reasons for deviations are explained in the beginning of chapter “III.E. North Sea and Eastern Arctic (ICES areas I, II)” under the “General remarks”.

Sebastes mentella, Iceland, Greenland and Irminger Sea area: due to lack of quota there was no fishing activity in Iceland, Greenland and Irminger Sea area. The cooperative vessels operated exclusively in the North Sea and Eastern Arctic areas.

Iberian Fishing Ground (ICES sub-area IXa)

Stock-related data is collected in connection with sampling of commercial sources (observer trips and harbour sampling) and on surveys. All stocks sampled during 2014 for biological variables, age, length, weight, sex, sexual maturity and fecundity are gathered in table III.E.3, which provides an overview over the species by region/fishing ground/area/stock that were sampled during.

The indications of the planned minimum numbers of individuals to be measured for the different variables are based on experiences with the Portuguese sampling scheme and survey catches until 2008. Even with the possibilities to adjust the numbers within the updates for the programme it is not always possible to predict accurately if these planned numbers are reachable and realistic.

Aphanopus carbo is usually landed gutted. For many years, the solution has been the purchase of fish directly to a fisheries organization with which IPMA's agreed the purchase of fish without gutting. IPMA and the organization involved make every effort to ensure the regular availability of gutted fish.

Lepidorhombus bosci: sampling relies mostly on research surveys at sea. For the variable weight @length the number of individuals achieved is below the planned. Due to vessel's balance the weight variable is difficult to collect accurately on board. Thus, individuals on the surveys are not weighed. For the remain variables the achieved number of individuals well exceeded the planned and requested minimum number of measurements. Reason for oversampling lies in the number of individuals sampled during the surveys at sea where all the variables, except the weight, were widely collected. Excess sampling does not incur in additional expenditure.

Lepidorombus whiffiagonis (all variables): although the share of this species in EU TAC is barely 3% and current retained catches are reduced to a few tons, it was not asked for derogation. The concernment on supporting a sampling scheme for the species is due to the use of its length composition in stock assessment. The species stock-based variables are mainly obtained from sampling at sea and at the market. Sampling achievements are therefore totally dependent on the catches of the species.

Lophius budegassa and *Lophius piscatorius*: as the fish reaches the market gutted and food security rules precludes the collection of gonads on-board of commercial vessels, gonads are only collected during surveys at sea, or purchased (very expensive) before processed. This results in reducing the possibility of sampling sex-ratio@length and maturity@length, becoming dependent on the amount of fish sampled during the research surveys at sea. For both species, ilia were only taken but not read. Detailed explanation on this issue is given under module VI.

Merluccius merluccius, *Micromesistius poutassou*, *Scomber colias*, *Scomber scombrus* and *Trachurus trachurus* (all variables): the reason for shortfalls is the sampling scheme based on the number of samples and not individuals, with a minimum of 10 specimens per sample to ensure its quality. All species are sampled on board, at market and during surveys at sea. Hake otoliths were only taken but not read due to lacking consensus on age reading methodology and validity. Excess sampling does not incur in additional expenditure.

Nephrops norvegicus and *Parapenaeus longirostris*: due to the high cost of samples, most individual sex-ratio and maturity variables are sampled during concurrent sampling at market. Maturity is ascertained if females and individual weight is collected during surveys at sea. Thus, weight@length and sex-ratio@length are below the planned minimum number of individuals to be measured, maturity@length is above the planned.

Raja brachyura, *Raja clavata*, *Raja montagui*, *Leucoraja naevus* (all variables): length frequency distribution and sex ratio analyses, as well as estimates of reproductive parameters (size at maturity, reproductive season and fecundity), were performed for several species. Skate's data collection is primarily supported through the purchase of fish. The deviations found are due to the market availability of the species. Age readings are not used in stock assessment.

Solea solea (all variables) sample acquisition was suspended until results from the ongoing analysis of collected data are available to identify gaps on stock related variables.

Azores Grounds (ICES Div. Xa)

The complex economic scenario in Portugal in 2014 was reflected with imposition of strict rules for public expenditures which rose difficulties to execute the program. As in previous year, the program activities that depended on acquisitions of goods (such as purchasing of fish), and other activities have been severely restricted or deactivated (e.g. discards programme). Moreover, the cost per kg of some species (e.g. *Pagellus bogaraveo* and *Polyprion americanus*), hit prices which prevented its purchase for the acquisition of the planned number of fish to be sampled. Similarly, some policy measures prevented the achievement of planned objectives as TAC imposition for some species (e.g. *Dalatias licha* and *Beryx spp.*) and minimum landing size limits which reduced the number of length size classes and consequently the number of fish available for stock-related variables per sample (e.g. *Helicolenus dactylopterus*). Finally, the decreased (or scarce abundance) at landings regarding some species (e.g. *Aphanopus spp.* and *Molva dypterygia*, respectively) also explains the non-achievement of the planned objectives. For these reasons the number of fish sampled for stock-related variables were not achieved in an important part off stocks.

In opposition to the previous species (mentioned above) *Trachurus picturatus* abundance increased in 2014, making the acquisition of samples for stock related variables more achievable.

III.E.2. Data Quality: Results and deviation from NP proposal

NAFO Areas and Iceland, Greenland and Irminger Sea

See section III.E.2 for Supra-region North Sea and Eastern Arctic (ICES areas I, II).

Iberian Fishing Ground (ICES sub-area IXa)

Deviations and reasons for deviations are explained under section III.E.1.

Different quality control assessment analysis (quarterly and annual) are implemented on the data base. The checks assure the type of data and the range of the variables are correct.

R scripts perform quarterly checks on all commercial sampling data logged by the observers into the database. Each observer checks his/her data and gets feedback on quality results. Checks are run sequentially and until observer data is free of major errors.

For both, on-board and market sampling data, a random check of 10% of the data per year is executed by inspecting the sample forms and the registered data. On this procedure observers check each other's field logs against database value. When systematic biases are found, all observer records are checked. Additionally R scripts perform annual checks on all data logged by the observers into the database.

Portugal has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators. It became evident that the COST tools were not suitable for the Portuguese sampling design and that an evaluation on if and how the COST tools can be used are still required.

Azores Grounds (ICES Div. Xa)

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 executed by inspecting the registered data for logical errors, like for example, type of data and values range of variables.

III.E.3. Follow-up of Regional and international recommendations

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III.E.4. Actions to avoid shortfalls

NAFO areas, Iceland, Greenland and Irminger Sea

See section III.E.4 North Sea and Eastern Arctic (ICES areas I, II).

Iberian Fishing Ground (ICES sub-area IXa)

Regarding crustacean species, sampling directly at the auction by the staff has in general been very successful and cost effective. Portugal will continue with this sampling setup.

Regarding the other stocks, Portugal plans to keep following the fishing activity improving sampling when acquisition is subject of market availability.

Portugal remains focused on providing high-quality data to stock assessment working groups. Other stocks or parameters that are not directly relevant will have a lower priority. From 17 to 20 November 2014 was held at IPMA the Workshop on Sampling Design and Optimization (WKSDO), chaired by Cristina Silva and Manuela Azevedo (IPMA-PT) and Jon H. Vølstad (IMR-NO). The workshop focus on the analysis of the current Portuguese sampling designs under the Data Collection Framework with the aim to optimize the current market sampling design to estimate the species length composition of landings, the onboard sampling for catches and the biological sampling for growth and maturity. The workshop took into account the initiated review process of EU fisheries data collection for stock assessment and management (DCF). During the workshop several approaches and methods were analysed and discussed, resulting in a set of guidelines and recommendations for future work which are relevant to ensure a high quality and optimized future data collection programme. For further details please check the link below:

<https://www.ipma.pt/resources.www/docs/publicacoes.site/rel-cientif-tecnicas/Reln2-IPMA.pdf>

Azores Grounds (ICES Div. Xa)

Shortfalls in sampling species for stock-related variables detected in the respective sampling year are easily overcome once the funding problem for the regional data collection is overtaken. Additionally, in 2014 several problems were detected as TAC, size limits, high sale prices, which challenged the Azorean program to achieve the objectives. One of the measures implemented to avoid shortfalls were length and weight measures at on-site sampling with generally positive results.

Concerning *Beryx spp.*, extra sampling effort will take place during at least the first semester, in order to prevent the eventually early closing of this fishery (since it tends to close earlier every year).

The implementation of the discard observer sampling programme will help to overcome some of the identified problems in achieving objectives with that fraction of the population that is not landed due to policy measures.

Sampling of *Aphanopus spp.*, is directly related to the uncertainty of whether there will be a fishery targeting this species in the region.

III.E. Other Regions

III.E.1. Achievements: results and deviation from NP proposal

ICCAT

All stocks sampled during 2014 for biological are gathered in table III.E.3. The majority of stock-related variables are obtained from sampling at sea. Sampling achievement is therefore totally dependent on the catch composition. This is the main reason for the downsampling concerning sex-ratio @length for *Isurus oxyrinchus*, *Prionace glauca*, which are often a by-catch of the longliner fleet, and *Xiphias gladius*.

It is difficult to plan the number of individuals to be weighed on board. The use of weighing scales on board depends on vessels facilities and weather conditions. As fish (especially sharks) is landed in heavy blocks, weight's sampling at the market is also unfeasible. This is the reason behind the deviations concerning weight @length for *Isurus oxyrinchus*, *Prionace glauca* and *Xiphias gladius*.

Thunnus thynnus: biological sampling achievements took advantage of the census enforced by legal provisions. Taking advantage on scientific observer's presence during each tuna harvesting, all individuals are measured and many of them are also weighted.

IOTC

All stock-based variables are obtained from sampling at sea. Sampling achievement is therefore totally dependent on the catches of the species. Sampling is carried out by observers who remain on board throughout the period of the fishing trip, which can last from 2 to 3 months, with likely short notice changes in the fishing behavior.

Isurus oxyrinchus, *Prionace glauca*, *Thunnus alalunga* are by-catch species. Planned minimum number of individuals to be sampled at a national level cannot be planned in advance.

The use of weighing scales on board depends on vessels facilities and weather conditions. For several species it is difficult to plan in advance the number of individuals to be weighted (weight @length) on board. That is the case for *Isurus oxyrinchus*, *Prionace glauca*, *Thunnus alalunga*, *Thunnus albacares* *Thunnus obesus* and *Xiphias gladius*.

Autonomous Region of the Azores (ICCAT)

Since the tuna species (i.e *Thunnus obesus* and *Thunnus alalunga*) reach high weight values per fish, this would imply unsustainable costs for biological sampling, for that reason the only data recorded were length and weight at landing. Further, *Thunnus thynnus* is not landed in Azores, and species like *Xiphias gladius* and *Prionace glauca* belong to a metier not sampled by the programme in Azores due to low landing values.

