



Ministerio de Agricultura, Pesca y Alimentación

Secretaría General de Pesca

## Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017

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

## Commission Delegated Decision (EU) 2021/1167 of 16 July 2021

establishing the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors from 2022

## Commission Implementing Decision (EU) 2021/1168 of 16 July 2021

establishing the list of mandatory research surveys at sea and thresholds as part of the multiannual Union programme for the collection and management of data in the fisheries and aquaculture sectors from 2022

## Commission Implementing Decision (EU) 2021/...

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

# Spain Work Plan for data collection in the fisheries and aquaculture sectors

2022-2027

Version [4] – 2021

Madrid, 17-12-2021

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## Section 1: General information

### Data collection framework at national level

General comment: Use this text box to describe how data collection is organised in your Member State (institutions involved, contact information) and in which regional coordination groups (RCG) your Member State participates.

Outline the general framework of the national data collection programme in relation to the relevant sections of the EU MAP. If applicable, indicate major methodological changes in approach compared to previous year(s), and to which section(s) they apply.

Give full name, acronym and contact details of all institutes that contribute to the data collection activities, and describe briefly their role in the work plan.

Provide a link to the national data collection website, if there is one.

The National Authority responsible for implementing the Data Collection National Program (PNDB) is the GENERAL SECRETARY FOR FISHERIES, (hereinafter SGP) from the Ministry of Agriculture, Fisheries and Food (hereinafter MAPA), who acts as National Correspondant for the exchange of information between the Commission and the Kingdom of Spain.

It is based in Madrid, C/Velázquez, 144. 28006. Tel. 91 3476110/6057 Fax. 91 3476037.

E-mail: [sgprotec@mapa.es](mailto:sgprotec@mapa.es)

Spain has a central website where general information about data collection framework is stored.

<https://www.mapa.gob.es/es/pesca/temas/proteccion-recursos-pesqueros/programa-nacional-datos-basicos/documentos-clave/>

There are several Units involved in PNDB, collecting different DCF variables each:

Fishing activity variables are collected directly by SGP, from sources such as: logbooks, censuses, sales notes, etc. Furthermore, SGP coordinates the data collection of from Spain's 17 Autonomous Regions (recreational fisheries, environmental and aquaculture data, etc).

Economic data on fisheries and aquaculture are collected by MAPA in the Economic Survey of Marine Fisheries and the Economic Survey of Aquaculture, respectively. These surveys are included in the National Statistical Plan.

Social data on fisheries and aquaculture are collected by the Spanish National Statistics Institute (INE). This Institute also collects socioeconomic data on the fish processing sector, through the Survey of Industrial Companies.

Biological métier-related data and biological stock-related data are collected by different Research Institutes and compiled at the Spanish Institute of Oceanography (hereinafter IEO-CSIC), who processed and made them available to the responsible national body, SGP.

SGP collaborates with these Research Institutes, providing the oceanographic research vessels R/V Miguel Oliver, R/V Vizconde de Eza and R/V Emma Bardán.

The participants Institutes are:

#### **Spanish Institute of Oceanography (IEO-CSIC):**

Under the Ministry of Science and Innovation, with headquarters in Corazón de María, 8, 28002 Madrid; Tel: +34 91 342 11 00, ([www.ieo.es](http://www.ieo.es)). It collects fisheries data from the different areas, length sampling and biological sampling both on shore (market) and on board, as well as scientific analysis for the assessment of the Spanish fisheries. It carries out most of the research surveys at sea along the Spanish coast and NAFO area (11 on an annual basis and 4 on a triennial basis) as well as the subsequent analysis of the associated data. All 9 coastal centers that IEO-CSIC has along the Spanish coast are involved in these tasks.

IEO has a space in its central website where general information about data collection framework is shown.

[http://www.ieo.es/es\\_ES/web/ieo/pndb](http://www.ieo.es/es_ES/web/ieo/pndb)

IIM-CSIC, another research institute from the same Ministry, collaborates in the Flemish Cap survey activities on board and analysing samples.

#### **Instituto Tecnológico, Pesquero y Alimentario (Fundación AZTI - Tecnalia):**

Based on Txatxarramendi Ugarte a z/g, 48 395 Sukarrieta-Bizcaia (Spain): Tel: +34 94 602 94 00, Herrera Kaia - Portu aldea, z/g, 20110 Pasaia (Gipuzkoa) Tel: +34 943 00 48 00), ([www.azti.es](http://www.azti.es)). AZTI is in charge of the collection of fisheries data, biological sampling and assessment of the fisheries in which the fleet based in the Basque Country are involved. It carries out five research surveys at sea in the Bay of Biscay (4 on an annual basis and one on a triennial basis).

## COMMENT ON GUIDELINES COMPLIANCE

Table 2.2:

Although the guideline says. "List all biological variables per species/stock, even if you don't plan to collect in a given year. In such case, put '0' in column 'Number of individuals to sample'".

A 'Y' in column "O" of table 2.1 indicates a variable to be collected in some year(s) so a "Y" means a combination of, as a minimum, 5 variables x 3 years = 15 lines per stock/sampling scheme in table 2.2.

It will result in a long list with a lot of "0", even more in countries that plan for 6 years (5 variables x 6 years = 30 lines per stock/sampling scheme).

As Spain decided to submit the plan for 6 years and there are more than one sampling scheme per stock (in most of the stocks), we have slightly modified the presentation of the list of biological variables in table 2.2.

Instead of presenting all variables for each stock, we have decided to reflect just the variables that is planned to be collected, at least, once during the span of the WP and give up the idea of presenting a variable when it is not planned at all in the period (like age and crustaceans).

Example: if we only plan to get sex ratio in a given stock but no other variables, we keep 'sex-ratio' in all years (even if some of them are=0), and in this case we don't need to say also age=0, fecundity=0, maturity=0 and weight=0 for all years, etc.

Our base is the stock. One stock (like mackerel) has 5 variables, other stocks (like skates) could have 3 variables and other stocks can even have only one.

In the first case we keep the 5 variables always (for the 6 years=30 rows by sampling scheme), putting 0 in the years when the variables are not collected. In the second case we show only the 3 planned variables for each year (for the 6 years=18 rows by sampling scheme) putting 0 in the years when the variables are not collected, if any. This saves 12 rows with "0" per stock and per sampling scheme.

## ANNEXES

Due to the large number of Annexes 1.1, they are submitted in a separate file named as "*Spain\_WP\_2022-2024\_Annexes\_20211015*"

### REFERENCE PERIOD in several tables

In several tables the period 2017-2019 was considered as "reference period". This is due to the fact that 2020 is not considered a representative year due to COVID-19.

(max. 1000 words)

## Text Box 1a: Test studies description

### STOMACHS

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex. This text box applies to the work plan and the annual report.

### STOMACHS

#### 1. Aim of the test study

Understanding the trophic web of an ecosystem through the study of predator-prey relationships is key for an accurate application of ecosystem and multispecies models as well as for estimating natural mortality. This data and models are required to anticipate the responses of ecosystems to fishing pressures and to make good predictions about the status of fisheries stocks. Traditionally, food web studies have been made through the visual identification of stomach contents, which is a tedious and expensive activity which has limitations for (semi)digested, early life stages or gelatinous organisms. Genetic methods can represent an alternative allowing the accurate and cost-effective characterization of stomach contents. Yet, their application is not straight forward as there are limitations such as those related with quantification, detecting cannibalism, and detecting preys of preys. Thus, the aims of the study will consist of:

- -Establishing a framework for the inclusion of genetic derived stomach content data into the fisheries and ecosystem assessment

process

- -Developing standard genetic methods for stomach content sampling, DNA extraction and analysis
- -Assessing the accuracy of genetic methods for determining the prey composition of a variety of fish species
- -Setting the basics of a routine food-web monitoring program through genetic analyses of stomach contents.

## 2. Duration of the test study

Three years (2022-2023-2024)

## 3. Methodology and expected outcomes of the test study

The aims of the study will be achieved by a series of tasks that will be performed in parallel as they are interdependent.

- To fully understand the potential and limitations of genetic approaches compared to traditional methods, we will establish a working group including geneticists, taxonomists experts in stomach content analyses, fisheries assessors, ecosystem modelers and sampling and data collection experts. Using the multidisciplinary expertise of the group, we will assess minimum data requirements, logistically possible sampling designs and develop a draft proposal for routine monitoring. We will also make use of our connections with other organisms through ICES working groups (WGAGFM) and workshops (WKBECOSS) and through the stomach content working group of the NANSEA Regional Coordination Group. OUTCOME 1: Report assessing the potential of genetic methods to fulfil the needs of fisheries assessment and ecosystem modelling.
- To develop a standardized protocol while benchmarking genetic analyses, we will analyse stomach contents from several species, including demersal and pelagic and including also tropical tunas in areas beyond national jurisdiction. Results from genetic analyses using alternative procedures (including storage, DNA extraction, sequencing, etc...) will be compared to those obtained with visual inspection analyses. OUTCOME 2: Standardized protocol for genetic stomach content analyses
- To advance towards a routine monitoring of stomach contents through genetic analyses, we will integrate the information gathered from outcomes 1 and 2 and contrasted with collaborating institutes such as IEO and IFREMER in order to develop a common framework, with survey coordinators in order to further confirm feasibility, and with end users, such as modellers and fisheries assessors in order to fully test the benefits of including genetic derived stomach content information. OUTCOME 3: Proposal for a routine monitoring of stomach content analyses through genetics

(max 900 words per study)

## Text Box 1a: Test studies description

### HABITATS

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex. This text box applies to the work plan and the annual report.

### HABITATS

#### 1. Aim of the test study

Ecosystem effects of bottom contact fishing gears are of major concern. Among others, it can produce physical disturbance of the seafloor which can be traduced into a reduction of habitat complexity by removing emergent epifauna, smoothing sedimentary bedforms, and removing taxa that produce habitat structure. And thus, it produces significant effects on the overall habitat stability and productivity. There is a clear association of fishes with structural habitat features that provide essential fish habitat. Wich includes species of commercial interest.

Fishing gear that makes contact with the seafloor has different levels of impact, depending on the gear type, the properties of the seafloor, the biodiversity living within or on the seabed, and the intensity and frequency of contact. Therefore, a spatially and temporally explicit approach is required to assess the impact of bottom contact fishing gears.



Within this context, the objectives of the present Pilot Study are:

- Characterisation of bottom contact fishing gears and their potential impact on seabed habitats.
- Perform experimental surveys to obtain data necessary to assess the environmental status of seabed habitats in areas of fishing activity.
- To integrate ecosystem level information obtained from surveys to assess the spatial distribution and magnitude of impacts of bottom contact fishing gears.
- To develop standard protocols for the collection of data dealing with environmental impacts of bottom contact fishing gears.
- To set up the essentials of a routine monitoring of data for the monitoring the status of seabed habitats of fishing grounds.

## 2. Duration of the test study

5 year pilot study (2022-2026)

## 3. Methodology and expected outcomes of the test study

- Identification and characterisation of fishing gears with potential impact on the seabed.
- Identification and description of methodologies for the characterization and identification of the potential impacts of fishing gear on the seafloor and seabed habitats and species.
- Definition of a survey strategy: adopting the Basque Country as case study, validate the proposed characterization methodologies and the potential impacts identified.
  - Identification and delimitation of fishing grounds of for each fishing gear. Estimation of fishing effort based on Vessel Monitoring System (VMS) and Automatic Identification System (AIS) data.
  - Field surveys. Different survey technologies will be applied according to benthic habitats under study.
    - Acquisition of multibeam echosounder bathymetry information for the characterisation of the seafloor morphology. That includes the characterisation of habitats and seabed species communities on Habitats of Community Interest according to Habitats Directive (Council Directive 92/43/EEC of 21 May 1992)
    - Beam-trawl and sediment grab samples acquisition for the characterisation of sedimentary fishing grounds. It will include the characterisation of pockmark fields (Priority Habitat: 1180 Submarine structures made by leaking gases). A stratified survey will be performed covering fishing grounds showing different fishing effort. That includes areas in which fishing activity is not performed according to historical VMS data.
    - Underwater video and images recording on rocky seafloor (Priority Habitat 1170 Reef and other hard substrata). A stratified survey will be performed covering fishing grounds where different fishing gears are used and showing different fishing effort.
    - Data processing, integration and interpretation for the assessment of benthic habitats conservation status and estimation of potential impacts derived from fishing activity.
- Results obtained during the study will be evaluated for their adequacy for assessing and monitoring the environmental and conservation status of seafloor habitats and impacts produced by bottom contact fishing gears.

Based on the outcomes obtained from the Pilot Study and the experience gained the incorporation of the approach under routine marine fisheries surveys will be evaluated.

## 4. Expected outcomes

- Incorporation of the developed approach under routine marine fisheries surveys, to collect comprehensive information to advance in developing effective management measures.
- Production of information to implement efficient spatio-temporal management measures.
- Advance in ecosystem-based fisheries management.

## Text Box 1a: Test studies description

### PETFISH

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex. This text box applies to the work plan and the annual report.

#### PETFISH

##### 1. Aim of the test study

Current fishery regulations require the collection of data on the incidental bycatch of seabirds, marine mammals, reptiles and species of fish and protected invertebrates. The regulations require reporting the incidence of bycatch through the identification of the Protected, Endangered and Threatened species (PETs) involved and the number of individuals captured in current onboard observer programs. Moreover, understanding the determinants of the probability of capture is a high conservation priority in order to implement efficient spatio-temporal management measures. However, the collection of more comprehensive information (i.e., specific collection of bycatch data) is necessary to advance in developing effective management measures to reduce bycatch and thus advance in ecosystem-based fisheries management. Moreover, areas of high fishing activity tend to be concentrated in productive marine areas and overlap with areas of high biodiversity, where PETs can occur. Therefore, a spatially-explicit approach to assess PETs bycatch requires the integration of spatial information on different ecosystem components. Within this framework, the objectives of this study are:

- To establish a framework for the inclusion of bycatch data into fisheries monitoring
- To develop standard protocols for the collection of bycatch information of PETs
- To increase sampling coverage specifically directed at monitoring bycatch
- To integrate ecosystem level information (e.g., oceanography, prey and predators) obtained from ecosystem-based surveys to assess the spatial distribution of PETs
- To set up the essentials of a routine monitoring of PETs bycatch following an ecosystem-based approach

##### 2. Duration of the test study

Three years (2022-2023-2024).

##### 3. Methodology and expected outcomes of the test study

The objectives of the study will be accomplished by the following tasks:

- To establish a framework for including PETs bycatch monitoring on current onboard fishery sampling programmes. We will create an expert committee gathering scientists with multidisciplinary background in PETs ecology, sustainable fishery, ecosystem functioning, fish ecology and fisheries monitoring, in addition to the observers of the routine fishery programmes. The output of the expert committee will have the premise of not compromising the data routinely collected by the observers, and therefore the expert committee will assess the need to increase sampling coverage to specifically address fishing bycatch of PETs. Particular attention (i.e., interaction and outputs) will be given to related ICES Working Groups such as the Working Group on Bycatch of Protected Species (WGBYC), Working Group on Marine Mammal Ecology (WGMME), and Joint OSPAR/HELCOM/ICES Working Group on Seabirds (JWGBIRD), as well the regional agreements in the framework of the Convention on Migratory Species and the OSPAR convention.
- In order to develop an integrative protocol, we will follow the guidelines described in the series of workshops on Practical Implementation of Statistical Sound Catch Sampling Programmes (WKPICS) to develop a combined protocol to sample fisheries catch and PETs bycatch. Thus, the observers' onboard protocol will be used as a base document, determining target population, stratification, sampling effort allocation and selection of sampling units (trips). Then, new objectives will be defined and new tasks will be added to monitor PETs bycatch in different fisheries. Developing experimental protocols for current data collection programmes is the way forward to perform a few years of initial testing to analyse the feasibility of the collection of new

ecosystem descriptors. Once established and after debugging the initial protocol, an established protocol could be transferred for its implementation in other data collection programmes.

- To integrate ecosystem-level information collected on annual integrated ecosystem surveys to understand the spatial distribution of PETs. Integrated ecosystem surveys taking place in Bay of Biscay and carried out by different regional institutes already routinely collect data each year following a standard and shared protocol between collaborating institutes (AZTI, IEO, IFREMER – La Rochelle University), which guarantees the interoperability and comparability of these data. PETs distribution outputs will be crossed with fishery bycatch data to assess potential conflict areas, providing a spatial perspective of PETs bycatch.

(max 900 words per study)

## Text Box 1a: Test studies description

### RECREATIONAL

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex. This text box applies to the work plan and the annual report.

#### RECREATIONAL

##### 1. Aim of the test study

Under the DCF, AZTI collected the required data for marine recreational fisheries using off-site methods (e.g., Telephone and email surveys). The information collected is being used to provide the catch and effort estimates for the mandatory species for the Atlantic region. These off-site methodologies are incorporated under the routinary sampling programme. The aim of this study is to take a step forward and start using on-site methodologies (e.g, Access Point Surveys) to collect the information required. This test study will allow us to improve the design, and the implementation of these methodologies based on the experience acquired during these test years:

##### 2. Duration of the test study

Two years (2022-2023).