Autonomous Region of Madeira (CECAF area 34.1.2)

Tables III.E.1 and III.E.2 summarises the average landings from 2012 to 2014 and the long term sampling of the required stocks.

Table III.E.3 summarises the sampling intensity for stock-based variables. The coverage achieved in the species considered was below was previously planned and this was due to a lack of fish for biological samplings.

III.E.2. Data Quality: Results and deviation from NP proposal

ICCAT

Deviations and reasons for deviations are explained in section III.C.1.

Portugal has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators. It became evident that the COST tools were not suitable for the Portuguese sampling design and that an evaluation on if and how the COST tools can be used are still required.

Different quality control assessment analysis (quarterly and annual) are implemented on the data base. The checks assure the type of data and the range of the variables are correct. Checks on national data processing include monitoring achievements, trend analysis, quality indicators and non-response rates.

IOTC

See section III.E.2 above for supra region Other Regions (ICCAT).

Autonomous Region of the Azores (ICCAT)

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.

Autonomous region of Madeira (CECAF area 34.1.2)

In 2014, there were several delays in the administrative procedures for carrying expenditure on the purchase of fish for biological sampling, this being the only way to get the necessary fish. As a result, the percentage of achievement of the goals was very low (8% for most species).

III.E.3.Follow-up of Regional and international recommendations

ICCAT

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

IOTC

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

III.E.4. Actions to avoid shortfalls

ICCAT

Shortfalls are due to problems inherent in large pelagic fisheries: long fishing trips and vessel's conditions. Sampling intensities depend on fishing behaviour. No additional measures to be proposed.

IOTC

See section III.E.4 above for supra region Other Regions (ICCAT).

Autonomous Region of the Azores (ICCAT)

In ICES Sub-area X, extra efforts will be made in order to collect weight@length information from tuna species directly at the auction sales. As for large pelagic fishes captured through drifting longline, shortfalls are due to problems inherent to this fishery in this region, namely: low number of vessels using this gear type and consequently low volume of landings, as well as specimens are often landed processed (gutted).

Autonomous region of Madeira (CECAF area 34.1.2)

In 2015, the administrative procedure for carrying expenditure on the purchase of fish for biological sampling are now properly established and is assured the necessary budget.

III.F. Transversal variables

III.F.1. Capacity

III.F.1.1. Achievements: Results and deviation from NP proposal

As stated in our NP the collection of capacity data defined in DCF was achieved through Fleet register database and covers 100% of population.

III.F.1.2. Data quality: Results and deviation from NP proposal

Results reflect the actual state of the fleet. There are no deviations from the NP proposal. Some numbers might not match the fleet register data. This is due to the recommendation to include any active vessel in 2014 and as a consequence DCF capacity includes some vessels that became active after January, 1st.

III.F.1.3. Actions to avoid shortfall

Not applicable.

III.F.2. Effort

III.F.2.1. Achievements: Results and deviation from NP proposal

Mainland

As stated in our NP the collection of effort data defined in DCF was achieved through logbooks for vessels > 10m and through sales notes for vessels < 10m.

During 2014 all logbooks covering the vessels with a pattern of activity with more than one day, were computerised. This information covers all the activity in foreign grounds, landings in foreign ports and also information of larger vessels operating in national waters. Most vessels have now the electronic logbook, which provides a more updated information but with a different approach. This results in some different ways to account for the fishing days and days at sea. As a consequence time series may change after 2011.

For the remaining vessels, with one day trip and landings of fresh fish on mainland ports, the source of information for effort estimation are the sales notes. For the purpose of effort estimation it is considered each auction sale as an effort day.

Between 2008 and 2009 a survey was carried out for small scales fisheries and a substantial amount of effort information was collected.

This information allows for the estimation of effort variables for small scale fisheries, according to the following methodology:

Number of fishing operations: (For purse seiners) – It's considered one fishing operation per sales day.

Number of nets: One net per fishing operation

Length of nets: Avg of length of nets x number of vessels x number of fishing days

Number of hooks: Avg number of hooks x number of vessels x number of fishing days

Number of pots and traps: Avg number of pots and traps x number of vessels x number of fishing days

Hours fished: Avg number of fishing hours per gear x number of vessels x number of fishing days

Soaking time: Same as Hours fished

Therefore, for the mainland fleet all information to support effort estimation is collected, enabling to comply with rules laid down on the regulation.

III.F.2.2. Data quality: Results and deviation from NP proposal

Not applicable

III.F.2.3. Follow-up of Regional and international recommendations

Not applicable

III.F.2.4. Actions to avoid shortfalls

Not applicable

III.F.3. Landings

III.F.3.1. Achievements: Results and deviation from NP proposal

The information resulting from sale at wholesale fish markets, in the case of landings of fresh or refrigerated fish, complemented by the logbook landing declaration for all landings of frozen fish at Portuguese ports and all landings at foreign ports, makes it possible to achieve the aims of this parameter.

The geographical origin of landings was disaggregated in accordance with level 3 of Appendix I. This parameter was collected, in the case of logbooks, from the information stated in the landings declaration and, by other hand, in the case of 1st sales, was disaggregated by fishery at mainland Portugal, the Azores and

Madeira Autonomous Regions, Spain and Mauritania (ICES statistical divisions VIII, IXa and X and CECAF 34.1.2 and 34.1.3).

Only the information collected from the 1st sale by auction meets the required specifications in terms of the assessment of the value of commercial landings with disaggregation and in compliance with the criteria set forth in the Regulation. Information is therefore available for all species landed at the wholesale markets in mainland Portugal and the autonomous regions. Remaining values were estimated based on the economic survey to the fleet.

The collection of data makes it possible to assess annual commercial landings of all stocks in accordance with the level 3 for geographical disaggregation indicated in Appendix I.

III.F.3.2. Data quality: Results and deviation from NP proposal

There are no deviations from the NP proposal.

III.F.3.3. Follow-up of Regional and international recommendations

Not applicable.

III.F.3.4. Actions to avoid shortfalls

Not applicable.

III.G. Research surveys at sea

In 2014, Portugal conducted 4 surveys supported within the DCF and participated in the Flemish Cap Groundfish Survey conducted by Spain.

As indicated in the Table III.G.1, all the programmed surveys were performed. For the number of hauls and sampling activities, also refer to Table III.G.1.

The following text provides a short description of all surveys carried out in 2014, with a map of the achieved sampling activities.

III.G.1. Achievement: Results and Deviation from NP proposal

Sardine DEPM (triennial)

The survey was conducted from 14-03-2014 to 15-05-2014 on RV Noruega. Data coming from the sardine DEPM survey is stored in a national database. The data was sent to the ICES WGMEGS. Refer to Fig. III.G.1 (A) for the achieved CalVET sampling stations and Fig. III.G.1 (B) for the fishing station grid.

Due to bad weather conditions the 2014 sardine DEPM survey took place later than planned. Technical problems and bad weather conditions over the first part of the survey (14 to 21 March) impaired the continuous progress of the survey which had to stop and was restarted only by the 3rd of April. After this break, due to calendar's overlapping with the acoustic survey already scheduled, both surveys had to run simultaneously. Although this simultaneous exercise is useful to compare the results achieved by both estimation methods (as recommended by WGACEGG) it has to be seen as an exceptional adjustment not feasible in future. DEPM methodologies must take place during the peak of the spawning season, between January and February, while the acoustic must take place between March and April. Beyond the methodological issue, logistic constraints concerning human resources availability and long working shifts are to be considered exceptional.

The plankton sampling grid, for egg abundance and spawning area estimation, CalVET nets and CUFES, slightly exceed the plan. The first part of the survey (14-21 March) covered the northern Cape Carvoeiro area. Due to bad weather conditions the survey has stopped and restarted by the 3rd of April (simultaneously with the acoustic survey). To guarantee a good time sequence of CalVET and CUFES sampling allowing comparative studies for that area it was decided to repeat the stations sampled during the first part. As a result of this additional sampling two full coverage for Calvet and CUFES were performed in Cape Carvoeiro area.

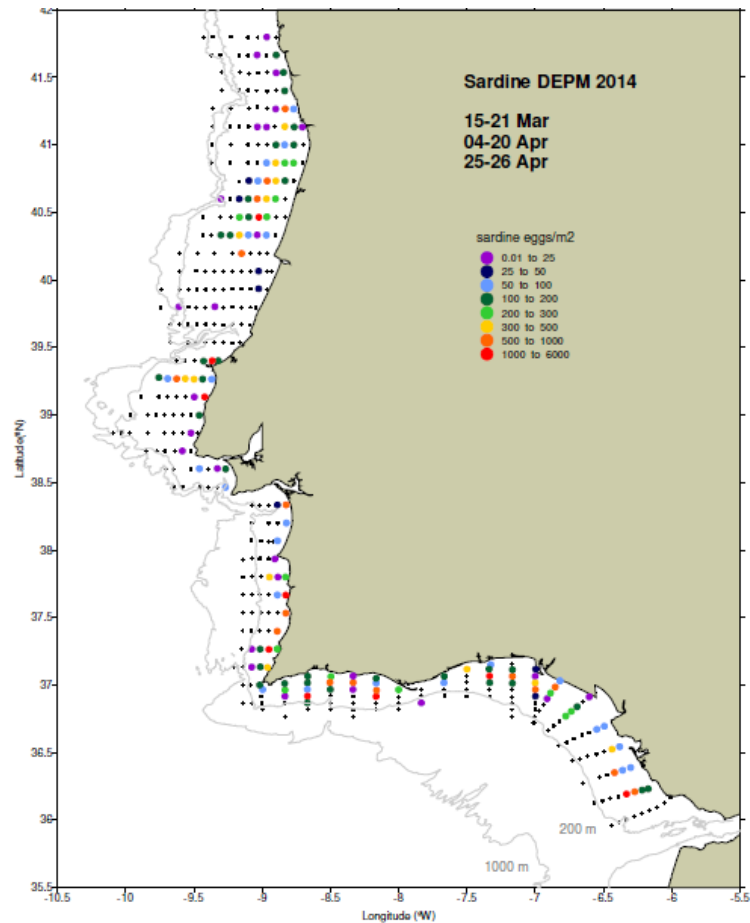


Figure III.G.1 (A): International Mackerel and Horse Mackerel Egg Survey, MEGS. Achieved CalVET