##### 3. Methodology and expected outcomes of the test study

The aims of the study will be achieved by a series of tasks:

The objectives of the study will be accomplished by the following tasks:

- Identification of main access points and fishing sites for onshore recreational fisheries and marinas, piers etc. for recreational fishermen from boat, including spearfishing. This will allow to collect the relevant information needed for a proper survey design (e.g, number PSU, Stratification variables, temporal clusters etc.).
- Once the sampling design is ready the interviewers trained for this specific task, will intercept recreational fishermen in the assigned specified times at the specified sites. Catch, effort and biological information (when possible) will be collected. Additional data (demographic, socio-economic etc will be also collected).
- With the information collected, an analysis of the data will be carried out.
- In all the survey stages (design, implementation, data analysis etc.), best practise guidelines coming for the ICES WGRFS will be adopted.

On the expected results, catch and effort estimates will be provided. In addition, if sufficient biological information (length data) is collected this will be also analyse providing length distribution frequencies for these species. A comparison between the estimates obtained from the

different methodologies will be also carried out (off-site vs on-site).

Finally, the experience gained during these years will allow to incorporate the on-site methods under the routine marine recreational fisheries surveys.

(max 900 words per study)

## Text Box 1b: Other data collection activities

### CULTIVOS

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### 1. Aim of the data collection activity

The main objective of this project is to carry out sampling in the mollusc production areas of the Basque coast in order to take the necessary samples of molluscs (mussels and oysters) and water to carry out the control of these areas. This is required by the regulations in force regarding official controls of bivalve molluscs intended for human consumption.

This project is linked to the "Procedure for the control and monitoring of the production of live bivalve molluscs in the Basque Country" which is part of the Official Control required by EU Regulations 2019/627 and 2017/625). Therefore, the information obtained will allow the Directorate of Fisheries and Aquaculture of the Basque Government to achieve the following milestones:

- i. Opening and closing of the mollusc production areas according to the levels of biotoxins in mollusc meat and/or presence of biotoxin-producing phytoplankton.
- ii. Classification of the mollusc production areas according to microbiological conditions, in accordance with current regulations.
- iii. Evaluation of the quality (in terms of food safety) of the molluscs.

In addition, the availability of historical data allows to adjust the risk levels for the presence of biotoxins in mollusc flesh and the daily variation rates. This will be used to better adjust monitoring plans to a limited risk, from a food safety point of view.

#### 2. Duration of the data collection activity

This is a routine project. From 2022 to 2027, in a yearly basis.

#### 3. Methodology and expected outcomes of the data collection activity

The molluscs and water samples will be taken throughout the year in the mollusc production areas of the Basque coast. The analyses to be carried out will be those required by the regulations in force: microbiological parameters in mollusc flesh (*E. coli* and *Salmonella*), biotoxins in mollusc flesh (ASP, PSP, lipophilic) and pollutants in mollusc flesh (Cd, Hg, Pb, PAHs, dioxins, dioxin-like PCBs and non-dioxin-like PCBs), and the presence of toxic phytoplankton in water.

Sampling and analytical efforts will focus on times when shellfish harvesting is allowed for human consumption, which vary depending on the results obtained. In general, sampling for chemical contaminants will be carried out quarterly/semi-annually/annually depending on the parameter; sampling for microbiology and phytoplankton will be carried out monthly/quarterly; sampling for biotoxins will ideally be weekly, but the frequency will be modified depending on the extraction activity and the possibility of sampling according to wave conditions. Biotoxin sampling will be carried out only in the mollusc production areas where shellfish harvesting is allowed, with the cooperation of the producers. There is no specific target number of samples, as it depends on the activities, but it is expected to collect and analyse around 100-150 samples of molluscs (not all parameters are analysed in all samples) and around 12-16 samples of phytoplankton.

The results obtained will make it possible to carry out the control of the mollusc production areas of the Basque coast and subsequent annual classification of these areas. In this way, the aim is to guarantee the quality of the molluscs extracted in these areas for human consumption. Similar controls are carried out in other areas of Spain where mollusc production areas are present. The Ministry of Agriculture, Fisheries and Food collects annually information concerning the number of controls carried out as well as the decisions to open/close mollusc production areas. In addition, the Ministry communicates guidelines and protocols for sampling and decision making.

(max 900 words per activity)

## Text Box 1b: Other data collection activities

### IDAO

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### 1. Aim of the data collection activity

In tropical tuna purse seine fishery, fishing efficiency has increased with the incorporation of new technology on board and with the use of Fish Aggregating Devices (FADs) (Lopez et al., 2014; Torres-Irineo et al., 2014; Gaertner et al., 2016). The difficulties of providing new indicators based on fine scale data to reflect these technological changes and the impact on fishing efficiency has hampered to standardize the FAD fishing CPUEs (Gaertner et al., 2016; Wain et al., 2021). This has prevented on integrating the purse seiner CPUE in stock assessment models and resulted in a lack of skipjack and juvenile yellowfin and bigeye tuna indices. In order to improve tropical tuna assessments, science-industry collaborative projects like this, are making possible to gain of knowledge on technological implementation on this fleet and to advance on the CPUE standardization (Wain et al., 2021).

The introduction of FADs in purse seine fishery and the satellite-linked echosounder buoys attached (Scott & Lopez, 2014) provides an alternative and catch-independent method to evaluate tuna abundance. These instrumental buoys give daily information on buoy position and tuna aggregation underneath the FADs, being unique observation platforms of tuna and other aggregated species. The information extracted from echosounder buoys needs to be routinely collected and can be used to determine buoy derived indices that has been recently incorporated in several tropical tuna stock assessment (ICCAT, 2020). In this sense, this research action aims to:

- Establish routine data collection protocols of buoy derive information (i.e. acoustic information collected by the echosounder buoys and information derived from the buoy track as GPS position and speed),
- Development of methodological frameworks to extract reliable scientific information from echosounder buoys.
- Creation of standardize data base to be used for determination of buoy derived abundance index (BAI).

This project is conducted with the collaboration of the tropical purse seine fishing companies and buoys providers. The data is managed under a strict confidentiality rules.

#### 2. Duration of the data collection activity

The data collection is done in monthly and yearly basis from 2022 to 2027

#### 3. Methodology and expected outcomes of the data collection activity

Establish routine procedures for data collection and database management. This requires from establishing data sharing and use agreement with buoy providers companies and data owner (purse seine fishing companies). To create a standardize database filtering protocols are defined for preprocessing the data (to filter out erroneous locations, data related to failures in satellite communication and location data acquisition, land positions and on-board positions). Then biomass indicators provided by different buoy models are converted to decibels. Finally, biomass is re-estimated based on the TS (target-strength or strength of the target of each species) by species and species composition.

The information derived from echosounder buoys will be used for:

- Determination of buoy derived abundance index (BAI) for tropical tuna which is being used in the stock assessment as indicator of skipjack and juvenile yellowfin and bigeye tuna indicators.
- Quantification of FAD fishing effort indicators.
- Study of tuna and other species behavior around FADs.

Gaertner, Daniel, Ariz, J., Bez, N., Clermidy, S., Moreno, G., Murua, H., Marsac, F. (2016). Results achieved within the framework of the EU research project: Catch, Effort, and eCOsystem impacts of FAD-fishing (CECOFAD) (No. IOTC-2016-WPTT18-35).

ICCAT, 2020. Report of the 2019 ICCAT yellowfin tuna stock assessment meeting. (Grand-Bassam, Cote d'Ivoire, 8-16 July 2019)

Lopez, J., Moreno, G., Sancristobal, I., & Murua, J. (2014). Evolution and current state of the technology of echo-sounder buoys used by Spanish tropical tuna purse seiners in the Atlantic, Indian and Pacific Oceans. *Fisheries Research*, 155, 127–137. <https://doi.org/10.1016/j.fishres.2014.02.033>

Torres-Iruneo, E., Gaertner, D., Chassot, E., & Dreyfus-León, M. (2014). Changes in fishing power and fishing strategies driven by new technologies: The case of tropical tuna purse seiners in the eastern Atlantic Ocean. *Fisheries Research*, 155, 10–19. <https://doi.org/10.1016/j.fishres.2014.02.017>

Wain G, Loreleí Guéry, David Michael Kaplan, Daniel Gaertner, Quantifying the increase in fishing efficiency due to the use of drifting FADs equipped with echosounders in tropical tuna purse seine fisheries, *ICES Journal of Marine Science*, Volume 78, Issue 1, January-February 2021, Pages 235–245, <https://doi.org/10.1093/icesjms/fsaa216>

(max 900 words per activity)

## Text Box 1b: Other data collection activities

### MARCADO

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### 1. Aim of the data collection activity

Conventional and electronic tagging program for temperate tunas in the Bay of Biscay.

Conventional and electronic tagging of bluefin tuna and albacore tuna data are sent annually to the Atlantic Regional Fisheries Organization (ICCAT) responsible for the conservation of tunas. The data are available Through ICCAT to the scientific community to contribute to spatial movement models so they can be used integrated, with data from other programs, in assessment models (estimated migration rates, defining stock structure, parametrizing growth, etc.) or assimilated by assessment models using methods that are being developed. Another aspect of the conventional tuna tagging is to promote the responsible recreational fishing and ensure the quality of the data: Associations are advised, skippers are trained for tagging with good practices and their tagged fish releases are accredited.

#### 2. Duration of the data collection activity

From 2022 to 2027, in a yearly basis.

#### 3. Methodology and expected outcomes of the data collection activity

Methodology: Electronic tagging is carried out by expert taggers with recreational or professional fishermen on an opportunistic basis. Conventional tagging is carried out by recreational fishermen in the daily activity and during the dedicated days organized by local recreational fishermen associations. During the organized tagging days, the video recording is compulsory for all the participants, so each valid release and its quality has been reviewed by the scientists.

Outcomes: As an example, the structure of the Atlantic and Mediterranean albacore stocks and their connection have been estimated thanks, essentially, to the migration rates obtained in conventional tag depletion models. Electronic tagging for bluefin tuna can be incorporated to the last developments of S3 assessment model. Aspects related to albacore and bluefin tuna stock structure, such as

transatlantic or inter-area migration rates (transition matrices), geographic habitat use (seasonal, inter-annual), vertical habitat use and others, important for their correct assessment and conservation, are investigated by means of the data obtained in this tagging program. These are largely unknown aspects since the usual and fundamental data for the evaluation of the state of the stocks are based on data originated by the fishery to be managed (indirect methods) while conventional and electronic tagging data are largely independent from the fishery activity. Tagging data are complementary to those obtained from fishery data collection.: in the case of the electronic tagging data an important post processing is necessary. Improvement of methodological aspects such as methods of geolocation by light and trajectory estimation are investigated. Ontogenetic aspects or ethological changes, which may seem less important for conservation, are also investigated.

(max 900 words per activity)

## Text Box 1b: Other data collection activities

### Biological parameters of tuna

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### 1. Aim of the data collection activity

The state of exploitation of tropical tuna (skipjack; *Katsuwonus pelamis*, yellowfin; *Thunnus albacares*, and bigeye; *Thunnus obesus*) species in the Atlantic and the Indian Oceans is evaluated using stock assessment models. These models, explicitly describe the key fish dynamics and key processes of the population dynamic such as growth, reproduction, and maturity, with equations that need accurate parameters from biological studies. The lack of knowledge on biological processes can reduce the reliability and confidence in stock assessment outcomes and undermine the sustainable management of fish stocks and fisheries. Besides, the understanding of stock structure and population dynamics of these species is needed to determine the appropriate units for stock assessment, particularly for species with large transboundary distribution ranges, or migratory behaviour. Species response to management decisions cannot be accurately predicted if the boundaries that characterize a stock are not correctly defined. Finally, in order to move towards an ecosystem-based fisheries management, a better understanding of the habitat utilization and trophic relationships of the three tropical tuna species in the Atlantic and Indian Oceans is also needed. This knowledge will be useful to evaluate species-specific vulnerability to different fisheries.

Therefore, an increased knowledge of these species' life-history characteristics, habitat utilization and an accurate validation of stock structure of tropical tuna fisheries in the Atlantic and Indian Oceans will be essential to implement and enforce management strategies that ensure long-term sustainable fisheries. On the light of this evidence, the main aim of this work is the development and implementation of a sampling scheme that supports the collection and analyses of biological samples to provide improved estimates of age, growth, reproduction, stock structure and trophic ecology of tropical tunas for the Atlantic and the Indian Oceans.

#### 2. Duration of the data collection activity

Samples will be taken intermittently during 2022, taking advantage of the presence of observers on board, access to deep-freezing cannery factory and port sampling opportunities.

#### 3. Methodology and expected outcomes of the data collection activity

##### 3.1 Age and longevity estimates:

Sagittal otoliths and fin spines will be used to provide estimates of age, growth and longevity by direct reading of daily and/or annual increment bands. Results will be used to perform a growth curve that fit to the estimate age and length data used in the stock assessment model. To validate the annual periodicity of the bands being counted and verify age estimates, a relatively new approach, based on the use of the decline period in the  $^{14}\text{C}$  signal (~1980-present) can also be explored in a subset of samples.

##### 3.2 Reproductive biology:

Individual sex will be identified visually, and macroscopic maturity status will be assessed visually from the gonads. Only female gonads (i.e., ovaries) will kept for further histological analyses. Histological analyses together with gonad index (GI) will permit to set the size at first

maturity, expand the knowledge on spawning timing and locations and estimate of spawning frequency and batch fecundity. These parameters are needed to determine the productivity of the species that contribute to the recruitment of new individuals to the population and will help to understand the fluctuations in population dynamics, and hence, allow to better assess population resilience to both fishing activities and environmental changes.

### 3.3 Stock structure delineation:

The combined analysis of otolith and fin spine microchemistry with genetic markers will allow to explore population structure and connectivity of tuna at different time scales. Otolith or fin spine microchemical analyses provide demographic information over an individual's lifetime whilst genetic markers resolve connectivity and population structure over evolutionary time scales. Thus, these two complementary approaches allow us to unravel individual movements as well as to estimate long term population exchange rates. The application of microchemical analyses (both stable isotopes or trace elements) in population structure generally relies on first establishing baseline references from source groups. There is currently a baseline of otolith stable isotope data for these species from the potential nursery grounds in the Atlantic and Indian Oceans. Expanding this baseline would help to have a temporal continuity and make it more robust. This is needed to make projections of population composition (i.e., nursery origin of adults captured from different fishery grounds) and evaluate whether the stock complexity is being captured by current stock assessment models.

### 3.4 Trophic ecology

Stomachs and muscle tissue will be collected from individuals. Stomach content will be analysed both visually and genetically, to make for the first time a calibration exercise for these species. This will help to determine main prey items consumed by these species. Examination of stable isotope ratios ( $^{13}\text{C}$  and  $^{15}\text{N}$ ) in muscle tissue will provide information on individual trophic position. Together, this information can help to better understand the food web dynamics and energy transfer between and within ecosystems, a prerequisite for ecosystem-based management approach that sustains healthy marine ecosystems and the fisheries they support.

All fish will be measured to the nearest fork length (FL), weighted and sex identified when possible

(max 900 words per activity)

## Text Box 1b: Other data collection activities

### REMASMuest

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### 1. Aim of the data collection activity

To undertake the field campaigns to obtain the necessary data for the evaluation of density, biomass and total stock of shellfish resources (bivalve molluscs, sea urchin, anemones and gooseneck barnacle) and algae (*Gelidium corneum*) for the sustainable exploitation of these resources in the estuaries and coast of the Basque country (northern Spain).

#### 2. Duration of the data collection activity

The data collections are made annually. Twice for bivalve molluscs (summer and winter) and once for the rest of shellfish and algae resources. From 2022 to 2027, in a yearly basis.

#### 3. Methodology and expected outcomes of the data collection activity

##### Bivalve molluscs (clams and cockles):

In each of the three estuaries subject on bivalve mollusc exploitation (clams and cockles) an stratified random sampling methodology is employed. For this a number of 88, 65 and 17 sampling stations are distributed in the Oka, Butroe and Bidasoa estuaries respectively. In each sampling station the first 15 cm of sediments are obtained in a quadrat of 40x40 cm and they are sieved on a 1 mm mesh size to obtain all the specimens.

##### Sea urchin (*Paracentrotus lividus*):

Depending on the extent of the coastal area to be assessed, between 50 and 100 sampling points are distributed between 0 and 10 m



depth in a random sampling methodology. At each sampling point, a photograph is taken with a camera mounted on a tripod with a 50x50 cm square.

**Gooseneck barnacle (*Pollicipes pollicipes*):**

In a selected area of the Basque coast 14 sampling points are distributed. In each sampling point two transects (named a and b) were sampled, with two replicates in each, in which 30 x 30 cm squares were scraped. In each transect, the barnacle cover over an area of 5 metres on each side of the transect, the height of the intertidal at which the barnacle disappears corrected for the tide height of the day and time of sampling, the orientation of the shore at the sampling site and a photograph of the selected sample was obtained.