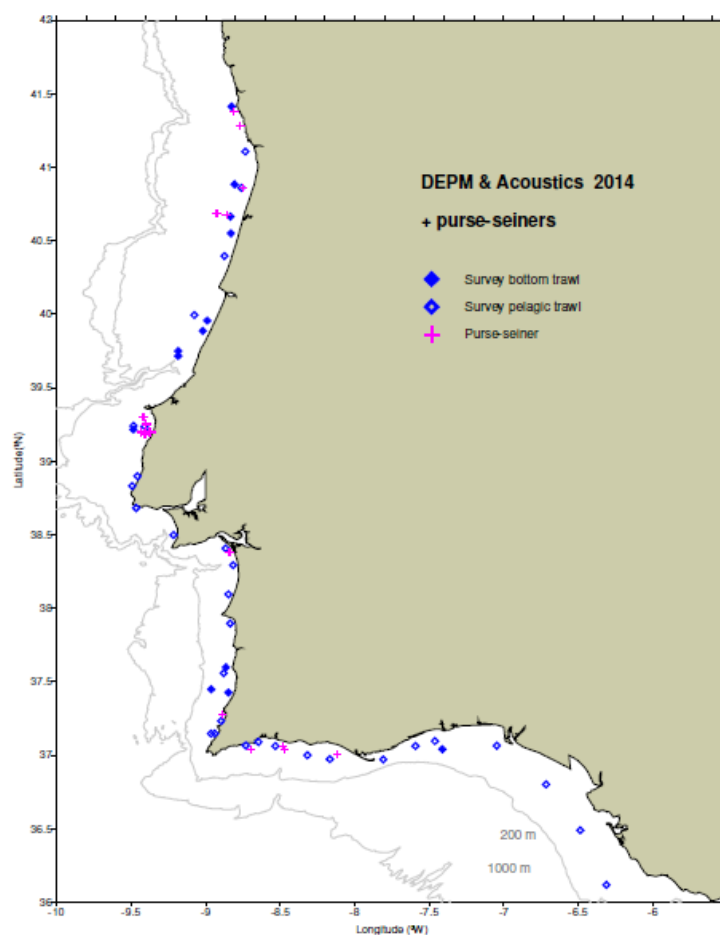


Figure III.G.1 (B): International Mackerel and Horse Mackerel Egg Survey, MEGS. Fishing stations grid.

Sardine, Anchovy, Horse Mackerel Acoustic Survey

The survey was conducted from 03/04/2014 to 12/05/2014 on RV Noruega. Data coming from Sardine, Anchovy and Horse Mackerel Acoustic survey is stored in a national database. Data was sent to the ICES WGHANSA and used on the assessment of sardine and anchovy. Refer to Fig. III.G.1 (C) for sampling radials and Fig. III.G.2 (D) for fishing stations.

Due to bad weather conditions the 2014 sardine DEPM survey took place later than planned. Technical problems and bad weather conditions over the first part of the survey (14 to 21 March) impaired the continuous progress of the survey which had to stop and was restarted only by the 3rd of April. After this break, due to calendar's overlapping with the acoustic survey already scheduled, both surveys had to run simultaneously. Although this simultaneous exercise is useful to compare the results achieved by both estimation methods (as recommended by WGACEGG) it has to be seen as an exceptional adjustment not feasible in future. DEPM methodologies must take place during the peak of the spawning season, between January and February, while the acoustic must take place between March and April. Beyond the methodological issue, logistic constraints concerning human resources availability and long working shifts are to be considered exceptional.

Although the acoustic coverage was interrupted several times due to bad weather conditions and besides the overlapping with sardine DEPM monitoring, the survey itself was done in good conditions and the abundance and biomass estimates are considered to be comparable with previous surveys. Deviations from planned days at sea are in the margin of 10%. There are no shortfalls for the sampling target activities.

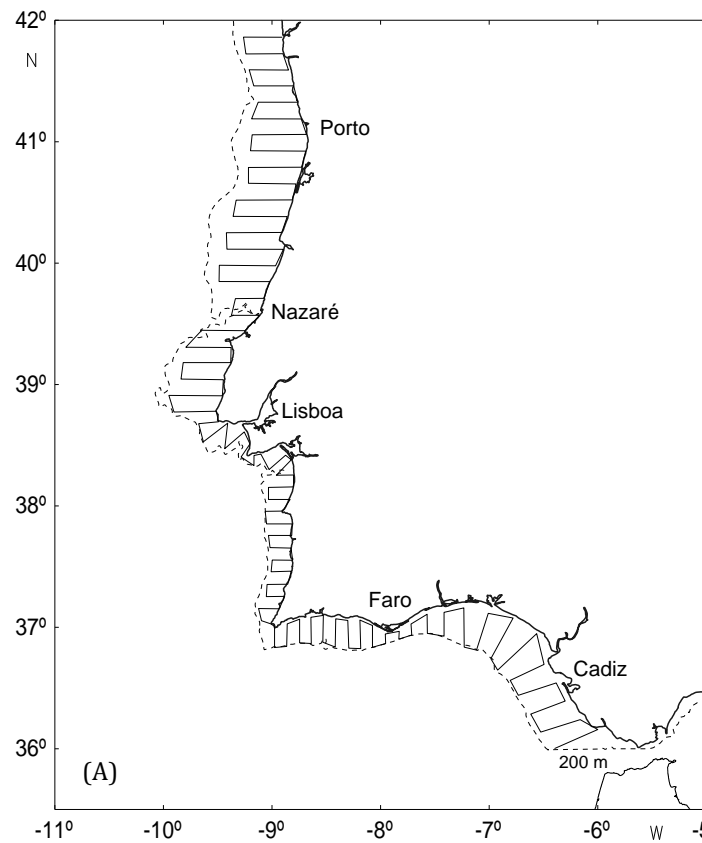


Figure III.G.1 (C): Sardine, Anchovy and Horse Mackerel Acoustic Survey. Sampling radials.

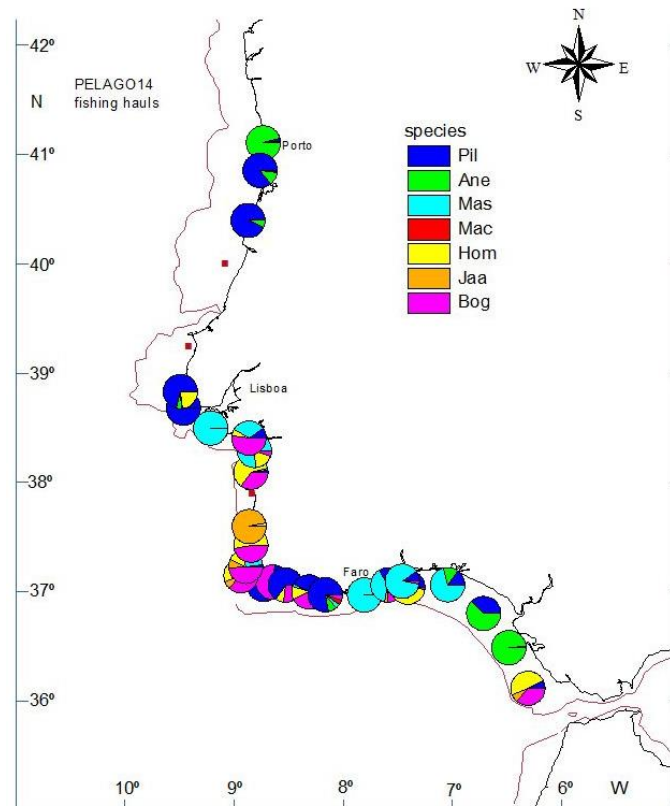


Figure III.G.1 (D): Sardine, Anchovy and Horse Mackerel Acoustic Survey. Species composition by fishing station.

Nephrops Bottom trawl survey/TV Survey Offshore Portugal

The survey was conducted from 10/07/2014 to 31/07/2014 on RV Noruega. Data from Nephrops bottom trawl survey/TV Survey Offshore Portugal, UWTV (FU 28-29) survey is stored in the CRUZDEM national database. The abundance/biomass indices from the bottom trawl sampling stations were sent to the ICES WGBIE and used on the assessment of *Nephrops*. Refer to Fig. III.G.1 (E) for sampling grid and Fig. III.G.2 (F) for fishing stations. Deviations from planned days at sea and target activities are in the margin of 10%.

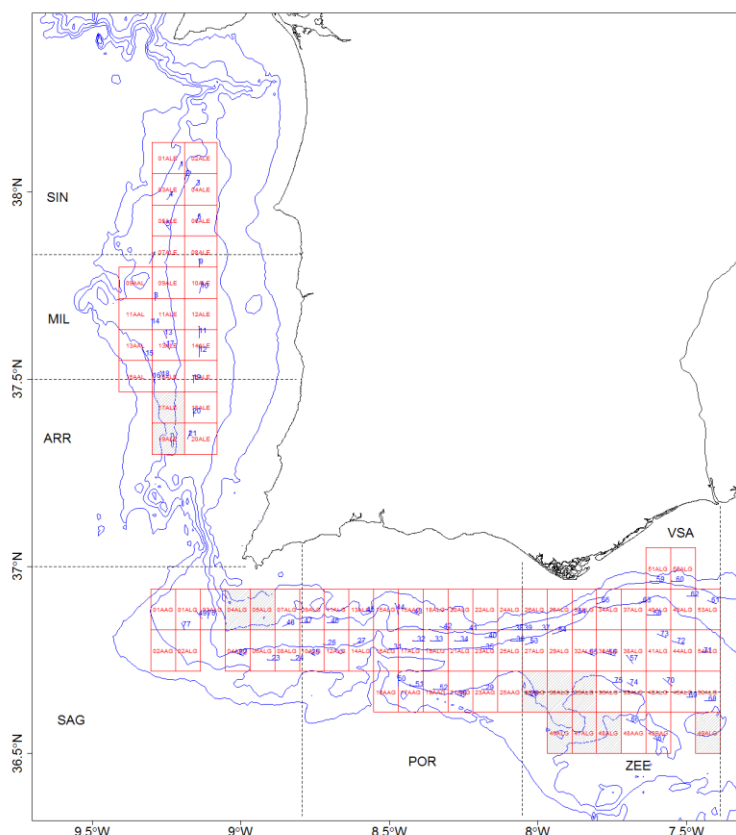


Figure III.G.1 (E) Nephrops Bottom trawl survey/TV Survey Offshore Portugal. Sampling grid.

The main objectives of the survey is 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 antennatus* (red shrimp). The sampling design was adapted from the bottom trawl surveys (stratified random sampling) and formed the basis for data collection for the crustacean surveys since 1997.

Complementarily to the use of bottom trawl, ACFM has recommended the use of Underwater TV (UWTV) survey for *Nephrops* abundance estimation. In 2005 and 2007, some experiments to collect UWTV images from the *Nephrops* fishing grounds were made with a camera hanged from the trawl headline.