**Anemones (*Anemonia viridis*):**

In different sub-areas of the areas subject to be exploited a variable number of transects is established between 0 and 15 m depth. The separation distance between transects was of approximately 200 m. In addition, 3 points or stations were defined in each transect (at 2.5 m, 7.5 m and 12.5 m depth). Depending on the extension of the area to be evaluated, the number of sampling point could be between 30 and 50. In each sampling point a visual estimation of the cover and number of individuals was carried out, in an area of 5 metres in the surrounding area. Subsequently, three photographs were taken with anemones, representative of the bottom of that sub-zone (these photographs corresponded to 50x50 cm squares) and with the help of an adapted fork and a net bag with a circular mouth, all the anemones were collected from the square corresponding to the first photograph. In order to know the population structure in each depth band, if the number of anemones was less than 30 individuals, the sample was completed up to 30 individuals, with specimens collected in the area surrounding the corresponding sampling point. Only at those points where the anemone cover was low was this last action not carried out so as not to significantly affect the existing population. A stainless steel structure with an underwater camera attached to the top of it was used to take photographs (Figure 8). The area photographed corresponded to a 50x50 cm box (base of the structure). All this work was carried out by scuba diving.

**Gelidium:**

In three sectors subject of exploitation in the coast of the Basque country, a total number of 30 transects were prospected. In each transect, samples were taken at 4, 8 and 12 m depth. In each sampling point a quadrat of 50x50 cm was scraped. Seaweed samples were stored in plastic bags without water and frozen until laboratory processing.

(max 900 words per activity)

## Text Box 1b: Other data collection activities

### REMASVarBio

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### 1. Aim of the data collection activity

To process the data obtained in the field campaigns for the evaluation of density, biomass and total stock of shellfish resources (bivalve molluscs, sea urchin, anemones and gooseneck barnacle) and algae (*Gelidium corneum*) for the sustainable exploitation of these resources in the estuaries and coast of the Basque country (northern Spain).

#### 2. Duration of the data collection activity

The data collections are made annually. Twice for bivalve molluscs (summer and winter) and once for the rest of shellfish and algae resources. From 2022 to 2027, in a yearly basis

#### 3. Methodology and expected outcomes of the data collection activity

##### Bivalve molluscs (clams and cockles):

Once in the laboratory, the samples were separated, the species of commercial interest identified, the individuals counted, and the biomass calculated in dry weight by drying in an oven at 80° C for 12 hours. Each sampling point is representative of a certain area of the intertidal

that was calculated from aerial images geo-referenced in a Geographic Information System (GIS). Thus, by multiplying the biomass determined at each of the sampling points by the corresponding area, the stock in tonnes for each of them is obtained. The sum of all of them would determine the total stock of the estuary. Other parameters were the length, measured along the longest axis using a calliper to the lower millimetre and age, calculated from growth rings for each specimen.

To determine significant differences in stock abundance, density, and biomass by zones within the estuary and by time, the corresponding comparisons were carried out using the non-parametric Kruskal-Wallis test, with the Mann-Whitney U test as a posteriori test. To determine temporal trends in stock abundance, density and biomass, either by zones or for the estuary as a whole, a simple linear regression analysis was carried out between the values of each parameter and time.

#### **Sea urchin (*Paracentrotus lividus*):**

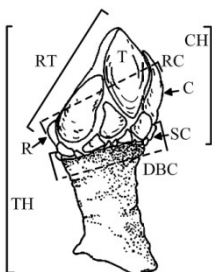
The photographs taken at each of the sampling stations were processed using ImageJ software. ImageJ is a public domain Java image analysis program inspired by NIH Image for Macintosh. Versions for Windows, Mac OS, Mac OS X and Linux are available on the web at <http://rsbweb.nih.gov/ij/>. There is also a user help Wiki: <http://imagejdocu.tudor.lu/doku.php>. This software was used to count the number of individuals at each sampling station, as well as to measure their total diameter (including barbs) from the image calibrated with the reference of the 50 cm side of the sampling square. Thus, considering the biometric ratios calculated by Bald et al. (2008) it was possible to determine, from the measurements made with ImageJ, the body diameter and weight of the individuals photographed at each sampling station.

Based on the information collected in situ, the following biological parameters were calculated for each of the stations: (i) the density in individuals per square metre; (ii) the biomass per square metre for each station; (iii) percent cover; (iv) percentage of compliance with the minimum legal catch size; (v) total and exploitable stock.

#### **Gooseneck barnacle (*Pollicipes pollicipes*):**

Once the samples had been thawed, they were processed, separating and cleaning each sample and specimen, removing stones, mussels, algae, etc. Subsequently, each sample was processed as follows:

- Count all individuals (adults and juveniles).
- Weigh each individual fresh. From the individual weights, the total weight of each sample was calculated by summing each value.
- Measure each individual, using a digital caliper. Three measurements were taken: (a) the total length of the individual (TH) (including the capitulum or nail and the peduncle or foot); (b) the length of the capitulum (RT); and (c) the diameter of the base of the capitulum (DBC), distance between the base of the rostrum (R) and the apex of the subcarina (SC), according to the following scheme:



With the data collected in the previous section, the following steps were taken:

- Establish distribution maps in the selected area.
- Determine the density ( $\text{ind} \cdot \text{m}^{-2}$ ) and biomass ( $\text{kg} \cdot \text{m}^{-2}$ ) of the resource at each sampling point.
- Assess the quantity (stock) of the resource available.

For the monitoring of barnacle catches in the coastal sections under study, professional shellfish gatherers were provided with a logbook in which to keep a record of their catches.

#### **Anemones (*Anemonia viridis*):**

Anemone data (presence/absence, abundance, distribution) were integrated into a Geographic Information System for later representation and analysis together with other sources of information.

Based on the information collected on site, the following parameters were calculated: (i) Average total and exploitable density of individuals; (ii) Average total and harvestable biomass; (iii) Percentage of average coverage; (iv) Percentage of compliance with the minimum legal catch size; (v) Total and exploitable stock.

In addition, distribution maps of the resource in the selected area were generated.

Once the availability of the resource in the study area had been determined in accordance with the methodology described in the previous section, and given that its possible exploitation could be assumed, at least in part, a plan for the exploitation of the anemone in the selected area was drawn up.

#### **Gelidium:**

In the laboratory, the epiphytes were separated and their dry weight and that of *Gelidium* were determined by drying at 70°C for 48 hours. The fronds were measured from base to apex, to the lower half centimetre, distinguishing 1 cm size classes. Based on the information collected on site, the total biomass of *Gelidium* was calculated for each sector and temporal trends were studied (between 1983 and this days) related to human activities and environmental factors such as light, temperature (both positive action) and wind (negative action or casting off).

(max 900 words per activity)

### **Text Box 1b: Other data collection activities**

#### **GENGES**

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

#### **1. Aim of the data collection activity**

Genetic analyses of marine organisms can provide information about evolution, structure and ecology of the species, populations and communities. This knowledge can be key for improving marine ecosystems and marine resources management. The aims of the study are:

- To determine the connectivity among populations of commercial fish species such as hake, sardine, anchovy, mackerel, anglerfish, bluefin, skipjack and bigeye tunas to define management units and to assign catches to origin.
- To assess genetic diversity and adaptation potential of commercial fish species to determine their resilience to pressures such as fishing and climate change.
- To evaluate alternative genetics-based approaches such as close-kin mark recapture (CKMR) to estimate spawning stock biomass of commercial fish species.
- To establish environmental DNA (eDNA) analyses as alternative to traditional approaches for monitoring fish diversity, abundance and distribution as well as to understand trophic webs.
- To evaluate other less mature genetic methods such as epigenetic age determination for ageing as tools for easing fisheries assessment.
- To transfer acquired knowledge and data to assessment and evaluation groups as well as to decision-making agents.

This Project is recognized as research activity as part of the data gathering operational program of Spain (section 13.1)

#### **2. Duration of the data collection activity**

Six years (2022-2027) in a yearly basis.

#### **3. Methodology and expected outcomes of the data collection activity**

The aims of the study will be achieved by a series of tasks that will be performed in parallel:

- To determine connectivity, we will collect tissue samples of identified species using scientific surveys and commercial catches. For each species, sampling design will be performed according to the question of interest and distribution of the species. We will use state of the art genetic methods such as restriction site associated DNA sequencing and low coverage whole genome sequencing to identify informative genetic markers such as Single Nucleotide Polymorphisms (SNPs), insertions/deletions, inversions etc. Using these markers, evolutionary significant units will be identified. **OUTCOME 1: Population structure of**

commercial fish species in the Northeast Atlantic; OUTCOME 2: Diagnostic SNP panels for origin assignment.

- Using previously identified genetic markers, we will perform genetic-environment association studies to identify markers under selection that could indicate adaptation to changing conditions. OUTCOME 3: Report on the adaptive potential of selected commercial fish species including genetic markers under selection.
- Evaluation of CKMR for spawning biomass estimations will be performing by: i) assessing the most suitable species for application of this method considering their biological parameters and sampling logistics, ii) establishing a network for regular collection of tissue samples as we anticipate that in the order of thousands will be needed, iii) generating a genetic chip that will allow to analyse thousand of genetic markers in a cost-effective way, iv) identifying kins using the genetic chip and applying the CKMR model in order to estimate SSB based on the number of kins found. OUTCOME 4: report on the suitability of Northeast Atlantic fish commercial species for application of CKMR; OUTCOME 5: Sampling design for CKMR studies of selected species. OUTCOME 6: SNP ship to determine kins for selected species; OUTCOME 7: Estimation of SSB based on CKMR analyses of selected fish species.
- Establishment of eDNA analyses as alternative to traditional approaches will be performed by analysing eDNA from a wide range of samples including water samples collected in the Bay of Biscay at different seasons and depths, including in protected and non-protected areas. Obtained taxonomic information derived from genetic data will be compared to estimates using catches, sightings and acoustics. OUTCOME 8: eDNA derived estimates of fish diversity, abundance and distribution in the Bay of Biscay. OUTCOME 9: Standardized procedures for application of eDNA for routine monitoring.
- Evaluation of less mature methods such as epigenetics for ageing will be performed by literature searches, knowledge sharing among colleagues and small pilot studies such as comparisons of epigenetic and otolith-based reading age estimations in fish of known age. OUTCOME 10: report on new avenues on the application of genetic methods for fisheries management
- Knowledge transfer will be achieved through assistance to ICES, ICCAT and IOTC working groups, as well through communication of results to relevant stakeholders at the regional, national and international levels. OUTCOME 11: Report of the communication and knowledge activities performed

(max 900 words per activity)

## Section 2: Biological Data

### Text Box 2.3: Diadromous species data collection in freshwater

General comment: This Textbox fulfils Article 5(2)(a), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II, point 2.1(b) and point 2.3 of the EU MAP Delegated Decision annex. Use this text box to give an overview of the methodology used for the data collected from freshwater commercial fisheries for salmon, sea trout and eel, and from research surveys on salmon and sea trout in freshwater, and on eel in any relevant habitat including coastal waters.

Method selected for collecting data. (MS should briefly describe the method for collecting the variables presented in Table 2.3. Detailed descriptions are to be included in Annex 1.1. If variables are not directly collected but estimated the method of estimation should be described here.)

#### ***Anguilla anguilla***

In Spain, each autonomous region constitutes an eel management unit. In some of the regions sampling for the determination of the required parameters are already taking place; but not in others. For these EMUs where sampling design needs to be developed it is not possible to give much detail about the sampling design.

The SUDOANG project has compiled various eel information from Spain that can be found at:

- Electrofishing data from the SUDOANG project are hosted at <https://bit.ly/3ilgrtT>.
- Recruitment and estimated escapement data can be downloaded from the interactive tool VISUANG

(<https://sudoang.eu/en/visuang/>)

- Data generated in the Oria, Ter and Guadiaro catchments can be downloaded from the interactive tool VISUANG (<https://sudoang.eu/en/visuang/>)

### **ES-Basque Country (ES-Bas)**

The Basque country has used the SUDOANG protocols to sample recruitment, Standing Stock and silvering eels.

<https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip>

1) The abundance of recruits will be estimated by:

- a. Monthly samplings of the glass eel entrance in the estuary using sieve trawling during the maximum recruitment period (October- February). Sampling includes the measurement of length and weight.
- b. Using the glass eel fishery catch and effort data compiled in the daily catches report.
- c. Sampling daily the eel entrance in a fish trap located in the tidal limit of the Oria River during the migration period (May-October). Sampling includes the measurement of length and weight.

2) The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys in 25 sampling points. Sampling includes the measurement of length and weight.

3) The number or weight and sex ratio of emigrating silver eels will be determined applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys. Sampling includes the measurement of length and weight.

### **EMU\_ES\_Asturias (EMU\_ES\_Astu)**

1) The abundance of recruits will be estimated using the glass eel fishery catch and effort data.

2) The length and weight of glass eel will be taken from 50 individuals monthly sampled from Nalon and Ribadesella fish market, from October to February.

3) The abundance of the standing stock (yellow eel) will be determined by electrofishing surveys. The length and weight of the yellow eels will be taken for each individual obtained from the electrofishing surveys.

3) The number or weight and sex ratio of emigrating silver eels will be determined applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys. The length and weight of the silvering eels will be taken for each individual obtained from the electrofishing surveys.

### **EMU\_ES\_Galicia (EMU\_ES\_Gali)**

1) The abundance of the standing stock (yellow eel); will be determined from electrofishing surveys.

2) The abundance of silver eels will be derived from electrofishing surveys

### **EMU\_ES\_Murcia (EMU\_ES\_Murc)**

- The abundance of recruits (eelglass) will be determined by sampling with specific trap gear.

- The proportion of yellow and silver eels as well as their size and weight will be determined by sampling the catches from the Mar Menor fishery.

### **EMU\_ES\_Valencia (EMU\_ES\_Vale)**

1) The abundance of recruits will be estimated using the glass eel fishery catch and effort data compiled in the daily catches report. Sampling includes the measurement of length and weight of 150 glass eel

2) The abundance of the standing stock (yellow and silver eel) will be determined by electrofishing surveys in 10 river sampling points.

3) The number or weight and sex ratio of emigrating silver eels will be determined by sampling of 100 individuals obtained from the Albufera fishery catches.

### **EMU\_ES\_Cantabria (EMU\_ES\_Cant)**

1) The abundance of recruits will be estimated using the glass eel fishery catch and effort data and if possible using fishery independent methods once an appropriate sampling design is defined

2) The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys.

3) The number or weight and sex ratio of emigrating silver eels will be determined applying Durif et al. (2003; 2005) to the eels obtained in

the electrofishing surveys.

#### **EMU\_ES\_Cataluña (EMU\_ES\_Cata)**

1) The abundance of recruits will be obtained by:

- a. Scientific based sampling. Monthly samplings of the glass eel entrance in the estuary using fyke nets with fine mesh during the maximum recruitment period (October-March). A subsampled kept to obtain length and weight measures of 50 individuals.
- b. Commercial based sampling. Using the glass eel fishery catch and effort data compiled in the daily catches report from 8 fishermen guilds. Commercial catches are allowed from October to March.

2) The length and weight of the glass eel stage will be obtained by:

- a. Scientific based sampling. A subsampled of monthly sampling will be kept to obtain length and weight measures of 50 individuals.
- b. Commercial based sampling. Measuring 50 individuals from 4 sites, 3 times during the fishing season.

2) The abundance of the standing stock (yellow eel and silver eel) will be determined in the Ter river by electrofishing surveys in 17 sampling points per year. The Sudoang protocol will be applied.

3) All individuals caught during electrofishing surveys will be measured (length and weight). The number, size and sex ratio of emigrating silver eels will be determined applying Durif et al. (2003; 2005). The Sudoang protocol will be applied.

#### **EMU\_ES\_Navarra (EMU\_ES\_Nava)**

Eel has disappeared in most of this EMU; and the population is restricted to the lower part of the Bidasoa River.

1) The abundance of recruits won't be estimated since Bidasoa River estuary is located below the limits of Navarra territory (between the Basque Country and France)

2) The abundance and length of the standing stock (yellow eel) will be determined by electrofishing surveys in October each year.

3) The number, length, weight and sex ratio of emigrating silver eels will be determined applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys in October each year

#### **EMU\_ES\_Andalucía (EMU\_ES\_And)**

1) Abundance is estimated:

- a. Sampling is carried out annually in the winter-spring months, between December and April. They begin after the first heavy winter rains and are only sampled when the intensity of lunar light does not exceed 60%.
- b. Forty sampling points are sampled using eel and shrimp traps. Twenty pots (10 per shore alternating eel and shrimp traps) are placed approximately 20 meters apart. They are fixed with corrugated steel bars nailed to the bed with a hammer. Their location will be recorded with GPS when the satellite error is less than 6 meters.
- c. The pots are collected after 48 hours and lifted in the same order in which they were placed (from the starting point to the end). The catches of each of the pots are processed independently on the shore.
- d. Data are taken on length, weight, eye diameter, presence or absence of lateral line and pectoral fin coloration. Once the biometric data have been collected, the specimens are returned to the water as close as possible to the stretch where they were captured.

### ***Salmo Salar***

#### **Navarra**

There is no professional fishing targeting *Salmo salar* (only recreational)

1) The abundance and length of parrs will be determined by electrofishing surveys in September each year.

2) The number, biometric data (length, height, maxilla length and weight), age (scales reading), sanitary status (Red Vent Syndrome, presence of sea lice, wounds, etc.), origin (wild or fish farm) and sex of all adult salmon captured in the fish trap (Bera Salmonid Monitoring Station) during the upstream migration will be determined.