Portugal emphasizes that FU 28+29 *Nephrops* stocks are deeper than the further northern stocks where this technique has been used. In these stocks, the burrows counting is done in real time with a camera mounted in a sledge and connected to the vessel with an umbilical cord. For the Portuguese stocks, a combined trawl and UWTV survey was carried out from 2007 to 2009. These depths were planned to be covered with a stand-alone UWTV camera and recorder placed in the trawl head rope allowing a subsequent *Nephrops* burrows count. However, as the Portuguese bottoms are very deep, the trawl survey is crucial to estimate abundance indices for the main crustacean species.

In 2008, the images collected from 9 stations in FU 28 with this procedure looked very promising. In 2009 survey, a two-beam laser pointer was attached to the camera and UWTV images were recorded from 58 of the 65 stations. The trawling speed and the turbidity were the main problems affecting the clarity of the image and the high variation of the height of the camera to the ground resulted in a variable field of view. Analysis of this method applied to FU 28+29, discussed in SGNEPS 2012 (Study Group of Nephrops Surveys) further demonstrated the importance of continuing the bottom trawl survey and the unsuitability of UWTV coupled with trawl to estimate *Nephrops* abundance. Therefore, Portugal recommends the re-adoption of the former name for this survey: *Nephrops* Bottom Trawl survey – NepBTS (FU 28-29). This survey is internationally coordinated within WGNEPS.

Flemish Cap Groundfish Survey

This survey was carried out by Spain with the RV Vizconde d'Eza between 24/06/2014 and 28/07/2014. Portugal has taken part by means of a team of two technicians. The survey ran within normality, were performed in total 183 hauls, of which 181 valid. The 32 planned strata were sampled (Figure III.G.1 (G)). The data from the Flemish Cap Groundfish Survey, FCGS, is stored in the IEO data base.

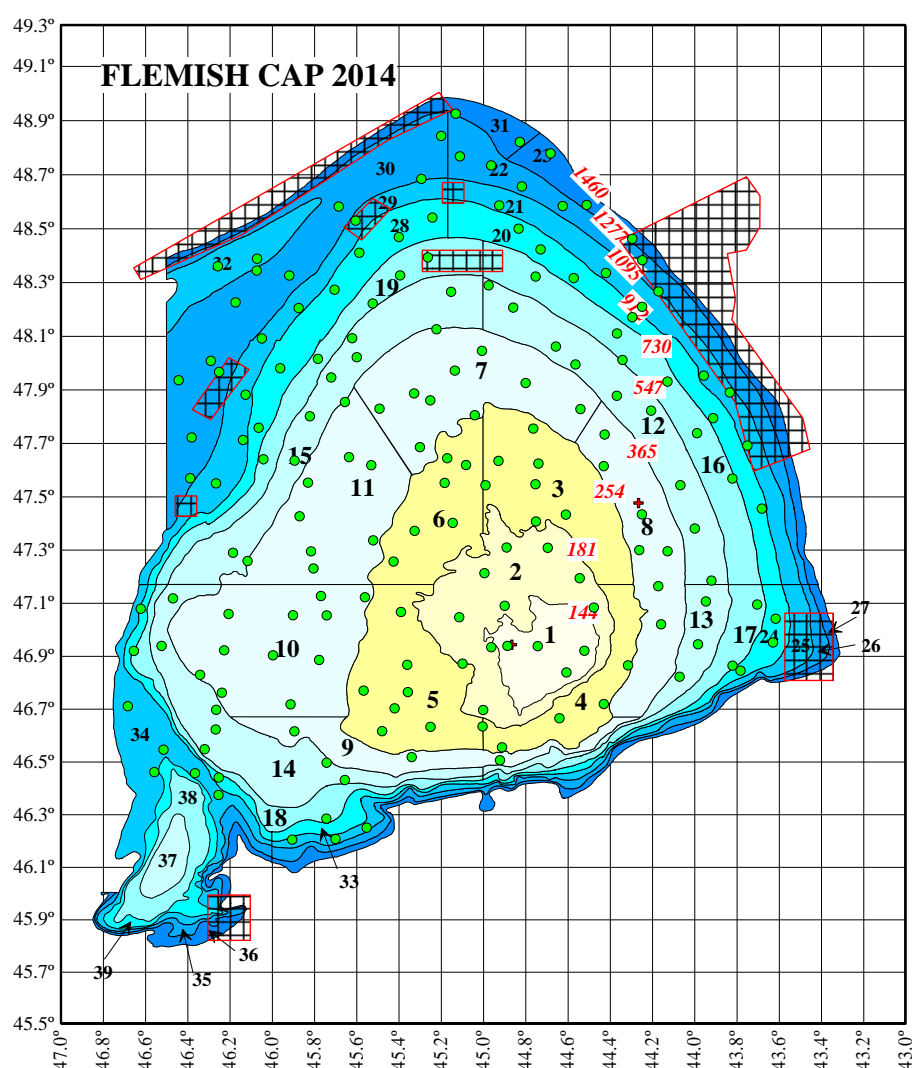


Figure III.G.1 (F): Flemish Cap Groundfish Survey, FCGS (RV Vizconde d'Eza). Sampling grid. Coral and sponge protection areas (red squares); Valid hauls (green circles); invalid hauls (red crosses)

The survey was conducted from 01/10/2014 to 03/11/2014 on RV Noruega. Refer to Figure III.G.1. (H) for sampling grid. Data coming from the IBTS survey is stored in DATRAS (<http://datras.ices.dk/Home/Descriptions.aspx>, with survey data and protocols) and also in the CRUZDEM national database. This data was sent to the ICES WGHMM and used on the assessment of demersal species.

Deviations from planned days at sea and target sampling are in the margin of 10%.

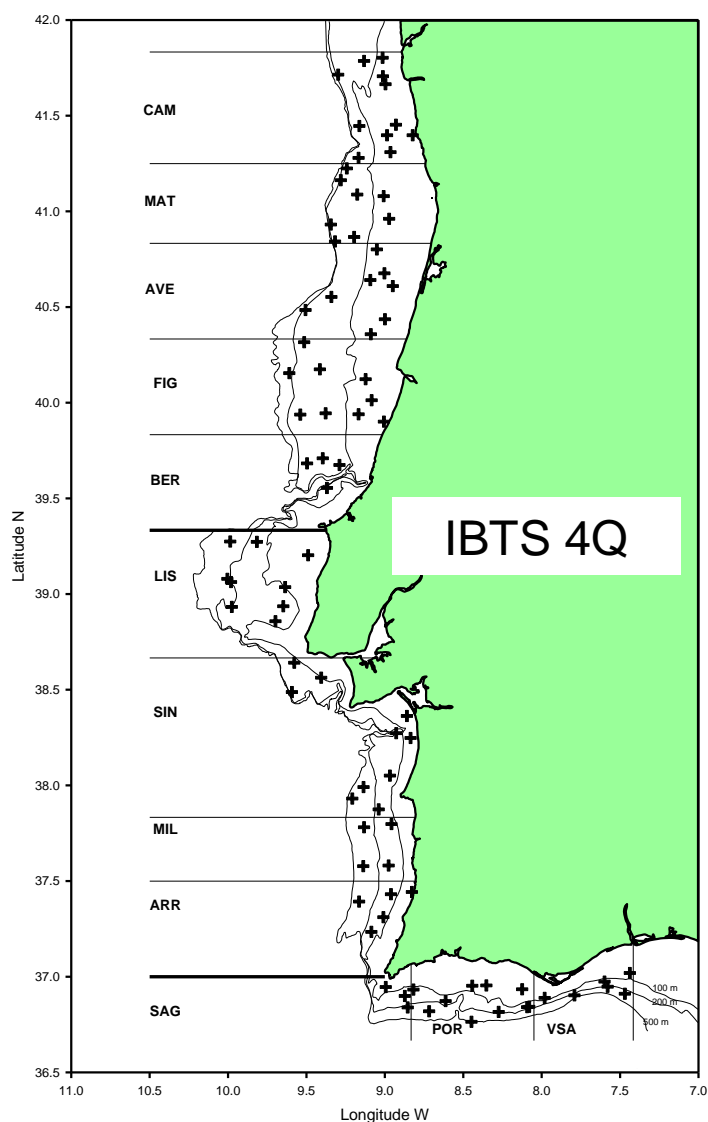


Figure III.G.1(G): Western IBTS 4th quarter – IBTS Q4. Sampling grid.

III.G.2. Data Quality: Results and deviation from NP proposal

Generally, the surveys are following the international manuals set up for the different surveys. These manuals therefore establish the data quality. No serious data quality problems or deviations from the NP occurred in 2014. Exceptionally, as a result of bad weather conditions, the Sardine DEPM (triennial) and the Sardine, Anchovy, Horse Mackerel Acoustic Survey overlap in time. Reasons for shortfalls are detailed in the section above (III.G.1).

III.G.3. Follow up of Regional and International recommendations

No relevant RCM recommendations. Recommendations and requests set up in the different survey working groups have been taken care of by the Portuguese participants taken part in the survey planning groups.

III.G.4. Actions to avoid shortfalls

No action is possible for shortfalls caused by bad weather conditions.

Vessels and equipment are always kept in best possible conditions. However, sudden and serious technical problems cannot be prevented. Since IPMA's creation in 2012, a strong commitment by its management board has been taken to improve the performance and reliability of existing vessel (NI Noruega). The vessel had three major interventions: 2012 (dry dock): engine maintenance, hull inspection and reinforcement, bridge communications systems, ship painting and accommodation improvement; 2013: generator maintenance, upgrade in some scientific equipment, deck maintenance, winch and crane maintenance; 2014: freezzing and cooling systems; engine; decarbonisation of main engine. The Operation of the vessel has been improving since 2012. Marine operations in 2012 were strongly penalized by the governmental reorganization, the creation of IPMA, and the structural refit of the vessel. The overall performance has improved greatly since then. Average technical execution of DCF cruises has increased from 84% (2011) to 100% (2014). In parallel IPMA has signed a contract to acquire a younger fishing research vessel. Budget has been secured to perform the purchase which will be performed by the issue of an international tender. The new vessel is expected to start operation by December 2015.

IV. MODULE OF THE EVALUATION OF THE ECONOMIC SITUATION OF THE AQUACULTURE AND PROCESSING

IV.A. Collection of data concerning the aquaculture

IV.A.1. Achievements: results and deviation from NP proposal

In 2014 the surveys used to collect data for EUROSTAT were also used to collect economic data for DCF. Economic data for 2012 was collected and estimates were made. Although a census was applied, the response rate was below 70%. The response rate has been decreasing over the years, albeit the efforts of the administration for collecting data. On Bottom units constitutes the majority of the aquaculture structure (over 1358 units on 2012) and is, traditionally, the segment with the lowest response rate (46% in 2012). A change to the type of data collection was considered but rejected as it would suffer from the same problem of high non response. Another reason for the census is the existence of national regulation requiring collection of data from all the aquaculture and the requirement of answer by the sector. Off bottom units usually have high response rates, but in the last two years the response rate decreased considerably from more than 90% to 61% and estimates were made in order to compensate for the low response.

IV.A.2. Data quality: results and deviation from NP proposal

Due to the low response rate, estimates were made and quality indicators calculated. The quality indicators are expressed in table IV.A.3. The low response rate achieved for some variables is due to the nature of the aquaculture structure. On bottom units represent 94% of total aquaculture units. This units consist mainly of a small piece of land, usually less than 1 ha, with low level investment and simplified cost structure. A simplified questionnaire and the production is estimated according to a methodology defined in cooperation with the National Statistics Institute. Capital variables have a higher variation as they are more difficult to answer (and have usually lower response rate, even when a questionnaire is answered).

IV.A.3. Follow-up of Regional and international recommendations

Not applicable.

IV.A.4. Action to avoid shortfalls

To forfeit the decreasing response rate, an extra effort has been made, with some positive results. Due to national regulation mandating the answering of the survey, it's possible for the administration to enforce some legal measures, as fines and the cancelling of the license. Letters to the establishment owners were sent explaining the consequences of non-answering the questionnaire, increased phone calls, reinforcement by the administration staff when on-site inspections, requirements of the questionnaire in order to access public funding for new projects.

IV.B. Collection of data concerning the processing industry

IV.B.1. Achievements: Results and deviation from NP proposal

NP states that processing industry data were to be collected by NSI (National Statistic Institute). We received the 2013 data from NSI. The sources of information are: Structural Business Statistics (SBS) and SUT- Supply and Use Tables (Intermediate consumption by product and by industry).

Under SBS it is not possible to collect data on Depreciation of Capital. SBS also does not collect unpaid labour or FTE by gender. However there is sufficient information available in order to make estimates for these variables.

FTE by gender will be calculated using the following formula:

$$\text{FTE}(\text{by gender}) = \text{TOTAL_FTE} \times \text{gender_employed} / \text{total_nb_employed}$$

Where:

TOTAL_FTE = Total FTE in the reference year

Gender = Male/Female

Gender_employed = Number of males/females employed in the reference year

Total_nb_employed = Total number of person employed in the reference year

$$\text{IMPUTED VALUE OF UNPAID LABOUR} = \text{UNPAID_LABOUR} \times \text{AVG_WAGE}$$

Where:

UNPAID LABOUR = Number of unpaid persons employed (SBS: S16120)

AVG_WAGE = Total_wages/Total_employees

IV.B.2. Data quality: Results and deviation from NP proposal

Quality under SBS and SUT is assured by National standards, guaranteed by NSI and in compliance with Eurostat rules of quality.

However it is not possible to provide quality indicator such as coverage rate or CV as they are not defined for these statistical procedures (e.g., no sample is defined as administrative data from fiscal declarations is used by NSI)

IV.B.3. – Follow-up of Regional and international recommendations

Not applicable.

IV.B.4. Actions to avoid shortfall

NSI was contacted in order to obtain the variable “Depreciation of Capital”, but the data collected by the Institute is not enough to calculate the variable.

V. MODULE OF EVALUATION OF THE EFFECTS OF THE FISHING SECTOR ON THE MARINE ECOSYSTEM

V.1. Achievement: Results and deviation from NP proposal

The data required for the calculation of indicators 1, 2, 3, 4 and 8 as defined in Commission Decision 2010/93/EU is collected through the research surveys. These data has been collected through the annual surveys carried out by IPMA. The surveys are described in section III.G.1. Data on species, length frequencies and abundance was collected from all hauls including individual parameters such as age, length, sex and maturity from the target species of the survey following the sampling levels established in the manuals for the respective survey. The spatial and temporal coverage of data collection for the evaluation of effects of the fishing sector will consist of sub-area IXa. No deviations occurred in 2014.

Relatively to DCF indicators 5 (Distribution of fishing activities), 6 (aggregation of fishing activities) and 7 (areas not impacted by mobile bottom gears) preliminary analysis were made in 2011 using 2005 VMS data for bottom trawl gears in Div IXa. However it must be stressed that the methodologies for calculation of these 3 indicators are still being discussed and proposed to be addressed in a ICES Workshop on DCF Indicators to be held in October 2013. Moreover, EU has recently requested ICES a scientific advice on data collection issues which includes the review of the existing environmental indicators to measure the impact of fisheries on the seabed and take proposals in time for the new DC-MAP 2014-2020. Therefore, the basis for ecosystem indicators definitions and its methodologies should outcome from these discussions and recommendations.

The data required for the calculation of indicators 8 is collected on-board of the commercial vessels monitored by IPMA since 2004. No deviations occurred in 2014.

In what concern indicator 9, the fuel consumption (both quantity and value) was estimated with data from economic survey and crosschecked with administrative data. Values of landings, total and per commercial species were obtained from sales notes. Fuel consumption was obtained per fleet segment and year. Fuel consumption by quarter and metier was obtained as a proportion of the total effort days spent by metier and quarter in relation to the total fleet segment and year.

This was made only for vessels with overall length > 10 metres. For vessels < 10 m we couldn't calculate metiers due to the budget restrictions already stated in III.F.2.1.

V.2. Actions to avoid shortfalls

Indicator 9

As soon as the budgetary constraints will overcome we will advance with the subcontract for the small scale vessels. Only after that can we calculate the métiers.

VI. MODULE FOR MANAGEMENT AND USE OF THE DATA

VI.1. Achievements: results and deviation from NP proposal

Management of data

As stated in the NP 2014-2016, primary fisheries data, whether transversal, economic or biological, is scattered among the different databases standing in the five Institutions engaged in National Programme.

Mechanisms for quality control assessment and validation procedures are executed in each one of the Institutions.

The developments achieved in 2014 regarding economic and transversal variables are the following:

1. Fishing Fleet Database

- The new module created in 2013 was updated with new information in 2014 and its structure improved.
- Implementation of additional validations in order to improvements data quality.

2. Auction's sales

- Register of 2014 daily auction sales of Azores and Madeira in the same database as mainland.

Use of the data

All the data sets used to support scientific analysis in ICES, NAFO, ICCAT, IOTC, STECF and DG MARE were organised, analysed and transmitted. The lack of requested data is explained bellow:

***Lophius budegassa* (VIIIc, IXa): no age are provided to the WGBIE.** At the WGHMM 2007 meeting, age-length keys, based on illicia readings, were used to obtain catch number-at-age for each species. The exploratory analysis of estimates indicated that the biased age reading criterion does not allow following cohorts along years in either of the two anglerfish species. The last research about white anglerfish ageing, White anglerfish illicia and otoliths exchange 2011 highlighted that neither illicia nor otolith age readings have been validated and, in the case of illicia studies, the agreement among readers and the precision were not acceptable. Therefore it was concluded that the available age reading criteria for white anglerfish southern stock is not valid to build an ALK.

***Lophius budegassa* (VIIIc, IXa) and *Lophius piscatoris* (VIIIc, IXa):** for species like the anglerfishes, where the vast majority of vessels land few amounts, species misassignment makes it particularly difficult to obtain good proportions and length frequencies at trip level, greatly limiting the **accuracy and precision of final length composition estimates**. From 2009 onwards the design has been focused on metiers conforming DCF requirements (Commission Decision No. 2010/93/UE). Following preparatory discussions on probability-based sampling, IPMA is already working to design a pilot market sampling plan to overcome this issue and to be implemented in 2016. The goal of this sampling plan is therefore to improve the quality of data sent for ICES stock assessments and the overall quality of fisheries data, including blackbellied angler and anglerfish.

***Merluccius merluccius* (VIIIc, IXa):** during 2014 **otoliths were collected but not used in the assessment** due to lack of a validated ageing method. Otoliths will continue to be collected from the specimens sampled for maturation throughout 2015 and possibly 2016, after which the biological sampling will be determined from the needs of maturity samples and not otolith collection.

***Pollachius pollachius* (VII, IX): no data on growth, maturity, and discards.** Portugal doesn't collect biological parameters on pollock. Portuguese official landings are very low. Since 2009, a concurrent sampling design is carried out and length compositions has been provided since then. Discards of pollock are null. In 2015 Portugal updated Intercatch with zero values in the years when discards were null or negligible.

***Gadus morhua* (I, II):** no age data provided. The Portuguese catch of arctic cod in ICES Div. II is 0,5% or less of the overall annual catch from this stock. Commercial age length keys are built with otoliths from the bulk of the catch, taken by the major fleets in this fishery (Norway and Russia). Portugal does not provide an ALK. However, even if collected and read, arctic cod otoliths from Portuguese catches will have little chance to impact either of these ALK, that each year disaggregate the marginal catches at length into catches at age (depending on the division they are taken from). MS plans to ask for derogation.

***Sebastes mentella* (I, II): no biological data provided.** The Portuguese sampling programme in Eastern Arctic fishing ground is performed onboard by a nurse man, member of the crew of the collaborative fishing

vessels. In 2014, as in previous years, no length compositions or stock-related variables were collected for *Sebastes mentella*. *Gadus morhua* was the primary target of the Portuguese collaborative fleet operating in the Eastern Arctic areas and the catch of *S. mentella* bycatch was minimal, making the collection of individuals for sampling an impossible task to perform within the time frame of fish processing once the haul is on deck.

***Dicentrarchus labrax* (IX): no biological data provided.** Portugal doesn't collect biological parameters on sea bass. From 2009 onwards the design has been focused on métiers conforming DCF requirements (Commission Decision No. 2010/93/UE) and concurrent sampling has been applied. Since then quarterly length compositions of sea bass landings from division IXa are available. Sea bass discards are recorded by the DCF on-board sampling programme. Sea bass length compositions data have been validated and loaded into InterCatch database. At IPMA there is no research line dedicated to sea bass. There is also interest in understanding the relative contribution of recreational and illegal fishing to the total species catch and the definition of appropriate technical measures (applicable to both recreational and commercial fishers) that could improve the management of small-scale fisheries (Moreno and Stratoudakis, Working Document for the ICES Working Group on Assessment of New MoU Species (WGNEW), Copenhagen, 18-22 March 2013).