3) The number, biometric data (length, height, maxilla length and weight), age (scales reading), sanitary status (Red Vent Syndrome, presence of sea lice, wounds, etc.), origin (wild or fish farm) and sex of all adult salmon captured by anglers during the angling season downstream of the fish trap (Bera Salmonid Monitoring Station) will be determined.

### **Galicia**

- 1) The abundance of parr will be derived from electrofishing surveys.
- 2) The abundance of smolts will be derived from numbers in the fish trap.
- 3) Abundance of adults will be estimated from recreational catch and fish trap numbers.
- 4) Biometry of adults will be derived from recreational catch and fish trap samples.

### **Cantabria**

Salmon is sampled in all of the rivers with current salmon presence. Adults are sampled by traps and parrs by electric fishing

### **Basque Country**

Salmon fishing is not allowed in the Basque Country. In the 1980s, salmon had disappeared from all Basque rivers. Nowadays, they have recolonised several rivers and the species is sampled in all of the rivers with current salmon presence. Adults are sampled by traps, parrs by electric fishing and smolts by smolt trapping (rotary screwtrap) in one of the basins (Urumea).

### **Asturias**

There is a recreational salmon fishery in Asturias. The species is sampled in all of the rivers with current salmon presence. Adults are sampled by traps (sampled every 1-2 days.) and parrs by electricfishing. In addition, there is an annual underwater Visual Census: once a year 2 divers enter each river and make an assesment of the population.

## ***Salmo trutta (sea trout)***

### **Navarra**

- 1) The number, biometric data (length, height and weight), age (scales eading) and sex of all sea trout captured in the fish trap (Bera Salmonid Monitoring Station) during the upstream migration will be determined.
- 2) The number, biometric data (length, height and weight), age (scales eading) and sex of all sea trout captured by anglers during the angling season downstream of the fish trap trap (Bera Salmonid Monitoring Station) will be determined.

### **Galicia**

- 1) An index of abundance will be derived from density in the lowest reach of rivers, obtained from electrofishing surveys
- 2) An index of abundance of adults will be estimated from recreational catch and fish trap numbers.
- 3) Biometry of adults will be derived from recreational catch and fish trap samples.

### **Cantabria**

This species is not very abundant in this management unit. Therefore, there is no specific sampling for it. However, when it appears sporadically in sampling for other species, this information is noted and the specimen is measured and weighed.

### **Asturias**

This species is not very abundant in this management unit. Therefore, there is no specific sampling for it. However, when it appears sporadically in sampling for other species, this information is noted and the specimen is measured and weighed.

### **Basque Country**

This species is not very abundant in this management unit. Therefore, there is no specific sampling for it. However, when it appears sporadically in sampling for other species, this information is noted and the specimen is measured and weighed.

(max 250 words per species and area)

## **Text Box 2.4: Recreational Fisheries**

### **North-East Atlantic**

General comment: This text box fulfils Article 5(2)(a), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II, point 2.2 of the EU MAP Delegated Decision annex. Use this text box to give an overview of the methodology used for the data collected on marine and freshwater recreational catches.

Description of the sampling scheme/survey according to Table 2.4.

In the case of Highly migratory species [SelfOnShore\_recreational (off site surveys)], the data are collected by declaration of fishermen on the basis of Article 10 of RD 347/2011 (<https://www.boe.es/eli/es/rd/2011/03/11/347>).

For other species see table 2.4 and annex 1.1

(max 900 words per region)

## **Text Box 2.4: Recreational Fisheries**

### **Mediterranean Sea and Black Sea**

General comment: This text box fulfils Article 5(2)(a), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II, point 2.2 of the EU MAP Delegated Decision annex. Use this text box to give an overview of the methodology used for the data collected on marine and freshwater recreational catches.

Description of the sampling scheme/survey according to Table 2.4.

In the case of Highly migratory species [SelfOnShore\_recreational (off site surveys)], the data are collected by declaration of fishermen on the basis of Article 10 of RD 347/2011 (<https://www.boe.es/eli/es/rd/2011/03/11/347>).

For other species see table 2.4 and annex 1.1

(max 900 words per region)

## **Text Box 2.5: Sampling plan description for biological data**

### **North Sea and Eastern Arctic. (Eastern Arctic, Norwegian Sea and Barents Sea (ICES areas 1, 2, FAO area 27))**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes



No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **North-East Atlantic. (North-East Atlantic and Western Channel (ICES areas 5, 6, 7 (excl. 7d), 8, 9, 10, 12 and 14, FAO area 27))**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **Mediterranean Sea and Black Sea (GFCM GSA 1-29, FAO area 37)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **The outermost regions. (EU waters around Canary islands (FAO area 34.1.2))**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **Other regions. (North-West Atlantic (FAO area 21). NAFO)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

The out-of-frame parts of the population in all NAFO regions are =0, so no unsampled frames have been included in the table 2.5 for this RFMO.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **Other regions. (Eastern Central Atlantic (FAO area 34). CECAF)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

ESP-IEO\_P3\_AtSea\_Africa

Sampling plans are highly conditioned by both the signing of new agreements (SFPA) and their Protocols, which means that they are variable, not stable over time.

The EU currently has Sustainable Fisheries Partnership Agreements (SFPAs) for mixed fisheries (including demersal and/or small pelagic fisheries) with Morocco, Mauritania, Senegal, The Gambia and Guinea-Bissau. It should be noted that the EU-Morocco SFPA expired in July 2018, being the latest SFPA signed in 2019 and therefore, no fishery during almost one year between one agreement and the other. The fishery in Guinea-Bissau was ceased in November 2017, when the Protocol expired, and resumed in July 2019, after the signature of the current Protocol. In Senegal, the current SFPA (2014) and their two Protocols (2014 and 2019) included the possibility of a deep-sea trawl fishery targeting black hakes, that had been inactive since 2006. Also, the ratification of the EU SFPA with The Gambia in 2020 meant the reactivation of a fishing ground for EU black-hake trawlers that had not been accessible under an agreement since 1996. The fisheries in Mauritania are currently developed through an extension of the latest SFPA, while the negotiations for a new SFPA are still in place.

For more information about the SFPAs see the following EU web:

[https://ec.europa.eu/oceans-and-fisheries/fisheries/international-agreements/sustainable-fisheries-partnership-agreements-sfpas\\_en](https://ec.europa.eu/oceans-and-fisheries/fisheries/international-agreements/sustainable-fisheries-partnership-agreements-sfpas_en)

Additional description on sampling frames

ESP-IEO\_P3\_AtSea\_Africa - OTB\_CRU\_>=40\_0\_0

The observation programme on board shrimp vessels operating in Mauritania and Guinea-Bissau alternates both fishing grounds on an annual basis.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## Text Box 2.5: Sampling plan description for biological data

### Other regions. (Atlantic Ocean and adjacent seas (FAO areas 21, 27, 31, 37, 41, 47, 34, 48). ICCAT)

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

In tuna fisheries the out-of-frame parts of the population in all ICCAT regions are =0 in all sampling schemes, so no unsampled frames have been included in the table 2.5 for this region/RFMO.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **Other regions. (Indian Ocean (FAO area 51 and 57). IOTC)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

In tuna fisheries the out-of-frame parts of the population in all IOTC regions are =0 in all sampling schemes, so no unsampled frames have been included in the table 2.5 for this region/RFMO.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 2.5: Sampling plan description for biological data**

#### **Other regions. (Western Central Pacific (FAO area 71). WCPFC)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

In tuna fisheries the out-of-frame parts of the population in all WCPFC regions are =0 in all sampling schemes, so no unsampled frames have been included in the table 2.5 for this region/RFMO.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## **Text Box 2.5: Sampling plan description for biological data**

### **Other regions. (Eastern Central Pacific (FAO area 77 and 87). IATTC)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

In tuna fisheries the out-of-frame parts of the population in all IATTC regions are =0 in all sampling schemes, so no unsampled frames have been included in the table 2.5 for this region/RFMO.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## **Text Box 2.5: Sampling plan description for biological data**

### **Other regions. (Antarctic and Southern Indian Ocean (FAO area 48, 58 and 88). CCAMLR)**

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight additional information on sampling schemes and sampling frames that the Member State considers useful to understand the sampling design planned for the region and the implementation year(s).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## Text Box 2.6: Research surveys at sea

### FLEMISH CAP GROUND FISH SURVEY

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **FLEMISH CAP GROUND FISH SURVEY**

Acronym: FCGS

National Name of the research survey: **Flemish Cap**

#### 1. Objectives of the survey

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

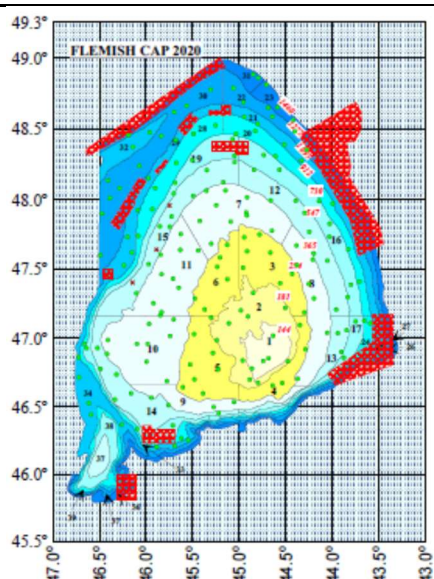
- Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, maturity and the collection of otoliths and gonads. For other species only length and length-weight sampling are performed.
- Observation of the oceanographic conditions on the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

Target species: Cod (*Gadus morhua*), Redfish (*Sebastes mentella*, *S. fasciatus* and *S. norvegicus*), American plaice (*Hippoglossoides platessoides*), Greenland halibut (*Reinhardtius hippoglossoides*), Roughhead grenadier (*Macrourus berglax*) and Northern shrimp (*Pandalus borealis*)

#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

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

Bottom trawl fishing hauls that lasting for 30 minutes and are distributed using a stratified random sampling scheme. The trawling gear used is the Lofoten (NAFO 1990). Temperature and salinity profiles are taken with a CTD according to a predefined square grid. The survey starts in the second half of June, and needs 35 days at sea.



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Participants: Spain (IEO-CSIC and IIM-CSIC) and Portugal (IPMA)

Research vessel: R/V Vizconde de Eza.

Relevant international planning group: Portuguese-Spanish surveys in Flemish Cap - coordination meeting for the survey (FCCM)

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Spain contributes with vessel, staff and samples analysis in laboratory and Portugal contributes with staff and samples analysis in laboratory.

There is not signed agreement about task sharing.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### 3LNO GROUND FISH SURVEY. (1st part -3NO)

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **3LNO GROUND FISH SURVEY** (1st part -3NO)

Acronym: PLATUXA

National Name of the research survey: **Platuxa**

#### 1. Objectives of the survey

The main objectives of the survey are the estimation of abundance and biomass index of the target species, as well as the knowledge of their population demographic structure and the oceanographic conditions on the Grand Bank (NAFO Division 3NO). To this end the following tasks are implemented:

- Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, maturity and the collection of otoliths and gonads. For other species only length and length-weight sampling are performed.

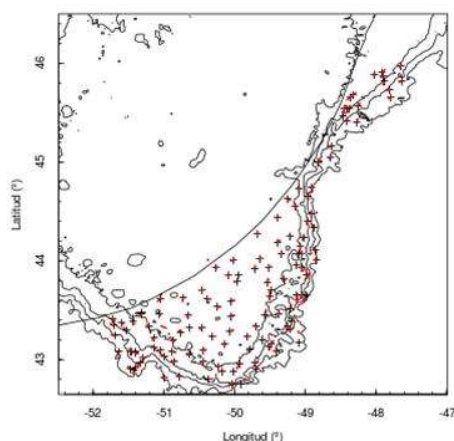
- Collection of oceanographic data from the area using a CTD at the end of each fishing-haul.
- Collection of catch data (weight and number) of invertebrates with special attention to corals and sponges, to allow identification of potentially vulnerable marine ecosystems.
- Sampling biennial of stomach contents of the main species to continue the study of their trophic relationships (even years).
- Collection of marine litter data classified in different items or codes, according to their characteristics.

Target species: Cod (*Gadus morhua*), Redfish (*Sebastes spp.*), American plaice (*Hippoglossoides platessoides*), Yellowtail flounder (*Limanda ferruginea*), Witch flounder (*Glyptocephalus cynoglossus*), Black dogfish (*Centroscyllium fabricii*), Thorny skate (*Amblyraja radiata*); White hake (*Urophycis tenuis*), Greenland halibut (*Reinhardtius hippoglossoides*), Northern shrimp (*Pandalus borealis*), Roughhead grenadier (*Macrourus berglax*) and Shortfinned squid (*Illex illecebrosus*).

## 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual: [http://www.repositorio.ieo.es/e-geo/bitstream/handle/10508/632/PROTOCOLO%20CAMPAC3%91A%203LNO%20GROUNDFISH%20SURVEY\\_v2-revisi%C3%B3n%20enero%202013%20\(2\).pdf?sequence=9](http://www.repositorio.ieo.es/e-geo/bitstream/handle/10508/632/PROTOCOLO%20CAMPAC3%91A%203LNO%20GROUNDFISH%20SURVEY_v2-revisi%C3%B3n%20enero%202013%20(2).pdf?sequence=9)

Stratified random sampling scheme, diurnal Bottom trawl fishing hauls from 6 am to 9.30 pm with an average hauling time of 30 minutes. The trawling gear used is the 'Campelen 1800'. Hydrographic profiles by haul are taken with a CTD. In NAFO Division 3NO there are planned 30 days at sea including sailing days.



## 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Spain is the only participant. The vessel is RV Vizconde de Eza.

## 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Not applicable.

(max 450 words per survey)

### Text Box 2.6: Research surveys at sea

#### 3LNO GROUNDFISH SURVEY. (2nd part -3L)

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **3LNO GROUNDFISH SURVEY** (2nd part -3L)



Acronym: PLATUXA

National Name of the research survey: **Fletán Negro 3L**

### 1. Objectives of the survey

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

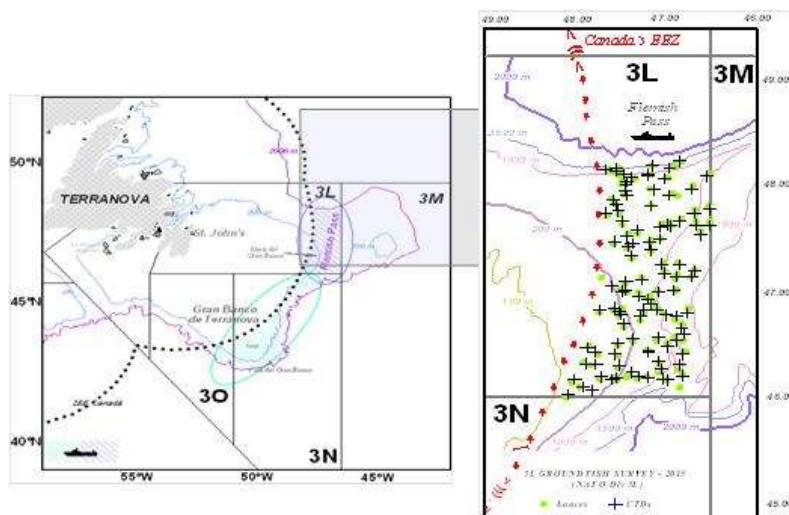
- Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, and the collection of otoliths and gonads. For other species only length and length-weight sampling were performed.
- Collection of oceanographic data data from the area using a CTD at the end of each fishing-haul.
- Collection of catch data (weight and number) of invertebrates with special attention to corals and sponges, to allow identification of potentially vulnerable marine ecosystems.
- Sampling biennial of stomach contents of the main species to continue the study of their trophic relationships (even years).
- Collection of marine litter data classified in different Items or codes, according to their characteristics.

Target species: Cod (*Gadus morhua*), Redfish (*Sebastes spp.*), American plaice (*Hippoglossoides platessoides*), Witch flounder (*Glyptocephalus cynoglossus*), Thorny skate (*Amblyraja radiata*), Greenland halibut (*Reinhardtius hippoglossoides*), Northern shrimp (*Pandalus borealis*), Roughhead grenadier (*Macrourus berglax*) and Black dogfish (*Centroscyllium fabricii*)

### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual: [http://www.repositorio.ieo.es/e-  
ieo/bitstream/handle/10508/632/PROTOCOLO%20CAMPA%C3%91A%203LNO%20GROUND FISH%20SURVEY\\_v2-  
revisi%C3%B3n%20enero%202013%20\(2\).pdf?sequence=9](http://www.repositorio.ieo.es/e-<br/>ieo/bitstream/handle/10508/632/PROTOCOLO%20CAMPA%C3%91A%203LNO%20GROUND FISH%20SURVEY_v2-<br/>revisi%C3%B3n%20enero%202013%20(2).pdf?sequence=9)

Stratified random sampling scheme, diurnal Bottom trawl fishing hauls from 6 am to 9.30 pm with an average hauling time of 30 minutes. The trawling gear used is the 'Campelen 1800'. Hydrographic profiles by haul are taken with a CTD. In NAFO Division 3L there are planned 28 days at sea including sailing days.



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Spain is the only participant. The vessel is RV Vizconde de Eza.

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Not applicable.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Western IBTS 4th quarter (including porcupine survey). (8c y 9a north)

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Western IBTS 4th quarter (including porcupine survey). (8c y 9a north)**

Acronym: IBTS\_Q4

National Name of the research survey: **Demersales**

Identifier in assessment working groups: **WIBTS-SPNSGFS-Q4-**

#### 1. Objectives of the survey

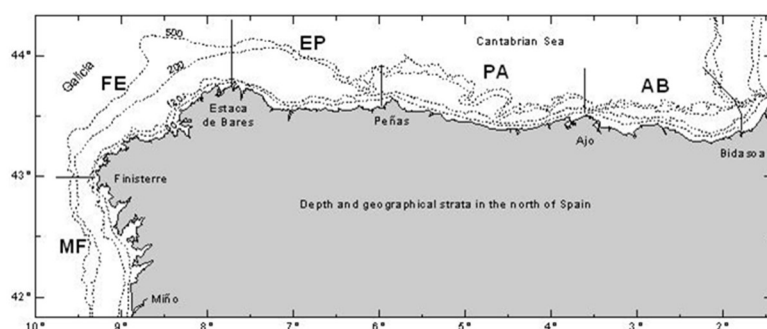
- Estimation of abundance indices by age of megrim (*Lepidorhombus boscii* and *L. whiffiagonis*), blue whiting, horse mackerel and mackerel, as well as indices by size class of hake and monkfish (*Lophius budegassa* and *L. piscatorius*),
- Estimation of the recruitment strength of the species mentioned, mainly hake, monkfish and megrims.
- Estimation of abundance indices (number and biomass) of other demersal species of fishing interest (Norway lobster, sparids, etc), as well as the fauna associated to them.
- Determination of geographical and bathymetric distribution of the different species.
- Obtaining the length distributions of all species of fish, Norway lobster and main cephalopods in the catches.
- Collecting biological data of the main commercial species: maturity stages, sex ratio, etc...
- Getting oceanographic data.

#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual for the International Bottom Trawl Surveys

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2010%20%E2%80%93%20Revisi%20n%2011%20Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2010%20%E2%80%93%20Revisi%20n%2011%20Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf)

Stratified random sampling based on 30 minutes bottom trawl hauls during day light, getting abundance indices stratified by haul. Sampling for abundance indices covers the depths between 70 and 500 m and is stratified random, the hauls are allocated in 15 strata determined by combining 3 depth strata (70-120m, 121-200 m and 201-500m) and five geographical sectors. Hauls allocation is proportional to the area of each stratum.



#### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Miguel Oliver; Portugal/Mar Portugal

Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES

#### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

### Text Box 2.6: Research surveys at sea

#### Western IBTS 4th quarter (including porcupine survey). (9a south)

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Western IBTS 4th quarter (including porcupine survey). (9a south)**

Acronym: IBTS\_Q4

National Name of the research survey: **Arsa-otoño**

##### 1. Objectives of the survey

- -Estimate distribution and relative abundance the main commercial species and provide recruitment indices.
- -Monitor changes in the stocks of commercial fish species independently of commercial fisheries data.
- -Monitor the distribution and relative abundance of all fish and invertebrates species.
- -Collecting data for the determination of biological parameters for selected species;
- -Collecting hydrographical and environmental information.

##### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

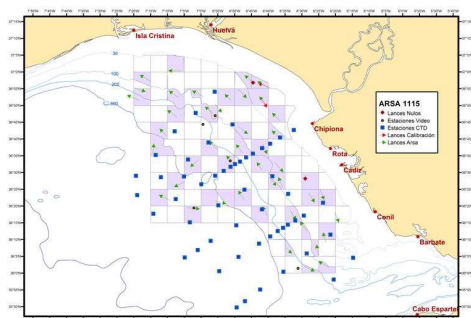
Manual for the International Bottom Trawl Surveys

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2010%20%E2%80%93%20Revisi%C3%B3n%202011\\_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2010%20%E2%80%93%20Revisi%C3%B3n%202011_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf)

The whole area (7224 km<sup>2</sup>) has been separated into five depth strata (15-30, 31-100, 101-200, 201-500 and 501-800 m). The sampling design is random stratified with proportional allocation with a total of 42 fishing stations and swept-area method.

Length distribution of all fish and main species of crustacean and cephalopods are collected and biological parameters are obtained in the most important commercial species

Temperature and salinity are collected during each tow with a CTD attached to the gear. A CTD by haul will be carried out in the survey area.



**3. For internationally coordinated surveys, describe the participating Member States/vessels.**

UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Miguel Oliver; Portugal/Mar Portugal.

Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES

**4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

**Text Box 2.6: Research surveys at sea**

**Western IBTS 4th quarter (including porcupine survey).(7ck)**

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Western IBTS 4th quarter (including porcupine survey).** (7ck)

Acronym: IBTS\_Q4

National Name of the research survey: **Porcupine**

Identifier in assessment working groups: **WIBTS-SPPGFS-Q3 / SP-PORC**

**1. Objectives of the survey**

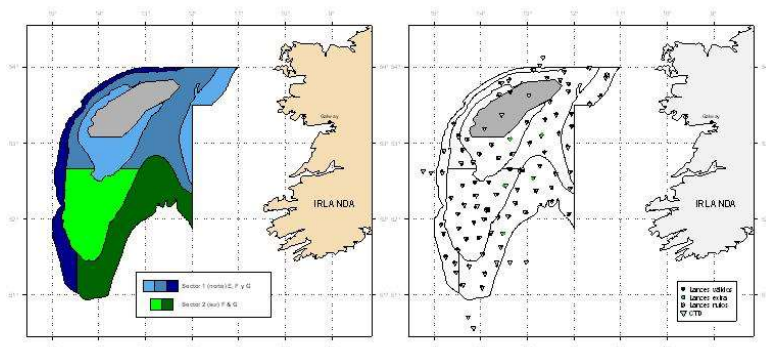
- To estimate stratified abundances indices by age of megrims (*L. whiffiagonis*) and by length of hake (*Merluccius merluccius*), monkfishes (*Lophius budegassa* and *L. piscatorius*), four spotted megrim (*L. boschii*), Norway lobster (*Nephrops norvegicus*) and other fish species.
- To estimate recruitment indices and spatial trends of younger ages of hake, megrims and monkfishes.
- To estimate stratified abundances indices of commercial fish species (*N. norvegicus*, *Phycis blennoides*, *Helicolenus dactylopterus*, *Molva molva*, *Conger conger*)
- To describe the spatial distribution patterns of demersal and benthic species on Porcupine Bank.
- To collect otoliths and biological parameters of the main commercial fish species (hake, megrims, anglerfishes, *H. dactylopterus*....)
- To collect data for the determination of biological parameters for the demersal species selected by DCF.
- To collect hydrographic data.

**2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

Manual for the International Bottom Trawl Surveys

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2010%20%E2%80%9320Revision%2011\\_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2010%20%E2%80%9320Revision%2011_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf)

The sampling design was random stratified with two geographical sectors (Northern and Southern) and three depth strata (180-300 m, 301–450 m and 451-800 m). Hauls allocation is proportional to the strata area following a buffered random sampling procedure.



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Vizconde de Eza; Portugal/Mar Portugal  
 Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Blue Whiting Survey

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Blue Whiting Survey**

Acronym: IBWSS

National Name of the research survey: **Blue Whiting**

#### 1. Objectives of the survey

The survey aims to determine the distribution and abundance at age and length of the Northeast Atlantic blue whiting stock during the spawning season to the west of Britain and Ireland, and a physical, chemical and biological characterization of the pelagic ecosystem. This estimate is used as a tuning index by ICES to determine the size of the population and the results are submitted annually to WGWIDE.

#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual for International Pelagic Surveys (IPS)

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20\(IPS\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20(IPS).pdf)

Systematic grid with random start, tracks 21 nmi apart, from self-break in the eastern limit to 13°W in the western limit, following the methodology defined in the "ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.1" The Spanish part of the International Survey is located in a polygon showed below in the area called Porcupine Seabight (Strata n° 7).

The Acoustic data are collected using a Simrad EK80 scientific echosounder at 18-38-70-120-200 kHz. Day/night observation. Pelagic

fishing stations to identify the species composition of the acoustic recordings. Hydrological characterisation (CTD).



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

The survey is performed in collaboration with research vessels from Ireland (R/V Celtic Explorer), Faroe Islands (R/V Jakup Sverri), Netherlands (R/V Tridens) and Norway (R/V Vendla), and coordinated by the ICES Working Group on International Pelagic Surveys (WGIPS). During the survey effort was refined and adjusted by the survey coordinator (Norway) using real time observations.

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

The IBWSS is carried out by three EU MSs (Ireland, Netherlands and Spain), and two non EU MSs, each contributing with its own vessel. Cost sharing: the operational costs of the vessels are shared by EU MSs applying an allocation key proportional to national share of the EU TAC.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### International Mackerel and Horse Mackerel Egg Survey (triennial).

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **International Mackerel and Horse Mackerel Egg Survey (triennial) (march april)**

Acronym: MEGS

National Name of the research survey: **Careva**

#### 1. Objectives of the survey

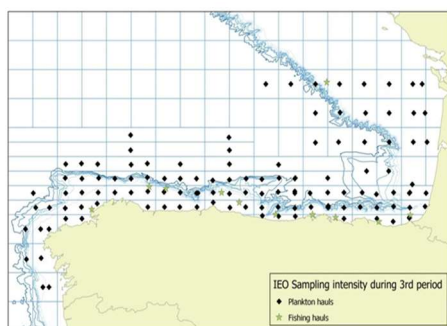
- This survey (CAREVA) provides indices for the strength of the SSB and a relative abundance index of Atlantic mackerel (*Scomber scombrus*) spawning stock.
- Egg production and spawning area estimation for both mackerel and horse mackerel.
- Fecundity estimation
- Determine the egg distribution area and density of other commercial species (hake, sardine, etc.)
- Characterise the main oceanographic conditions of the surveyed area

## 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual for the Mackerel and Horse Mackerel Egg Surveys.

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%206%20Manual%20for%20the%20mackerel%20and%20horse%20mackerel%20egg%20surveys,%20smapping%20at%20sea\\_Jan%202019.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%206%20Manual%20for%20the%20mackerel%20and%20horse%20mackerel%20egg%20surveys,%20smapping%20at%20sea_Jan%202019.pdf)

- In most of the western area plankton samplers are deployed at the centre of half standard ICES rectangles, which are 0.5° latitude, by 0.5° longitude. To the north of Spain (Cantabrian Sea) more sampler deployments are undertaken, because of the proximity of the shelf edge to the coast.
- The number of stations and geographic coverage is coordinated internationally within the framework of the WGMEGS and depends on the availability of ship days in the different countries, to allow full coverage of the spawning stock area. Also, the number of stations and their location depend on the abundance and distribution of the target species (the map shows the number and geographical distribution of the stations in 2019, as an example).
- The standard plankton samplers used in the survey are Bongo 40 (oblique tows). All of these samplers generally have temperature, salinity and depth probes attached to the frames and they are also fitted with either mechanical flowmeters to enable the volume of water filtered on each deployment to be calculated.
- CTD profiles with Seabird 25 are also obtained in each BONGO station.
- Adult fish samples are obtained by pelagic trawls. Those samples are obtained either on board the vessel in which the ichthyoplankton survey CAREVA is carried out, or on board other vessels that simultaneously carry out other pelagic surveys in the area (i.e. PELACUS acoustic survey).



## 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Spain /Vizconde de Eza, Ramon Margalef, Enma Bardan; Portugal/; Denmark/; UK-Scotland/; Ireland/; Germany/; The Netherlands/; Faroe Islands/;

Relevant international planning group: WGMEGS: Working Group on Mackerel and Horse Mackerel Egg Surveys

## 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey

(max 450 words per survey)

### Text Box 2.6: Research surveys at sea

#### International Mackerel and Horse Mackerel Egg Survey (triennial).

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey



is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **International Mackerel and Horse Mackerel Egg Survey (triennial) (april may)**

Acronym: MEGS

National Name of the research survey: **Jureva**

### 1. Objectives of the survey

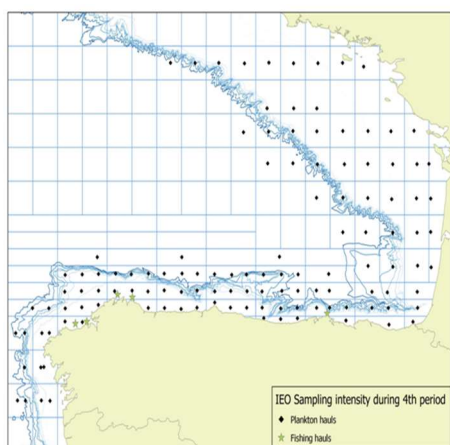
- This survey (JUREVA) provides indices for the strength of the SSB and a relative abundance index of horse mackerel (*Trachurus trachurus*) spawning stock.
- Egg production and spawning area estimation for both mackerel and horse mackerel.
- Fecundity estimation
- Determine the egg distribution area and density of other commercial species (hake, sardine, etc.)
- Characterise the main oceanographic conditions of the surveyed area

### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual for the Mackerel and Horse Mackerel Egg Surveys.

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%206%20Manual%20for%20the%20mackerel%20and%20horse%20mackerel%20egg%20surveys,%20smapling%20at%20sea\\_Jan%202019.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%206%20Manual%20for%20the%20mackerel%20and%20horse%20mackerel%20egg%20surveys,%20smapling%20at%20sea_Jan%202019.pdf)

- In most of the western area plankton samplers are deployed at the centre of half standard ICES rectangles, which are 0.5° latitude, by 0.5° longitude. To the north of Spain (Cantabrian Sea) more sampler deployments are undertaken (in an east-west direction), because of the proximity of the shelf edge to the coast.
- The number of stations and geographic coverage is coordinated internationally within the framework of the WGMEGS and depends on the availability of ship days in the different countries, to allow full coverage of the spawning stock area. Also, the number of stations and their location depend on the abundance and distribution of the target species (the map shows the number and geographical distribution of the stations in 2019, as an example).
- The standard plankton samplers used in the survey are Bongo 40 (oblique tows). All of these samplers generally have temperature, salinity and depth probes attached to the frames and they are also fitted with either mechanical flowmeters to enable the volume of water filtered on each deployment to be calculated.
- CTD profiles with Seabird 25 are also obtained in each BONGO station.
- Adult fish samples are obtained by pelagic trawls. Those samples are obtained either on board the vessel in which the ichthyoplankton survey JUREVA is carried out, or on board other vessels that simultaneously carry out other pelagic surveys in the area (i.e. PELACUS acoustic survey).





**3. For internationally coordinated surveys, describe the participating Member States/vessels.**

Spain /Vizconde de Eza, Ramon Margalef, Enma Bardan; Portugal/; Denmark/; UK-Scotland/; Ireland/; Germany/; The Netherlands/; Faroe Islands/;

Relevant international planning group: WGMEGS: Working Group on Mackerel and Horse Mackerel Egg Surveys

**4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey

(max 450 words per survey)

**Text Box 2.6: Research surveys at sea**

**International Mackerel and Horse Mackerel Egg Survey (triennial).**

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **International Mackerel and Horse Mackerel Egg Survey (triennial) (march may)**

Acronym: MEGS

National Name of the research survey: **trienal AZTI**

**1. Objectives of the survey**

The main objective of the survey is to provide indices for the strength of the SSB and a relative abundance index of Atlantic mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*) spawning stock applying the method of eggs production (EPM).

To achieve this goal, the necessary parameters/variables are: (1) Egg production and spawning area estimation for both mackerel and horse mackerel, (2) Fecundity estimation for mackerel and horse mackerel and (3) Temperature and salinity. Additionally, the abundance and area of distribution of other commercial species (hake, sardine, anchovy, etc.) are determined along with the main oceanographic conditions of the surveyed areas.

AZTI provides data for period 3 (March-April) and period 5 (May).

**2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

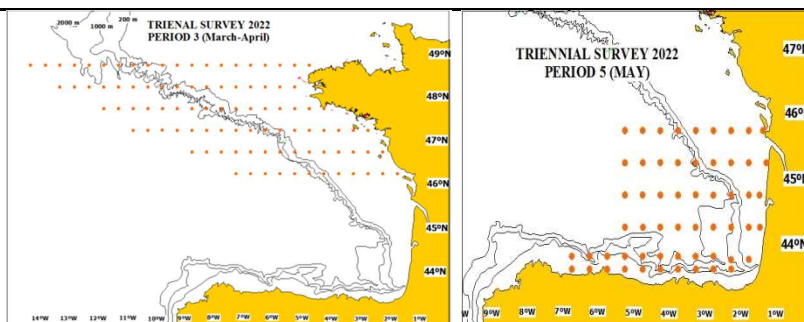
Details of survey design and methods are in. Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Series of ICES Survey Protocols. SISP 6 - MEGS V1.3. 62 pp.