Cephalopods: no discard data provided. The vast majority of cephalopod taxa were rare in the Portuguese discards and when present they were generally discarded in low number, e.g., on average <5 individuals discarded per haul. This low frequency of occurrence and low number of specimens indicates that discards are null or negligible for most ecosystem management and assessment purposes. Overall, total cephalopod discards by the Portuguese fisheries appear to be <200 tonnes/year in recent years. This value is a rough approximation but indicates cephalopod discards are relatively low comparatively to the total landings of cephalopods from portuguese waters (~14 000 tonnes).

VI. 2 Actions to avoid shortfalls

In what concern the biological data collected by IPMA, the entry into force of the sampling scheme based on métiers and concurrent sampling, forced a number of changes in databases. Due to the large volume of information stored in the national databases, its complexity and variability of the fleet behaviour of the fleet it is necessary a continuous adaptation and improvement, allowing an effective data management, appropriated to the latest international recommendations. The application of sound data management practices, alongside a continuing effort for upgrade and consolidation of databases and exploration tools, has helped to avoid many shortfalls with the Portuguese DCF data.

Nevertheless, several data calls had to be answered in 2014, which was done within the respective deadlines and with complete and quality-checked data. Data were transmitted to regular data users, such as ICES, JRC, and assessment working groups (see Table VI.1). Deviations are detailed in the section above (VI.1)

Regarding biological data, IPMA main lines of action considers implementing a new database in an open source database management system in order to build a system ensuring the compilation of all existing databases in a common system. The project is already running, the diagnosis and data model design phase are finished and the development of the new application phase is planned to be finished by the beginning of 2016.

VII. FOLLOW-UP STECF RECOMMENDATIONS

All recommendations from the RCMs, Liaison Meeting, STECF and survey planning groups, believed relevant to the AR year and to Portugal are dealt with in table II.B.2.

VIII. LIST OF ACRONYMS AND ABBREVIATIONS

CECAF	Committee for the Eastern Central Atlantic Fisheries
CV	Coefficient of Variance
	Direcção Geral de Recursos Naturais, Segurança e Serviços Marítimos/Directorate General for Natural Resources, Safety and Maritime Services
DGRM	Departamento de Oceanografia e Pescas da Universidade dos Açores/Oceanographic and Fisheries Department of the University of Azores
DOP	Direcção Regional das Pescas da Madeira/Regional Directorate of Fisheries of Madeira
DRPM	Good Environmental Status
GES	International Bottom Trawl Survey Working Group
IBTSWG	International Commission for the Conservation of Atlantic Tunas
ICCAT	International Council for the Exploration of the Sea
ICES	Instituto Português do Mar e da Atmosfera/Portuguese Institute for Sea and Atmosphere
IPMA	Indian Ocean Tuna Commission
IOTC	Marine Strategy Framework Directive
MSFD	Northwest Atlantic Fisheries Organization
NAFO	National Programme
NP	Programa Nacional de Amostragem Biológica
PNAB	Região Autónoma dos Açores/Autonomous Region of Azores
RAA	Região Autónoma da Madeira/Autonomous Region of Madeira
RAM	Universidade dos Açores/University of Azores
UAç	

IX. COMMENTS, SUGGESTIONS AND REFLECTIONS

According to the Commission Regulation 665/2008, support of experts' participation in each scientific meeting shall be limited to a maximum of two experts per Member State (article 10). However, as some Working Groups remit for more than two stocks with assessment and of interest to the MS (e.g. WGBIE), it is often necessary to extend the national representation to more than two experts without DCF financial support. Portugal draws the Commission attention to this issue and suggests its amendment in future criteria for expenditure eligibility.

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XI. ANNEXES

Annex I. Final Report on the Pilot Study on the Portuguese Trammel Nets Fishery in Ices Division IXa

Annex II. Working Document Presented to the ICES Working Group on Elasmobranch Fishes (June 2014)

Annex III. Methodological procedures for the identification of the Azorean métiers

ANNEX I
ANNUAL REPORT 2014
PILOT STUDY ON THE PORTUGUESE TRAMMEL NETS FISHERY IN ICES
Div. IXa

1. INTRODUCTION

The fishery targeting anglerfish (*Lophius budegassa* and *Lophius piscatorius*) is one of the most important artisanal mixed fisheries in Portugal mainland. This group of species is mainly caught by trammel nets but high catches are also recorded from gillnet fisheries, and exploitation depths have historically been up to 600 m deep until the implementation of the Annex III to Regulation (EC) No 43/2009. According this rule, European Community vessels were prohibited to deploy gillnets, entangling nets and trammel nets at any position where the charted depth is greater than 200 m in the ICES zones IIIa, IVa, Vb, VIa, VIb, VIIbcjk, VIII, IX, X and XII. However, point 9.4 clearly stipulated the derogations for the use of gillnets and entangling nets down to 600 meters, targeting hake and anglerfish respectively, and these could be applied to certain fisheries in ICES Zones VIII, IX and X, if “information provided by Member States shows that those fisheries result in a very low level of shark by-catches and of discards”.

To accomplish such requirement and increase the knowledge on the fishery, a pilot study on the Portuguese trammel nets fishery targeting anglerfish in ICES Division IXa started in May 2012 under the PNAB/DCF. Despite the derogation established in the EU regulation N. o 227/2013, point 34b from 20th March 2013, which allows fishing operations with trammel nets at that depth range, the monitoring of this fishery must proceed.

The pilot study was designed for three years and has four main objectives:

- 1 - Characterization of the fisheries and of the fleets that use trammel nets between the 200m and 600m isobaths: number and characterization of the vessels, seasonal and spatial distribution of the fisheries.
- 2 - Characterization of the catches by species: variation in space and time.
- 3 - Estimation of fishing effort and its distribution in space and time.
- 4 - Estimation of the impact of these fisheries on sharks: definition of estimators and estimation of the catches of each shark species by these fleets.

Those are subdivided in three tasks:

- 1 - Analysis of fishing regime of vessels with trammel net licenses in Portugal mainland. The data used will be derived from the data base available at the General Portuguese Directorate. Possible data sources are logbook, daily landings by boat and VMS data.
- 2 - Development of an onboard sampling programme to estimate the level of by-catch, including deep-water sharks. The data analysis and results from 1) will be basis to select the vessels for which on board sampling will be performed. The sampling programme will be updated by cross-checking information from the on-board sampling and the other data sources referred in 1). The fishing trips with on board observers are authorized by the national entities to operate between 200 and 600 m deep.
- 3 – Analysis of the sampling data.

During 2014 all the four objectives were updated. Special focus was made on the definition and selection of a standardized catch per unit of effort (CPUE) model. The analysis was also extended to the gillnet fishery targeting anglerfish. Onboard sampling was maintained. Finally, it was hypothesized the use of a reference fleet for sampling purposes.

ACHIEVEMENTS: RESULTS AND DEVIATIONS FROM THE PROPOSAL

SCOPE	RESULTS
Characterization of the fisheries and of the fleets that used trammel nets between the 200m and 600m isobaths	1. Update (include logbook data from 2012-2014) and new analyses to characterize trammel net and gillnet fisheries targeting anglerfish: characterization of the catches, gears used, geographical areas, seasonality and identification of groups of vessels with similar fishing patterns.
Characterization of the catches by species: variation in space and time	1. Update (include logbook data from 2012-2014) and new analyses to characterize anglerfish and other important species catches, seasonality and potentially important fishing grounds by group of vessels as defined in point 1 from the previous section.
Estimation of fishing effort and its distribution in space and time	<ol style="list-style-type: none"> Effort and catches were mapped by year and ICES rectangle. CPUE was estimated for the anglerfish trammel net and gillnet fisheries using fishing vessels selected in point 1 from the first section and catch information presented in logbooks. Generalized additive models (GAM) were used to standardize CPUE, considering the factors year, month, haul duration, ICES rectangle, landing port, and vessel size (not all were included in the final model). Interactions between factors were also evaluated. Two units of effort were tested: fishing haul and fishing trip. In addition to the common methods used to evaluate the goodness-of-fit, model selection was also based on its accuracy to predict to onboard observations. The potential use of a reference fleet to provide information for the assessment of anglerfish was evaluated.
Estimation of the impact of these fisheries on sharks	<ol style="list-style-type: none"> Analysis of the data collected onboard during the course of the pilot study (2012-2014). Ten deepwater shark species (74 individuals) were caught. From these, eight species (68 individuals) are included in the list of deepwater sharks with zero TAC. From these (~41%) were captured deeper than 590 m. The catch of deepwater sharks represented, in number, ~2% of the anglerfish catches (2012-2014). Productivity-susceptibility analysis (PSA) was applied to assess the impact of the trammel net fishery in the deepwater shark populations from Portugal mainland. Species distribution models (GAMs, boosted regression trees and maximum entropy) were fitted to presence only and presence-absence data.
On board data collection	<ol style="list-style-type: none"> A total of 40 hauls targeting anglerfish were sampled at two different geographical areas in 2014, from January to December. Data collected included: identification of the catches at a species level, total length of the main species, depth and geographical position of the catch, and effort data.
Scientific papers and other deliverables	<ol style="list-style-type: none"> Expected papers: <ul style="list-style-type: none"> Fisheries targeting anglerfish in mainland Portugal: description and effort standardization The trammel net fishery targeting anglerfish:

	<p>impact on deepwater shark populations</p> <ol style="list-style-type: none"> Interim analysis of the data has been developed in order to produce scientific outputs for ICES Working Group on Elasmobranch Fishes (WGEF) and for data quality control. A final working document will be presented in 2015 WGEF meeting. Data/results were also presented in the Workshop on Sampling Design and Optimization of fisheries data, carried out in IPMA (October 2014).
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2. ACTIONS TO AVOID SHORTFALLS

1. Identification of fishing hauls at 200-600 m deep.

The data available was not adequate to extract depth information, precluding the execution of the initial objective of characterizing fisheries and catches at this depth interval (official landing data does not include such information and in logbooks the field for depth information is not mandatory being seldom reported). However, due to the close of the fishery in 2009 (from 200 to 600m deep), the data analysis from recent years would not be helpful to fulfill this objective. As a consequence, analyses were carried out without depth constraints. Future analysis will use vessel monitoring systems data which will allow identifying those fishing hauls and crossing information between databases.

2. Onboard sampling

The number of fishing trips sampled was lower than the expected due to:

- Meteorological conditions
- Change of the fishermen strategy (other target species, gears and/or fishing grounds) maybe because of the anglerfish availability.
- Administrative constraints (must be treated one by one, depending on its nature)

OTHER REMARKS

Annex II: Working document presented to the ICES Working Group on Elasmobranch Fishes (June 2014)

ANNEX II

Working Document for the ICES Working Group on Elasmobranch Fishes Lisbon, 17-26 June 2014

Results from the pilot study on the Portuguese trammel nets fishery targeting anglerfish in ICES Div. IXa

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Abstract

To evaluate the level of by-catch and discards of sharks and to increase the knowledge on the fishery, a pilot study on the Portuguese trammel nets fishery targeting anglerfish in ICES Div. IXa between 200 and 600 m deep started in May 2012 under the PNAB/DCF. Fifty hauls were sampled from June 2012 to December 2013 onboard of 4 vessels operating at 3 different geographical areas of the Portuguese continental coast. Six of the 13 captured species (30 individuals caught in 8 hauls) belong to the EU list of deep-water sharks (UE regulation 1182/2013). All but one were caught deeper than 500 m, and 21 were caught deeper than 600 m (maximum depth sampled = 630). Results collected up-to-date show that the fishery targeting anglerfish between 200 and 600 m has low impact in deep-water shark populations. Most of the species are likely to be observed deeper than 600 m.

1. Introduction

The fishery targeting anglerfish (*Lophius piscatorius* and *Lophius budegassa*) is one of the most important artisanal mixed fisheries in Portugal mainland (Duarte *et al.*, 2007). Anglerfish are mainly caught by trammel nets but high catches are also recorded from gillnet fisheries. Exploitation depths have historically been down to 600 m deep until the implementation of the Annex III to Regulation (EC) No 43/2009 which stated that *Community vessels should not deploy gillnets, entangling nets and trammel nets at any position where the charted depth is greater than 200 m in the ICES zones IIIa, IVa, Vb, VIa, VIIb, VIIbcjk, VIII, IX, X, and XII.*

According to this regulation there were possible derogations for the use of gillnets and entangling nets down to 600 m, targeting hake and anglerfish respectively, whenever *information provided by Member States shows that those fisheries result in a very low level of shark by-catches and of discards.* Derogation for IXa was established in the EU regulation N. o 227/2013, point 34b from 20th March 2013, but the monitoring of this fishery must proceed.

To evaluate the level of by-catch and discards of deep-water sharks and to increase the knowledge on the fishery, a pilot study on the Portuguese trammel nets fishery targeting anglerfish in ICES Div. IXa started in May 2012 under the PNAB/DCF. In addition to data compilation and analysis to characterize the fishery and its impact in deep-water shark populations (e.g. landing data, logbooks, and vessel monitoring systems), this study also relies on onboard observations.

Results presented to WGEF in 2013 showed that catches of anglerfish with trammel nets represented between 74 to 89% of the polyvalent catches in 2007-2011 (Moura *et al.*, 2013WD). The fishing activity for anglerfish is seasonal, with higher landings between March and May. Each trip may combine a set of different gears, particularly traps and gillnets, to capture other species like hake (*Merluccius merluccius*) and octopus (*Octopodidae*), or also use trammel nets to capture other target species as, for e.g., John Dory (*Zeus faber*) and soles (*Solea* spp. and *Pegusa lascaris*). Thus the frequency of deployment of each gear can vary between vessels. Preliminary results from this project show that fishing effort from trammel nets targeting anglerfish is higher at the southern waters (south to Peniche) (Figure 1). Also, fishing grounds

from Sagres to Vila Real de Santo António are located at depths shallower than 200 m (fishermen information).

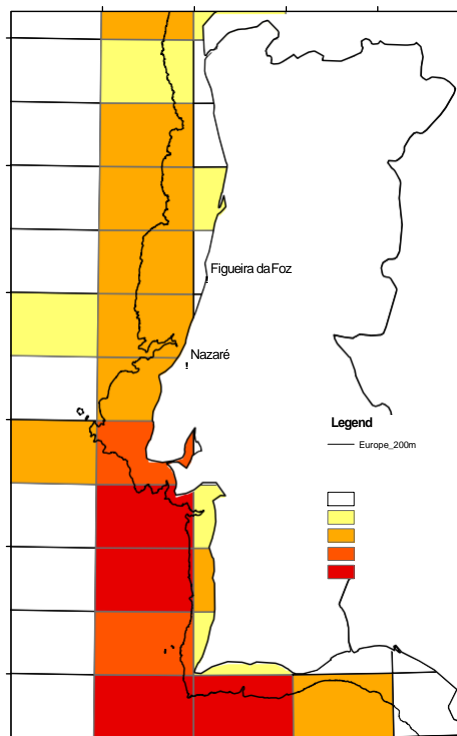


Figure 1. Number of fishing hauls targeting anglerfish by ICES rectangle. Dark line represents 200m isobath. Data source: logbooks from the year 2013 provided by Direcção Geral de Recursos Naturais, Segurança e Serviços Marítimos (DGRM).

Based on results presented last year for deep-water sharks, the WGEF agreed that the level of bycatch of deep-water sharks in the Portuguese trammel net fishery was generally very low (ICES, 2013).

This working document updates the information from on board sampling presented to WGEF in 2013, by including data from the year 2013.

2. Methods

An onboard sampling programme was established to estimate the level of catch of anglerfish and deep-water sharks in depths ranging from 200 to 600 m using trammel nets in hauls targeting anglerfish. Hauls deeper than 600 m were also considered. The information collected onboard consisted in total length of all individuals caught (identified at a species level), categorization into discarded or retained individuals, geographical coordinates and depth of the fishing haul and effort data (number and size of nets, number of fishing hours).

3. Results and discussion

Fifty hauls were sampled from June 2012 to December 2013 onboard of 4 vessels operating at 3 different geographical areas of the Portuguese continental coast (Figure 2). Sharks were discarded or brought to laboratory for scientific analysis.

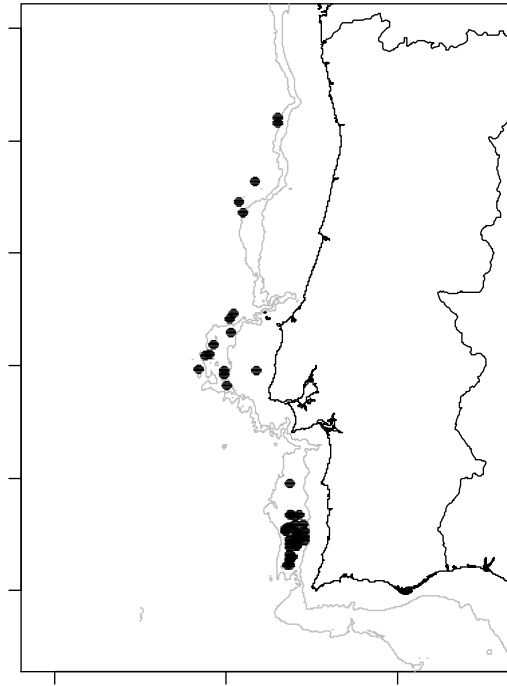


Figure 2. Location of the sampled fishing hauls.

The number of shark species and of the two species of anglerfish caught by depth strata are presented in Table 1. A total of 198 individuals from 13 species of sharks were caught in 37 hauls. From these, 138 individuals were identified as *Scyliorhinus canicula*. Six of the captured species (30 individuals caught in 8 hauls) are included in the EU list of deep-water sharks (UE regulation 1182/2013). All but one deep-water shark were caught deeper than 500 m, and 21 were caught deeper than 600 m (maximum depth sampled =630).

Length ranges of caught specimens by species are presented in Table 2. Despite the few records, it seems that the hauls conducted have not impacted particular size groups (i.e., newborns, large females etc.)

Results collected up-to-date show that the fishery targeting anglerfish between 200 and 600 m has a low frequency of occurrence of deep-water sharks. Higher frequencies are likely to be observed deeper than 600 m, according to the depth ranges reported for most of these species (e.g. Compagno *et al.*, 2005; Moura *et al.*, 2014). To provide more robust estimates of shark abundance by depth strata it is required an increase of the sampling effort. Nevertheless it is important to remark that anglerfish catch rates were higher between 200 and 400 m deep (average no/haul; Table 3).

Table 1. Number and catch weight of anglerfish (*Lophius spp.*) and sharks by 100m depth strata. *Lophius spp.* Combines *Lophius piscatorius* and *Lophius budegassa*. n, number of sampled specimens; West, estimated weight (based on length- weight relationships)

	Total	100-200	200-300	300-400	400-500	500-600	>600
Species	n	n	n	n	n	n	n
<i>Centroscymnus coelolepis</i> *	4		1			2	
<i>Centroscymnus crepidater</i> *	2					1	1
<i>Chlamydoselachus anguineus</i> *	5						5
<i>Dalatias lixa</i> *	5					1	4
<i>Deania calcea</i> *	11					2	9
<i>Scymnodon ringens</i> *	3					1	2
<i>Etmopterus pusillus</i>	1					1	
Squaliformes NI	1					1	
<i>Mitsukurina owstoni</i>	2				2		
<i>Galeus atlanticus</i>	1			1			
<i>Galeus melastomus</i>	23	1	1	1		8	12
<i>Scyliorhinus canicula</i>	138	30	75	31	1	1	
<i>Mustelus spp</i>	1					1	
<i>Galeorhinus galeus</i>	2		2				
<i>Lophius</i> spp. (n)	2104	216	1230	520	3	44	91
<i>Lophius</i> spp. (w)	6965.0	683.4	3544.0	1316.1	20.0	263.6	1137.8
No hauls	50	9	25	7	1	2	6

Table 2. Total length ranges and number of sampled specimens by species and by sex (in cm).

Species	TL range	n	TL range	n	TL range	n
<i>Centroscymnus coelolepis</i> *	52-116	2	71	1		
<i>Centroscymnus crepidater</i> *					48-82	2
<i>Chlamydoselachus anguineus</i> *	56-74	3	61	1	54	1
<i>Dalatias lixa</i> *	95-150	5				
<i>Deania calcea</i> *	46-91	10			90	1
<i>Scymnodon ringens</i> *	85-107	3				
<i>Etmopterus pusillus</i>			39	1		
Squaliformes NI	144	1				
<i>Mitsukurina owstoni</i>	164	1	144	1		
<i>Galeus atlanticus</i>			39	1		
<i>Galeus melastomus</i>	46-73	16	41-62	6	40	1
<i>Scyliorhinus canicula</i>	40-62	44	34-65	91	48-51	3
<i>Mustelus</i> spp.	104	1				
<i>Galeorhinus galeus</i>	140-143	2				

Table 3. Average number caught/haul by depth strata. “Deep-water sharks” refers to sharks included in the list of species defined by the EU commission and the individual classified as “Squaliformes NI”.