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%206%20Manual%20for%20the%20mackerel%20and%20horse%20mackerel%20egg%20surveys.%20smapling%20at%20sea Jan%202019.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%206%20Manual%20for%20the%20mackerel%20and%20horse%20mackerel%20egg%20surveys.%20smapling%20at%20sea%20Jan%202019.pdf)

The standard plankton net used in the ICES triennial egg surveys by AZTI is the Bongo 40 furnished with RBR (CTD) to record environmental variables through the water column. The procedures used in these surveys are described in detail in the manual of surveys (see link above). On completion of the hauls, plankton is preserved in a 4% buffered formaldehyde solution. At sea, fish eggs from plankton samples are sorted out and once at lab, the eggs (Mackerel and horse mackerel species) are identified and staged.

The figures below show the initial design of plankton stations to limit the spawning area of mackerel and horse mackerel during AZTI surveys.

Adult samples of mackerel are captured using pelagic trawls at those areas where the presence of eggs is positive.



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Spain / Vizconde de Eza, Ramon Margalef, Enma Bardan; Portugal/; Denmark/; UK-Scotland/; Ireland/; Germany/; The Netherlands/; Faroe Islands/;

Relevant international planning group: WGMEGS: Working Group on Mackerel and Horse Mackerel Egg Surveys

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Sardine, Anchovy Horse Mackerel Acoustic Survey.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Sardine, Anchovy Horse Mackerel Acoustic Survey**

Acronym: SAHMAS

National Name of the research survey: **PELACUS**

#### 1. Objectives of the survey

- The main objective of this survey was to achieve a biomass' estimation by echointegration of the main pelagic fish distributed in the Spanish Cantabrian and NW waters (sardine, anchovy, horse mackerel, mackerel, blue whiting, bogue, boar fish, and chub mackerel). Together with this, the following objectives were also foreseen:
- Determine the distribution area and density of the main fish species
- Determine the main biological characteristics (length, sex, maturity stage and age) of the main fish species
- Estimate the relative abundance and distribution area of sardine and anchovy eggs by means of CUFES
- Estimate the adults parameters needed to apply the Daily Egg Production Method to sardine.
- Characterise the main oceanographic conditions of the surveyed area
- Determine the distribution pattern, taxonomic diversity and dry biomass by size classes of the plankton population presented in the surveyed area.
- Determine the natural abundance of N15 in sardine, anchovy and mackerel and their trophic position.
- Determine the distribution area and density of apical predators

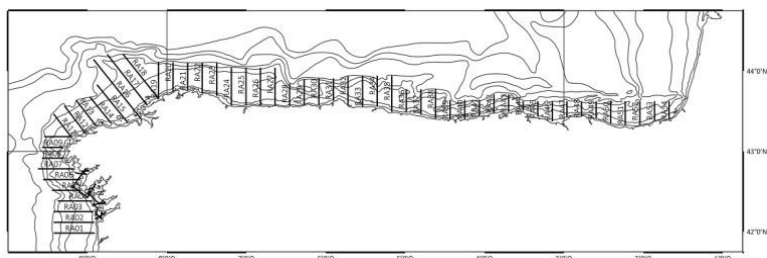
- Determine the distribution area and density of marine microplastics litter

## 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG)

[https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20\(TIMES\)/TIMES64.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20(TIMES)/TIMES64.pdf)

Acoustic, Systematic track with parallel transects evenly distribute each 8 nmi. Backscattering energy attributed to fish species after scrutinisation of the echograms. Biomass estimates using echointegration method. Pelagic fishing stations for echo-trace allocation and biological characterisation. CUFES for mapping egg (anchovy and sardine) distribution area. Trained observers recorded marine mammal, seabird, floating litter and vessel presence and abundance. Data on the hydrography and hydrodynamics of the water masses are collected via the deployment of rosettes and conductivity, temperature and depth sensors. Information on the composition, distribution and biomass of phytoplankton and zooplankton is derived from the analyses of samples taken by plankton nets.



## 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Spain/Miguel Oliver; Portugal/; France/

Relevant international planning group: WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9

## 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey

(max 450 words per survey)

### Text Box 2.6: Research surveys at sea

#### Sardine DEPM (triennial).

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Sardine DEPM (triennial)**

Acronym: SDEPM

National Name of the research survey: **Sareva**

#### 1. Objectives of the survey

- Estimate the spawning stock biomass of sardine (*Sardina pilchardus*) based on the application of Daily Egg Production Method (DEPM). The total spawning biomass from the SDEPM (Portuguese and Spanish) is used in the assessment such as fishery

independent index for the sardine stock pil 27 8c9a (ICES divisions 8.c and 9.a-Cantabrian Sea and Atlantic Iberian waters)

- Delimitate and estimate the spawning area of sardine.
- Estimate Daily egg production and Total egg production of sardine.
- Estimate the relative abundance and distribution area of sardine eggs by means of CUFES
- Determine the egg distribution area and density of other commercial species (anchovy, mackerel, horse mackerel, etc.)
- Characterise the main oceanographic conditions of the surveyed area.

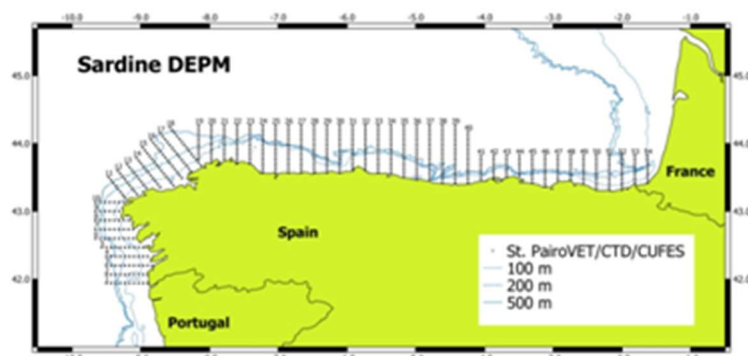
## **2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

Sardine DEPM survey methodology is described in ICES Cooperative Research Report 332.

[https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20\(CRR\)/CRR%20332.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR%20332.pdf)

SAREVA survey consisted of ichthyoplankton, hydrographic and adult sampling:

- Plankton samplers, PairoVET and CUFES are used on a survey grid consisting of fixed transects perpendicular to the coast and spaced 8 nm. CUFES is used as an auxiliary sampler for adaptive decisions in order to delimit the spawning area and to modify the intensity of the PairoVET sampling. The inshore limit of the transects is determined by bottom depth (as close to the shore as possible) while the offshore extension is decided adaptively (based on the presence/absence of eggs) and always covering the extension of the platform to the 200 m isobath.
- CTD profiles are obtained in each PairoVET station. A sensor continuously registers temperature, salinity and fluorescence at 5 m depth on the transects.
- Fishing hauls are undertaken for the estimation of the adult parameters (sex ratio, female weight, batch fecundity and spawning fraction) and are conducted by pelagic trawling following the species schools detection by the echo-sounder. For logistical reasons, the adult samples for the DEPM that would correspond to this survey will be taken in the PELACUS survey, which coincides in time and space. In addition, complementary fish market sampling will be carried out.



## **3. For internationally coordinated surveys, describe the participating Member States/vessels.**

Spain/ RV.Vizconde de Eza, RV. Miguel Oliver (Adult sampling); Portugal/RV Vizconde de Eza

Relevant international planning group: WGACEGG: Working Group on Acoustic and Egg Surveys for Small Pelagic Fish in NE Atlantic

## **4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

The sardine DEPM surveys have been carried out in a collaborative work between Portugal (Instituto Português do Mar e da Atmosfera, IPMA) and Spain (Instituto Español de Oceanografía, IEO) what led to increased coordination and standardisation of the surveys and analytical methodologies.

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Biomass of Anchovy.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Biomass of Anchovy**

Acronym: BIOMAN

National Name of the research survey: **BIOMAN**

#### 1. Objectives of the survey

- To estimate annually the total biomass of anchovy and sardine in the Bay of Biscay applying the DEPM, this implies to estimate all the parameters to apply the DEPM. To estimate the age structure of these populations (biomass by age, numbers by age, percentage by age, weight by age and length by age) and the spatial distribution of the species. The anchovy estimates in 8abcd are used for the assessment and posterior management of the stock. For sardine, biomass estimates in 8abd have to be incorporated in the assessment in the next benchmark.
- To obtain daily egg production for sardine in 8abd. These estimates are used for survey trends-based assessment of the stock.
- Biological characterization of the species, spawning area delimitation of anchovy and sardine in the Bay of Biscay.
- Hydrological conditions of the prospective area.
- To obtain the anchovy and sardine egg abundances at 3m depth with CUFES
- To obtain the distribution and abundance of zooplankton in the Bay of Biscay
- To obtain the distribution and abundances of marine mammals, sea birds, marine debris and human activities.
- To obtain the distribution and abundance of micro, meso and macro plastics
- Collection of water samples on the surface and at different depths in stations spread over the sampling area for eDNA analysis

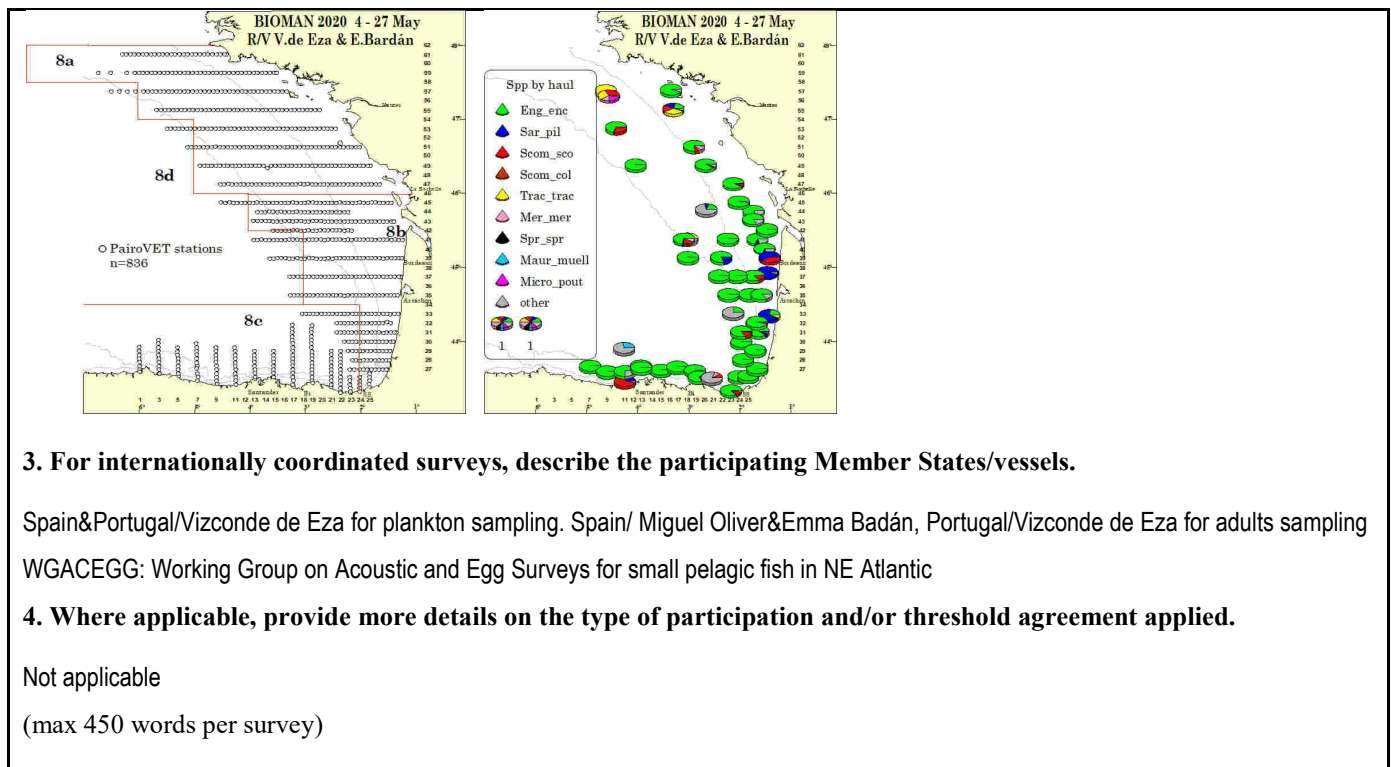
#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

The DEPM is applying following the protocol accorded at WGACEGG. In (ICES -Cooperative Research Report 332). [http://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20\(CRR\)/CRR%20332.pdf](http://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR%20332.pdf)

Coverage: southeast of the Bay of Biscay (anchovy and sardine main spawning area).

Sampling strategy: adaptive. The survey starts from the West, looking for the western limit of the spawning, and continues to the north until the limit of the 8a.

- Plankton sampling: Stations are located at intervals of 3 nmi along 15 nmi apart transects, perpendicular to the coast. At each station a vertical plankton haul is performed using a PairoVET net. The Continuous Underway Fish Egg Sampler (CUFES, Checkley et al., 1997) is used for adaptive decisions in order to delimit the spawning area of the species and to modify the intensity of the PairoVET sampling.
- adult sampling: The adult samples are obtained, coinciding in space and time with the plankton sampling. When areas with anchovy or sardine eggs are encountered, the pelagic trawl is directed to those areas. In each haul, a sample of 2 kg of anchovy and/or sardine is randomly selected. 100 individuals of each species are measured and a biological sampling (60 - 120 individuals) is conducted. Length, weight, sex, maturity and extraction of otolith are measured for each individual.
- hydrographic sampling: Sample depth, temperature, salinity and fluorescence profiles are obtained at each sampling station using a CTD coupled to the PairoVET



## Text Box 2.6: Research surveys at sea

### Acoustic Survey on Sardine and Anchovy.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Acoustic Survey on Sardine and Anchovy**

Acronym: **ECOCADIZ\_ESP**

National Name of the research survey: **ECOCADIZ**

#### 1. Objectives of the survey

- To estimate by hydroacoustics (echo-integration) and to map the abundance and biomass of the main neritic pelagic species inhabiting the Gulf of Cadiz shelf waters, especially the Gulf of Cadiz anchovy spawning stock.
- To determine the distribution area and density of the main fish species.
- To characterize the biology of the above species in relation to their main habitats, especially according to the size composition and/or age structure, and to the maturity, repletion and condition stages.
- To estimate the relative abundance and to map the distribution area of anchovy eggs by means of CUFES.
- To map the distribution and abundance of the apical predators within the surveyed pelagic community and their relation to oceanographic and biological factors.
- To oceanographically characterize the surveyed area.
- To map the distribution area and density of floating macro-litter and micro-plastics.
- To collect anchovy "extra" samples for the estimation of the adults' parameters needed to triennially apply the Daily Egg Production Method to Gulf of Cadiz anchovy.

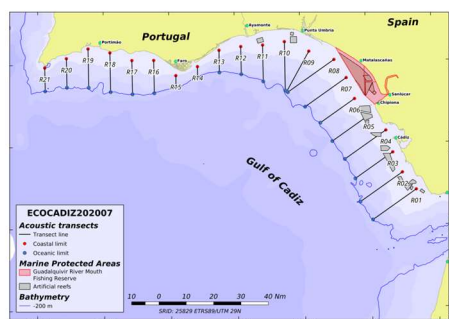
#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6

for this specific survey.

Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG)

[https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20\(TIMES\)/TIMES64.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20(TIMES)/TIMES64.pdf)

Acoustic estimation of the abundance and biomass of the survey target species during daylight, along to a systematic grid composed by (21) transects, between 20 – 200 m isobaths, 8 nm-equally spaced and normal to the shoreline, with a Simrad™ EK-60 scientific echosounder working in a multi-frequency fashion (18, 38, 120 and 200 kHz; ICES CRR 332, Massé et al., 2018; ICES, 2021). The echo-traces identification, size, age composition and other biological aspects of the assessed species are obtained from the results from opportunistic ground-truthing fishing hauls. Backscattering energy attributed to fish species after scrutinisation of the echograms. Biomass estimates using echointegration method. Hydrographic characterization of the surveyed area is carried out by night through the sampling of a systematic grid of discrete CTD (with coupled multisensors)-LADCP casts and along-transect sub-superficial continuous sampling with VMADCP and ThermoSal-F. The climatic characterization of the surveyed area is obtained from the analysis of continuous records of weather variables by an Aanderaa weather station. The ichthyoplankton (anchovy eggs) distribution and sub-superficial density is recorded by a Continuous Underway Fish Egg Sampler (CUFES) along transects during the acoustic sampling. Information on the distribution and abundance of apical predators and floating macro-litter is collated by direct observation. Sub-superficial density of micro-plastics is opportunistically sampled with Manta Trawl hauls.



3. For internationally coordinated surveys, describe the participating Member States/vessels.

Spain/ RV.Miguel Oliver.

WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Not applicable

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Acoustic Survey for Juvenile Anchovy in the Bay of Biscay.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Acoustic Survey for Juvenile Anchovy in the Bay of Biscay**

Acronym: JUVENA\_ESP

National Name of the research survey: **JUVENA**

#### 1. Objectives of the survey

The main objective of the project is estimating the abundance of juvenile anchovy in the Bay of Biscay in Autumn, as a tool for predicting

the recruitment of anchovy. Secondary objectives are:

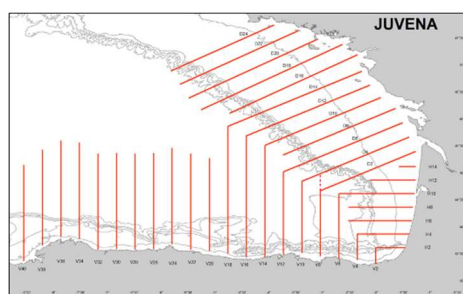
- Studying the biological condition of juvenile anchovy and its influence on the recruitment process.
- Characterizing the hydrographic conditions and the abundance and distribution of the components of the pelagic ecosystem relevant to understand the dynamics of the recruitment.
- Studying the interactions between top predators and their preys in the Bay of Biscay, as well as inter-specific interactions between marine birds and sub-superficial predators.
- Acoustic identification and vertical distribution of mesopelagic species in the Bay of Biscay.

**2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG)

[https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20\(TIMES\)/TIMES64.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20(TIMES)/TIMES64.pdf)

The methodology used to estimate the abundance of juvenile anchovy is the acoustic-trawl methodology. Acoustic data processing is performed by layer echo-integration. The identification and sizing is obtained by pelagic fishing hauls. The hauls are grouped by strata of homogeneous species and size composition. Inside each of these homogeneous strata, the echo-integrated acoustic backscattering is assigned to species according to the composition of the hauls. Afterwards, the energy corresponding to each specie-size is converted to biomass using their corresponding conversion factor. Details of the methodology of the JUVENA surveys were described in "Boyra, G., Martinez, U., Cotano, U., Santos, M., Irigoien, X., and Uriarte, A. 2013. Acoustic surveys for juvenile anchovy in the Bay of Biscay: abundance estimate as an indicator of the next year's recruitment and spatial distribution patterns. *ICES Journal of Marine Science*, 70: 1354–1368."



**3. For internationally coordinated surveys, describe the participating Member States/vessels.**

Spain: RV. Angeles Alvario, RV. Enma Bardan

WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9

**4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

Not applicable

(max 450 words per survey)

**Text Box 2.6: Research surveys at sea**

**Deepwater Longline Survey.**

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Deepwater Longline Survey**

Acronym: PALPRO\_ESP



National Name of the research survey: **PALPRO**

### 1. Objectives of the survey

- To obtain data on biodiversity and biomass estimates.
- To obtain biological samples (tissues) of the most deep-water representative species.
- To test the suitability of the commercial longline fishing gear (for deep-water sharks) modified for scientific surveys.
- To test depth, salinity and temperature sensors adapted to deep for monitoring the fishing gear.

### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

The methodology is published in the report of WGDEEP 2016.

A modified commercial deep-water fishing gear adapted was used for the survey. The fishing gear is a two equal horizontal line sections of 1750 m + 1750 m, each with 150 hooks (300 in total). Each hook was baited with 1/3 of mackerel.

The horizontal line was attached to the bottom with 1.5 kg stone each five hooks. To improve the catch efficiency of species that feed above the bottom, the stones of the horizontal line were removed in two "floating" sections of 75 + 75 hooks allowing these sections to get more buoyancy. The fishing gear was linked to the surface by two vertical lines and two buoys placed at the beginning and end of the horizontal line.

For the continuous recording of depth, temperature and salinity the long line was monitored with five small sensors DST centi and DST CTD able to withstand 2500 m depth. The survey area was 10.5 km north of the Cape Matixako (VIIIc east) in a narrow canyon of about 28 km length that decreases progressively in depth from 500 to 2.500 m.

The average duration of the haul was 7:30 hours. For the calculation of the fishing effort several categories of the hook status were recorded.

Null	(N)	Lost of bait during the hauling
Entire	(E)	Hook with bait
Eaten	(C)	with bait partially eaten
Broken	(R)	Tangled-broken hook
Empty	(V)	Empty (no catch, no bait)
With catch	(P)	with catch

The specimens were identified, measured (cm), weighted (g) and sexed on board.

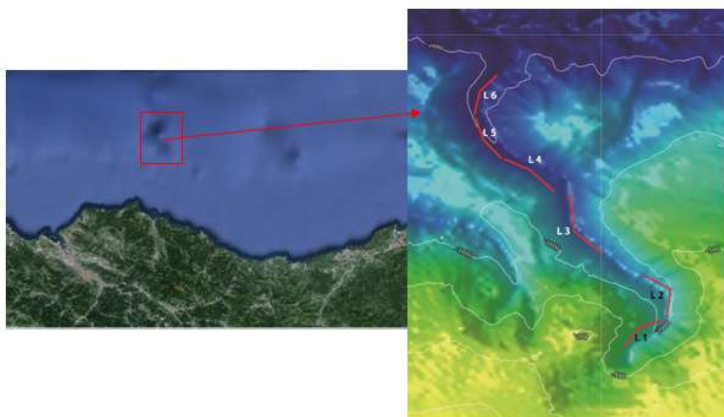
For the analysis of effort and CPUEs hauls' catches were grouped in four depth strata: 650-1050 m, 1051-1450 m, 1451-1850 m and 1851-2250 m.

The Effort in each stratum (EFFORTst) was estimated as the number of hooks able to fish during the haul (P + E + C) divided by the total of hooks and multiplied by the soak time (minutes):

$$\text{EFFORTst} = ((P + E + C) / \text{total hooks}) \times \text{min}$$

The Catch per Unit of Effort of each stratum (CPUEs) was calculated as the catch (kg) divided by the EFFORTst:

$$\text{CPUEst} = \text{kg} / \text{EFFORTst}$$



**3. For internationally coordinated surveys, describe the participating Member States/vessels.**

It is not an International coordinated survey

**4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

Not applicable

(max 450 words per survey)

**Text Box 2.6: Research surveys at sea**

**Pan-Mediterranean Acoustic Survey.**

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Pan-Mediterranean Acoustic Survey**

Acronym: MEDIAS

National Name of the research survey: **MEDIAS**

**1. Objectives of the survey**

The MEDIAS project started in 2009 within the cooperation of seven research Institutes from six Mediterranean Member States of the European Union. The target was to harmonize and standardize the five ongoing acoustic surveys in the Mediterranean: Gulf of Lions (IFREMER), Iberian Coast (IEO), Sicilian Channel (IAMC/MCFS), Adriatic Sea (ISMAR), and North Aegean Sea (HCMR). The general aim is to produce information on small pelagic species for management decisions and provide input to assessment for stocks which are managed internationally, principally, anchovy (*Engraulis encrasicolus*) and sardine (*Sardina pilchardus*). Surveys take place during summer, during the anchovy peak of spawning.

**2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

The MEDIAS survey design covers the Spanish Mediterranean continental shelf (20 to 200 m depth) from the French border to Punta Europa (Strait of Gibraltar). Transects run perpendicular to the coastline/bathymetry. The inter-transect is 4 or 8 nautical miles in order to achieve the minimization of the coefficient of variation of the acoustic estimates for the target species taking into account the topography of each area. Survey is performed during the day.

A calibrated EK80 (Simrad) scientific echosounder is used, equipped with five frequencies (18, 38, 70, 120 and 200 kHz), for the collection of acoustic data. The frequency for assessment is 38 kHz, while the 18, 70, 120 and 200 kHz operate as complementary frequencies. The elementary distance sampling unit (EDSU) is 1 nautical mile. The fish density values are obtained as NASC (Nautical Acoustic Scattering Coefficient) (m<sup>2</sup>/mn<sup>2</sup>) values.

Opportunistic pelagic hauls are carried out in order to ground truth the fish echotraces detected by the echosounder. Target species of the MEDIAS surveys are anchovy and sardine, for which abundance (n° individuals), biomass (tons) are estimated by length, sex and age but biological data for all species in the pelagic community regarding length frequency distribution and length-weight relationships are also acquired. Hydrological variables are collected by CTD's.

For the next period the sampling area of the Spanish MEDIAS survey has been enlarged to the GSA05 following the recommendation of the MEDIAS SC.

National coordinator of the survey is Magdalena Iglesias (IEO-C.O. de Baleares).

[http://www.medias-project.eu/medias/website/handbooks-menu/handbooks/MEDIAS-Handbook-\(April-2021\)/](http://www.medias-project.eu/medias/website/handbooks-menu/handbooks/MEDIAS-Handbook-(April-2021)/)



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Participating Member States: France, Italy, Greece, Slovenia, Malta, Croatia, Bulgaria, Romania and Spain/ RV. Miguel Oliver. (<http://www.medias-project.eu/medias/website/>)

The international coordination of the survey is carried out in the "MEDIAS coordination meeting".

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### International Bottom Trawl Survey in the Mediterranean.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **International Bottom Trawl Survey in the Mediterranean**

Acronym: MEDITS

National Name of the research survey: **MEDITS**

#### 1. Objectives of the survey

Main objective is to evaluate the abundance and distribution of stocks, independently of the data provided by commercial fisheries, and to assess the impact of the fishing activity on the environment. Specific objectives:

- To get standardized indices of abundance and biomass of demersal species
- To know their geographic and bathymetric distribution.

- To describe their demographic structure.
- To collect biological data of the target species.
- To get data on temperature and salinity of water masses where these species are distributed.

## 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

The survey is developed along the Spanish Mediterranean: GFCM GSAs 1 (Northern Alboran), 2 (Alboran Island), 5 (Balearic Islands) and 6 (Northern Spain). Only Mallorca and Menorca have been surveyed in GSA5, but in 2021 an additional survey has been made in Ibiza and Formentera to cover the whole GSA 5.

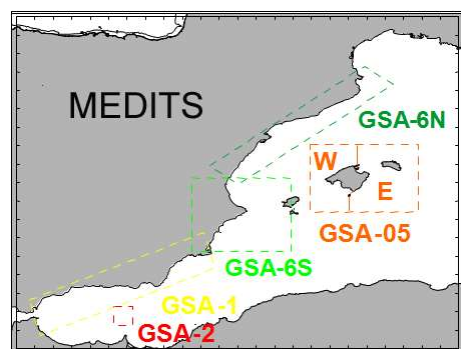
Sampling follows a stratified scheme, according to depth limits: 30, 50, 100, 200, 500 and 800 m. Hauls duration is 30 and 60' at <200 and >200 m depth, respectively. Hauls are performed during daylight.

Surveys have been developed in April-June (55 days), on board the research vessel Miguel Oliver (70 meters long, 14 meters wide, 2495 TRB and 2000 KW). The additional survey around Ibiza and Formentera islands has been made with this vessel in August 2021 (10 days).

The gear used is the GOC-73 bottom trawl, designed for experimental fishing. MARPORT is used to estimate horizontal and vertical net openings and effective duration of sampling. The water temperature and salinity is recorded with a CTD SBE-37 coupled to the net.

[https://www.sibm.it/MEDITS%202011/docs/Medits\\_Handbook\\_2017\\_version\\_9\\_5-60417r.pdf](https://www.sibm.it/MEDITS%202011/docs/Medits_Handbook_2017_version_9_5-60417r.pdf)

<https://www.sibm.it/MEDITS%202011/principaleprogramme.htm>



The data are stored in the IEO database SIRENO. Five file types are defined in order to store and exchange the data:

- TA: Haul Characteristics
- TB: FAul Catches
- TC: Length, sex, and maturity at aggregated level
- TE: Age weight and maturity by length at individual level
- TL: marine litter data.

The national coordinator of the MEDITS survey is Enric Massutí (IEO Baleares). The regional coordinators are Cristina García (IEO Málaga) for GSA01 and GSA02, Antonio Esteban (IEO Murcia) for GSA06 and Beatriz Guijarro (IEO Baleares) for GSA05.

## 3. For internationally coordinated surveys, describe the participating Member States/vessels.

Participating Member States: Albania, Cyprus, Spain, France, Greece, Croatia, Italy, Malta, Montenegro and Slovenia. For the list of vessels, see Annex I of the Medits Handbook\_v9.

The international coordination of the survey is carried out during the annual "MEDITS coordination meeting".

## 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Bluefin Tuna Larval Survey.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Bluefin Tuna Larval Survey**

Acronym: TUNIBAL

National Name of the research survey: **TUNIBAL**

#### 1. Objectives of the survey

Main objective: developing a fishery-independent abundance index for the spawning biomass and the recruitment of Atlantic bluefin tuna and Mediterranean albacore in their major spawning area in the Balearic Sea to be used in assessment models.

Secondary objectives include:

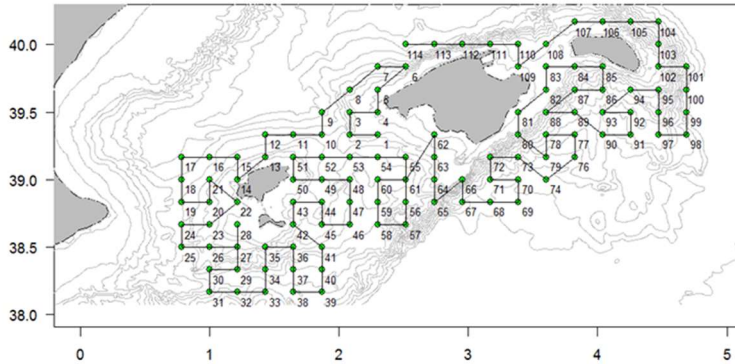
- Determine the influence of hydrographic scenarios on the structure, distribution and abundance of larval populations of large and medium pelagic species with special attention to the targeted species.
- Completing the database for the development of habitat models for the tuna species, models based on data taken in-situ by hydrographic profiles. The models are used to calibrate the fishery-independence abundance indices
- Estimate the viability of the survey to estimate fishery-independent abundance indices for other tuna species in the Balearic Sea
- Deepening knowledge about growth, trophic ecology (interactions predator prey), survival and the genetic structure of larval populations of bluefin tuna and related species in the Balearic Sea.
- Determining the processes that determine planktonic productivity and biodiversity in the Balearic Sea
- Improve inter-calibration of quantitative sampling carried out with different plankton samplers
- Compare fishery-independent indices for the bluefin tuna eastern stock and the albacore in the Mediterranean with indices developed for the western and Atlantic stocks

#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

The methodology used to estimate the abundance of tuna larvae includes

In all stations, an oblique plankton fishing between 0 and 30 meters, with Bongo 20 networks equipped with meshes of 55 and 200 microns and mounted above the structure of the Bongo 90 equipped with meshes of 500 microns is conducted. All networks are equipped with flow meters. To know precisely the depth of departure and the relative position of the plankton nets with respect to the vessel we will use an Acoustic Positioning System. Fishing will be carried out using a 4 mm steel cable, maintaining the speed of the ship at 2 knots. Additionally, in positive stations for bluefin tuna larvae are carried using other samplers. Besides, in each station a hydrographic profile with a CTD mounted in the rosette, is conducted between 0 and 350 or 650 meters. In standard stations, Niskin bottles will be sampled at depths of 5, 25, deep chlorophyll maximum, 200, 500, the LIW (maximum salinity). The methods are standardized with NOAA and University of Miami (USA).

The area coverage includes a grid of stations covering the major spawning area of tuna species in the Balearic Sea.



The methodology is detailed in:

Ingram W. Jr., Álvarez-Berastegui D., Reglero P., Balbín R., García A., Alemany F. 2017. Incorporation of habitat information in the development of indices of larval bluefin tuna (*Thunnus thynnus*) in the Western Mediterranean sea. *Deep Sea Research Part II: Topical Studies in Oceanography*, 140: 203-211. <https://doi.org/10.1016/j.dsr2.2017.03.012>

Álvarez-Berastegui D., Saber S., Ingram W.G.Jr, Díaz-Barroso L., Reglero P., Macías D., García-Barcelona S., Ortiz de Urbina J., Tintoré J., Alemany F. 2018. Integrating reproductive ecology, early life dynamics and mesoscale oceanography to improve albacore tuna assessment in the Western Mediterranean. *Fisheries Research*, 208C (2018) pp. 329-338. <https://doi.org/10.1016/j.fishres.2018.08.014>

Alemany, F., Quintanilla, L., Velez-Belchí, P., García, A., Cortés, D., Rodríguez, J. M., Fernández de Puelles, M. L., González-Pola, C., López-Jurado, J. L. 2010 Characterization of the spawning habitat of Atlantic bluefin tuna and related species in the Balearic Sea (western Mediterranean). *Prog. Oceanogr.* 86, 21–38. (doi:10.1016/j.pocean.2010.04.014)

### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

The survey is coordinated by IEO (Patricia Reglero and Diego Alvarez). Scientists from SOCIB (Spain), University of Bergen (Norway) and other institutions are invited to participate. It is being discussed the possibility of conducting acoustic sampling of spawners in collaboration with ICCAT.