Species	100-200 n	200-300 n	300-400 n	400-500 n	500-600 n	>600 n
Deep-water sharks	0.0	0.0	0.1	0.0	4.0	3.5
<i>Lophius</i> spp.	24.0	49.2	74.3	3.0	22.0	15.2

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ANNEX III

Methodological procedures and description of Azorean metiers

1. Methodological identification of Azorean metiers

A statistical analysis was carried out in order to allocate fishing gears with species composition using landings data obtained by on-shore interviews. For that purpose were used tools from PRIMER v6 software (Clarke and Gorley, 2006). To characterize the main species composition (or assemblages) of each gear and metier was used three steps. The first step was a preliminary analysis to detect fishing gears that correspond directly to a single metier, using the similarity percentage analysis (SIMPER), and cut offs of high similarity levels were applied. The following two steps were exclusively carried out for fishing gears characterized by low values of similarity and multispecies, indicating several possible metier per fishing gear. The second step was apply multivariate non-parametric approaches combining a hierarchical cluster analysis, multidimensional scaling (nMDS) and SIMPER, to determine homogeneous groups (metiers) allowing a feed-back analysis by assigning each landing with the specific metier. The detected homogeneous groups were named in accordance to the type of assemblage's composition (Meneses, 2003; Meneses et al. 2006) or species. Once groups were identified, the SIMPER routine analysis was used to identify the species that characterize each group and thereby identifies the métier. Finally, the third step in order to detect the level of dissimilarity between métiers, previously identified, was use the species mean biomass per landing expressed as weight for each metier. A hierarchical cluster analysis, based on the Bray–Curtis dissimilarity index, was used to analyse differences in catch composition between the main metiers sampled.

2. Metier algorithm for landings

Official data base on landings value and weight per species, date, landing ports, boat name was stored in Microsoft SQL server and a specific program was design in Microsoft visual FOX-PRO. An algorithm was constructed to detect the potential main fishing gear per landing trip, based on target species or species composition (see previous chapter). For each fishing trip the species landed weights were allocated to a species category (small pelagic, bethopelagic species, demersal slope species, deep water species, coastal demersal species, large pelagic species, coastal pelagic species, tuna species and crustacean species). However, for some highly specific fishing gears (with high levels of similarity in SIMPER analysis) were taken into account some target species (i.e squid, red mullet, parrot fish, black scabbardfish and rainbow wrasse). On the other hand, there was fishing gears that presented high levels of similarity (e.g handline and bottom longline) in terms of species composition for that reason some distinguish characteristics were incorporated in the algorithm (e.g vessels size, number of species). If the algorithm detects more than one possible fishing gear, an analysis of relative contribution of each gear is performed and the dominant gear prevails. The program was validated by comparing the output of the program with interviews and logbooks data. This simplification method was applied to meet the required specifications of metiers categories established by DCF.

Fishing trips were subsequently assigned to ten metiers types based on the following species compositions rules and in some cases vessels lengths:

1. Metier LLS_DEF_0_0_0
 - a) Set longline gear: vessel length > 10m and number of species ≥ 7 and bentopelagic species + demersal slope species + deep water species > other species. However if the total catch is inferior to 120kg is consider hand line gear
 - b) Set longline gear: vessel length < 10m and number of species > 5 and bentopelagic species + demersal slope species + coastal demersal species + deep water species > other species
2. Metier LHP_FIF_0_0_0
 - a) Hook-and-line gear: vessel length >10m and number of species < 7 and bentopelagic species + demersal slope species + coastal demersal species + deep water species > other species
 - b) Hook-and-line gear: vessel length <10m and number of species ≤ 5 and bentopelagic species + coastal demersal species > other species
 - c) Coastal pole and line gear: If coastal pelagic species > other species
3. Metier LLD_DWS_0_0_0

Drift bottom longline: If black scabbardfish > other species

4. Metier LHP_LPF_0_0_0

Pole and line gear: If tunas species > other species

5. Metier LHP_CEP_0_0_0

Squid jigging gear: squid > other species

6. Metier LLD_LPF_0_0_0

Drift longline gear: If large pelagic species > other species

7. Metier FPO_FIF_>=30_0_0

Fish trap gear: If red mullet exist and in conjugation with *muraena* eels, red porgy, axillary seabream, octopus, gastropods, red scorpion fish > other species

8. Metier FPO_CRU_>=30_0_0

Crustaceans trap gear: If exist crustaceans and in conjugation with octopus, red scorpion fish and gastropods > other species

9. Metier GNS_FIF_>=100_0_0

Gill net gear: If exist parrot fish and in conjugation with coastal pelagic species > other species

10. Metier PS_SPF_>=160_0_0

a) Lift net gear for small pelagic species: small pelagics species > other species

b) Lift net gear for small benthic species: If exist rainbow wrasse and in conjugation with *Labridae* and *Pomacentridae* > other species

3. Metiers Description

Metier LLS_DEF_0_0_0

In Azores LLS_DEF_0_0_0 metier is composed by the fishing gear set longline gear. This gear, since 2001, were banned from the 3 nautical miles of the coast islands, consequently the effort is distributed in the slope and offshore banks during all year round. Currently, vessels ranging a great variety of sizes use this metier; however, the 0_10, 10_12m and 12_18 segments are the main contributor in terms of landings. The traditional Azorean set longline consist of a main-rope set horizontally near the bottom, sometimes with a considerable length, to which are linked to a main-line intercalate with buoys and stones. The branch-lines are fixed at regular intervals to the main-line with hooks and bait, targeting a high variety of assemblages as benthopelagic species (e.g blackspot seabream) and demersals species (e.g bluemouth). This gear is also used with some design variations in the disposition of buoys and stones consequently targeting more demersal species or benthopelagic species, or also switching the material of the main-line, from nylon monofilament to strong multifilament and additionally using larger size hooks, targeting the wreckfish. Other variation are the vertical set longlines that can be one to several vertical sets usually linked to each other's with a high quantity of hooks targeting mostly the benthopelagic assemblage especially the blackspot seabream and less benthic species.

Metier LHP_FIF_0_0_0

In Azores LHP_FIF_0_0_0 metier is composed by the fishing gears hook-and-line and coastal pole and line. Currently, vessels using this metier belong to the 0_10m and 10_12 segments, being the 10_12 the main contributor in terms of landings. Hook-and-lines fishery in Azores occurred in inshore areas and offshore banks all year round. The gear is often supported by manual drums. The gear design can differ in line material (e.g nylon, wire metal), number of hooks (2 to 50), disposition of the hooks, type of bait and optionally the use of chum. These variations depend on the target specie(s) whereas in inshore areas are commonly coastal demersal species (e.g red porgy, fork-beard, blacktail comber) while in the slope of the islands and offshore banks are mainly the benthopelagic assemblage, especially the blackspot seabream. Coastal pole and line gear is used in inshore areas and at shallow seamounts ("*baixas*") characterized by a marked seasonal pattern (fishing effort and catches mainly concentrated during the summer months). This live bait fishery (and less often artificial lures) is carry out in small vessels (< 10m) targeting coastal pelagic species (e.g yellowmouth barracuda, jacks, bluefish and atlantic bonito).

Metier LLD_DWS_0_0_0

In Azores LLD_DWS_0_0_0 metier is composed by the fishing gear drifting bottom longline. Currently, vessels using this métier belong to the 12_18m segment. The gear consists of a main line connected to several perpendicular vertical lines, with a buoy attached to the upper end. The main line drifts above the bottom, fishing at different distances from the seabed, which ranges from 800 to 1500 m deep. Soak time averaged 10 h and the total number of hooks used by the fishing gear average ~3500 hooks.

Metier LHP_LPF_0_0_0

In Azores LHP_LPF_0_0_0 metier is defined by the fishing gear pole and line fishery targeting tuna species (e.g skipjack, big eye), operating from coastal areas to offshore and seamount areas during the April to October. Currently, vessels ranging a great variety of sizes use this metier; however the 12_18m and > 24m segments are the main contributors in terms of landings. This fishery is defined by the pole and line gear using live bait and less often artificial lures.

Metier LHP_CEP_0_0_0

In Azores LHP_LPF_0_0_0 metier is defined by the fishing gear squid jigging. Currently, vessels ranging the 0_10m and 10_12m segments are the main contributors in terms of landings. Squid jigging gear is performed by hand line, using a metal wire with several artificial lures. Squid fishery occurred in the slope of the islands, all year round although with a decreasing of effort and catch during the summer months. The line is given a jerky up-and-down movement which attracts the squid to the jig. The fishing is frequently worked non-mechanically but usually with an auxiliary manual drums, being highly selective for the target specie *Loligo forbesis*.

Metier LLD_LPF_0_0_0

In Azores LLD_LPF_0_0_0 metier is defined by the fishing gear longline. Vessels using this metier target swordfish and blue shark through the year; being the 10_12 and 12_18m segments the main contributors in terms of landings. It uses a drift surface long line, called the main line, with baited hooks attached at intervals by means of branch lines called *snoods*. A snood is a short length of line, attached to the main line using a clip or swivel, with the hook at the other end.

Metier FPO_FIF_>=30_0_0

In Azores FPO_FIF_>=30_0_0 metier is defined by the fishing gear traps defined as a simple passive fishing gear that allow fish to enter but the presence of a funnel make it hard for them to escape. Usually are a coastal fishery used by vessels of less than 10 m length during summer targeting benthic species (e.g *Mullus surmuletus*, *muraena* sp.).

Metier FPO_CRU_>=30_0_0

In Azores FPO_CRU_>=30_0_0 metier is defined by the fishing gear traps defined as a simple passive fishing gear that allow crustacean and mollusks to enter but the presence of a funnel makes it hard for them to escape. The 0_10m segment is the main contributor in terms of landings, being a seasonal gear mainly used during summer targeting crustacean species (e.g slipper, spiny lobster) and catching accessory species as octopus.

Metier GNS_FIF_>=100_0_0

In Azores GNS_FIF_>=100_0_0 metier is defined by the fishing gear gill nets. This fishery occurred in inshore areas with a marked seasonality (fishing effort and catch concentrated during the summer months). The 0_10m segment is the main contributor in terms of landings. This passive gear tends to gilled the fish in the netting which tend to be single panel (gill nets). According to their designed these nets can be used on the surface using buoyancy targeting mainly coastal pelagic species (e.g. yellowmouth barracuda, jacks, atlantic bonito) or using ballasting to fish on the bottom targeting the coastal demersal assemblage, especially the parrot fish, however in Azores the depth of operation together to the net design allow commonly to catch simultaneously coastal demersal and coastal pelagic assemblages.

Metier PS_SPF_>=160_0_0

In Azores PS_SPF_ \geq 160_0_0 metier is defined by the fishing gear purse seine and lift nets. This fishery occurred mainly in inshore areas all year round. Segment 10_12m is the main contributor in terms of landings. The target specie is the horse mackerel however with some by catch (e.g chub mackerel).

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