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Not applicable

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Nephrops UWTV Survey.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

ame of the research survey: **Nephrops UWTV Survey (FU 30)**

Acronym: UWTV30

National Name of the research survey: **ISUNEPCA**

#### 1. Objectives of the survey

- To obtain estimates of Nephrops burrows densities in the Gulf of Cádiz from a randomized isometric grid of UWTV stations spacing 4 nautical miles using the underwater images.
- To define the Nephrops distribution in the Gulf of Cadiz
- To obtain density estimates of benthic-demersal macrofauna species and the occurrence of trawl marks on the sea bed

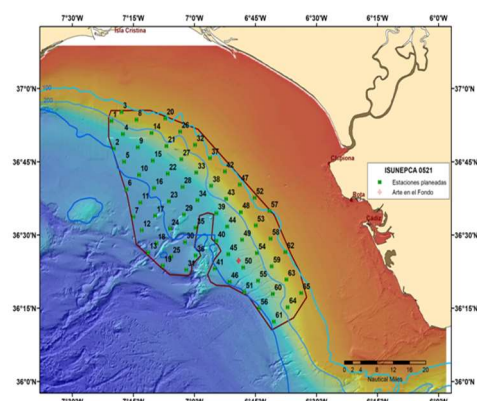
- To calibrate benthic-demersal macrofauna observed in the underwater videos and those obtained in the beam trawl.
- To measure oceanographic variables using a sledge mounted CTD

## 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual for *Nephrops* Underwater TV Surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS)

[https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20\(CRR\)/CRR340.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR340.pdf)

The UWTV survey design follows a randomized isometric grid of stations at 4 nm spacing. The stations ranged from 130-650 m depth with an average depth around 410 m. Additionally, stations located on the shallower edge of the study area are considered in order to verify the boundary of the *Nephrops* distribution. The sledge, once stable on the seabed, is towed at between 0.6-0.7 knots in order to obtain the best possible conditions for counting burrows and 10 good minutes are recorded. This time corresponds to 200 m swept, approximately. HiPAP transponder on the sledge is used to obtain the sledge position. The distance over ground estimate (DOG) is calculated using the sledge position and the field of view of the video footage is 75 cm (FOV), which was confirmed using line lasers.



## 3. For internationally coordinated surveys, describe the participating Member States/vessels.

UK-Scotland/Scotia; UK/Endeavour; AFBI/Corystes; Ireland/Celtic Explorer, Celtic Voyager; France/Celtic Voyager; Denmark/Havfisker; Sweden/Asterix; Spain/Ángeles Alvariño, Ramón Margalef

Relevant international planning group: WGNEPS\_ICES Working Group of *Nephrops* Surveys.

## 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Western IBTS 1st quarter.

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Western IBTS 1st quarter (Not mandatory survey)**

Acronym: IBTS\_Q1

National Name of the research survey: **Arsa-primavera**



## 1. Objectives of the survey

- Estimate distribution and relative abundance of the main commercial species and provide recruitment indices
- Estimate changes in the stocks of commercial fish species independently of commercial fisheries data
- Monitoring of distribution and relative abundance of all fish and invertebrates species
- Collect data for the determination of biological parameters for selected species
- Collect hydrographical and environmental information.

## 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

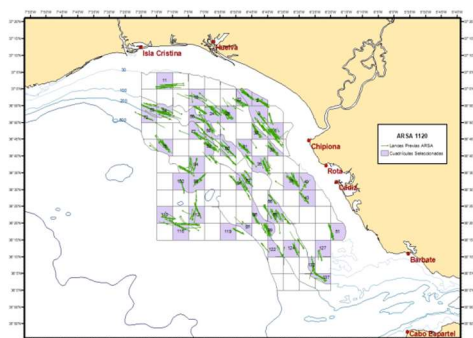
Manual for the International Bottom Trawl Surveys

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2010%20%E2%80%93%20Revision%202011\\_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2010%20%E2%80%93%20Revision%202011_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf)

The whole area (7224 km<sup>2</sup>) has been separated into five depth strata (15-30, 31-100, 101-200, 201-500 and 501-800 m). The sampling design is random stratified with proportional allocation with a total of 45 fishing stations and swept-area method.

Length distribution of all fish and main species of crustacean and cephalopods are collected and biological parameters are obtained in the most important commercial species

Temperature and salinity are collected during each tow with a CTD attached to the gear. A CTD by haul will be carried out in the survey area.



## 3. For internationally coordinated surveys, describe the participating Member States/vessels.

UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Miguel Oliver; Portugal/Mar Portugal.

Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES

## 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)



## Text Box 2.6: Research surveys at sea

### Anchovy DEPM (triennial)

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Anchovy DEPM (triennial). (Not mandatory survey)**

Acronym: -

National Name of the research survey: **Bocadeva**

#### 1. Objectives of the survey

The main objective of BOCADEVA series is the estimation of spawning stock biomass (SSB) of Anchovy (*Engraulis encrasicolus*), based on the application of the Daily Egg Production Method (DEPM)

- To estimate the extension of Anchovy Spawning area in the Gulf of Cadiz.
- To estimate the Daily egg production ( $P_o$ ) and total production ( $P_{total}$ ) of Anchovy in the Gulf of Cadiz.
- To determine the egg distribution area and density of other commercial species
- To characterize oceanographic and meteorological conditions in the study area during the survey

#### 2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

Manual Pelagic survey series for sardine and anchovy in ICES subareas 8 and 9.

[https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20\(CRR\)/CRR%20332.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR%20332.pdf)

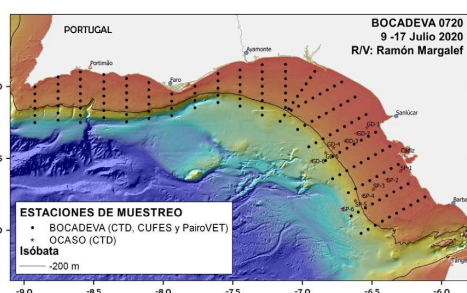
Vertical sampling (PairoVET)

The sampling grid is established on the continental shelf following a systematic sampling scheme, with the 21 transects being perpendicular to the coast and equally spaced 8 nm. Egg samples are taken every 3 nm in the inner shelf (ICES, 2003). The inshore limit of transects is determined by bottom depth (as close to the shore as possible), while the offshore extension is decided adaptively depending on the results of the CUFES sample.

Vertical hauls are carried out with a PairoVET sampler equipped with nets of 150  $\mu$ m of mesh size. Hauls are carried out up to a maximum depth of 100 m or of 5 m above the bottom in shallower depths, (speed of about 1 m/s). Flowmeters are used to calculate the volume of filtered water during each haul. Egg samples are analysed onboard. A preliminary identification and counting of anchovy eggs and larvae, as well as other commercial species is carried out. Samples are sorted, counted and preserved in a 4 % buffered formaldehyde solution. Anchovy eggs are classified in 11 developmental stages, according to the key proposed by Moser and Ahlstrom (1985).

Continuous sampling (CUFES)

During the CUFES sampling (Checkley et al., 2000) the volume of filtered water (600 l/min, approximately) is also integrated each 3 nm (at a fixed depth of 5 m). The CUFES collector was arranged with a 335  $\mu$ m net. Anchovy eggs were classified in three stages: No-Embryo (I-III), Early Embryo (IV-VI) and Late Embryo (VII-XI).



**3. For internationally coordinated surveys, describe the participating Member States/vessels.**

Spain/RV.Ramon Margalef; Portugal/

WGACEGG: Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic

**4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

Not applicable.

(max 450 words per survey)

**Text Box 2.6: Research surveys at sea**

**Acoustic Survey on Sardine and Anchovy-Recruits.**

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Acoustic Survey on Sardine and Anchovy-Recruits (Not mandatory surveys)**

Acronym: -

National Name of the research survey: **ECOCADIZ-reclutas**

**1. Objectives of the survey**

- To estimate by hydroacoustics (echo-integration) and map the abundance and biomass of the main neritic pelagic species inhabiting the Gulf of Cadiz shelf waters, especially in those waters considered according to previous studies as recruitment areas of the Gulf of Cadiz anchovy and sardine.
- To characterize the biology of the above species in relation to their main habitats (especially according to the size composition and/or age structure, and to the maturity, repletion and condition stages.
- To estimate the abundance and biomass of the juvenile fraction (age 0 fish) of anchovy and sardine in the surveyed area.
- To detect, identify and capture those echo-traces corresponding to anchovy (and sardine) recruits in the insonified water column.
- To delimit the extension of anchovy (and sardine) recruitment area in the surveyed area from the spatial distribution of this population fraction.
- To oceanographically characterize the surveyed area.

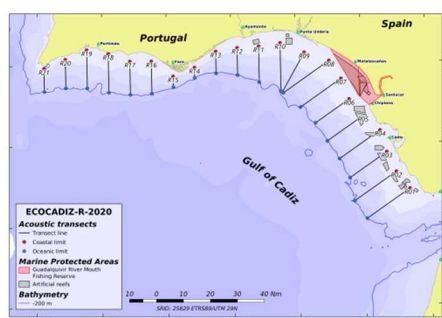
**2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic (WGACEGG)

[https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20\(TIMES\)/TIMES64.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Techniques%20in%20Marine%20Environmental%20Sciences%20(TIMES)/TIMES64.pdf)

Acoustic estimation of the abundance and biomass of the survey target species during daylight, along to a systematic grid composed by (21) transects, between 20 – 200 m isobaths, 8 nm-equally spaced and normal to the shoreline, with a Simrad™ EK-60 scientific echosounder working in a multi-frequency fashion (18, 38, 70, 120 and 200 kHz; ICES CRR 332, *Massé et al.*, 2018; ICES, 2021). Since 2018 on, the EK-60 echosounder was replaced by the EK-80 one. The echo-traces identification, size and age composition and other biological aspects of the assessed species are obtained from the results from opportunistic ground-truthing fishing hauls. Backscattering energy attributed to fish species after scrutinisation of the echograms. Biomass estimates using echointegration method. Hydrographic characterization of the surveyed is carried out by night through the sampling of a systematic grid of discrete CTD (with coupled multisensors)-LADCP casts and along-transect sub-superficial continuous sampling with VMADCP and TSG-F. The climatic characterization of the surveyed area was obtained from the analysis of continuous records of weather variables by an *Aanderaa* weather

station.



**3. For internationally coordinated surveys, describe the participating Member States/vessels.**

Spain/ RV Ramon Margalef,

WGACEGG: Working Group on Acoustic and Egg Surveys for Small Pelagic Fish in NE Atlantic.

**4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.**

Not applicable

(max 450 words per survey)

## Text Box 2.6: Research surveys at sea

### Acoustic index for juvenile bluefin tuna in the Bay of Biscay)

General Comment: This Text box fulfils Article 5 (1)(b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapters I and II of the EU MAP Implementing Decision. It is intended to specify which research surveys at sea set out in Table 2 of the EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Name of the research survey: **Acoustic index for juvenile bluefin tuna in the Bay of Biscay (Not mandatory surveys)**

Acronym: -

National Name of the research survey: **BFT-index**

#### 1. Objectives of the survey

Main objective: developing a fishery-independent abundance index for juvenile bluefin tuna in the Bay of Biscay.

- Secondary objectives include:

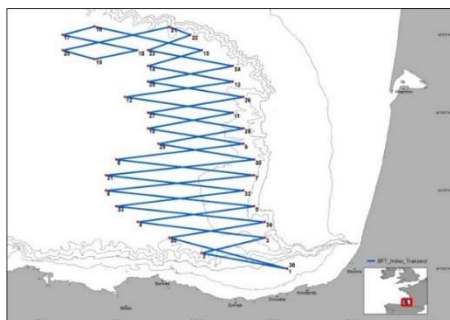
- Analysing the geographical distribution of bluefin tuna schools in the Bay of Biscay,
- Assessing the size distributions in each tuna school detected in the Bay of Biscay,
- Identifying differential geographical distribution of tunas of different size classes in the Bay of Biscay,
- Studying the interactions between bluefin tunas and their main prey (anchovy) in the Bay of Biscay, as well as inter-specific interactions between marine birds and sub-superficial predators.
- Acoustic identification of bluefin tuna behavior within schools in the Bay of Biscay.

**2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.**

The methodology used to estimate the abundance of juvenile bluefin tuna is an acoustic survey following systematic transects, using long-range omnidirectional sonar as a detection tool and an EK60 echosounder to measure school dimensions and estimate biomass.

The identification and sizing of tunas is obtained by pole-and-line fishing and release and by a stereoscopic camera. Acoustic data

processing is performed by both layer echo-integration, for schools observed during sampling fishing events, and school echo-integration for schools observed during transects without stopping the vessel. In the first case, the data are post-processed so as to keep only pings containing acoustic backscattering corresponding to tuna aggregations, by keeping only non-zero echointegration pings. This produces an along-track compacted echogram from which we obtain the mean density of the school calculated as the mean of the volume backscattering coefficient (sv; MacLennan et al 2002) of the non-zero pings. The shape of the schools is assumed to be a revolution ellipsoid with horizontal isotropy, i.e., with circular horizontal cross section. Details of the methodology of the surveys were described in "Goñi N, Onandia I, Lopez J, Arregui I, Uranga J, Melvin G D, Boyra G, Arrizabalaga H, Santiago J, 2016. Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the bay of biscay: 2015 and 2016 surveys. SCRS/2016/137, 15 p." and in "MacLennan, D.N., Fernandes, P.G., Dalen, J., 2002. A consistent approach to definitions and symbols in fisheries acoustics, ICES J. Mar. Sci. 59, 365-369."



### 3. For internationally coordinated surveys, describe the participating Member States/vessels.

The survey is coordinated by AZTI. Scientists from DFO Canada took part in the 2016 survey, and scientists from Ifremer, France, will be invited to participate in the survey every year. The possibility of organizing a parallel survey for juvenile bluefin tunas in the Gulf of Lions is being discussed with Ifremer scientists.

### 4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Not applicable

(max 450 words per survey)

## Section 3: Fishing Activity Data

### Text Box 3.1: Fishing activity variables data collection strategy

General comment: This text box fulfils Article 5 (2)(c), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 3.1 of the EU MAP Delegated Decision annex. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under the Control Regulation (EC) No 1224/2009 or where data collected under Regulation (EC) No 1224/2009 are not at the right aggregation level for the intended scientific use. Text Box 3.1 should be filled only in case complementary data collection is planned

Explain the reasons for implementing complementary data collection

Data are recorded under the Control Regulation (EC) No 1224/2009. No complementary data collection is planned.

(max. 900 words)

### **Text Box 3.2: Fishing activity variables data collection strategy (for inland eel commercial fisheries)**

General comment: This text box fulfils Article 5(2)(c), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 3.2 of the EU MAP Delegated Decision annex. It is intended to describe the methods and data sources used to estimate fishing capacity, effort and landings data.

MS is invited to describe inland eel commercial fisheries landings, effort and capacity data collection. Please list or describe e.g. number of fishing entities, fishing methods as well as associated units used.

The only diadromous species with a commercial fishery is the eel. The autonomous regions are in charge of the management of the fishery in inner waters (including coastal waters). - Each autonomous region has its own way of managing the stock; different fishing techniques are allowed and the data gathering is performed differently.

#### **EMU\_ES\_Asturias (EMU\_ES\_Astu)**

The only diadromous species with a commercial fishery is the eel. There is only glass eel commercial fishery. The Asturian regional administration is in charge of the management of the fishery in inner waters (including coastal waters). Glass eel fishermen (boat and land licenses) are asked to record daily the glass eel catches (kg) and the fishing effort data (fishing hours), fishing area and market place. This information is received from Nalon river (catches sold at Cudillero and San Juan de la Arena guilds), from Tinamayor exploitation plan (Deva and Cabra rivers whose catches are sold at Bustio guild) and from the free zone (rest of rivers).

#### **EMU\_ES\_Galicia (EMU\_ES\_Gali)**

Only one management unit has been defined in the Galicia-Costa RBD, in which recreational fishing activity has been completely forbidden. Yellow and silver eel fishery is performed from boat using a limited number of gears. The boats need a specific license for the fishing gear that will be used in each fishing trip. They might have more than one fishing gear license, but only one of them can be used in each fishing operation. According to the resolution that allows eel fishing in the Arousa, Ferrol and Vigo Rivers ("Resolución do 23 de decembro de 2010, da Dirección Xeral de Ordenación e Xestión dos Recursos Mariños, pola que se autoriza o plan de pesca de anguía para as confrarías de pescadores das rías de Arousa, Ferrol e Vigo" publicado no DOG nº 251 de 31 de decembro de 2010), the maximum number of sieves is 80, and the fishing period is limited from the 1st of February to the 29th of October. Nowadays, there are 66 boats allowed to fish using the 'butrón' sieve, but only 37 of them are active nowadays. Regarding the 'anguila' sieve, there are 41 boat licenses but this gear has been practically abandoned, and there is only 1 boat currently working with it.

Miño-Sil RBD is one of the most important eel fishing areas in Spain. The Miño River is the most important fishing point. The lower part of the Miño River limits the border of Spain and Portugal and for that reason the permanent International Commission of the Miño is responsible for the management of this part of the River. The catches are established using auctions data from the different fishermen guilds, which are assigned to a determined river basin. In the Galician fishermen guilds, yellow and silver eel catches are not split up. The estuaries are considered basins themselves because of their size, and are managed as basin units. In this way, the estuaries listed below contain catches data from the following fishermen guilds:

- Arousa Estuary: Cambados, Carril, and Rianxo fishermen guilds.
- Eo River: Asturians fishermen guilds.
- Ferrol Estuary: Barallobre, Mugardos and Ferrol fishermen guilds.
- Pontevedra Estuary: Pontevedra fishermen guilds.
- Vigo Estuary: Arcade and Redondela fishermen guilds.

Data from the Miño River are collected from the Miño River Command. Two thirds of the river basin drainage area is located inside the autonomous region of Galicia. The rest of the area is located among Asturias and Castilla-León autonomous regions of Spain, whilst a little part of the lower basin belongs to Portugal. Eel fishing is regulated according to the autonomous region where fishing is carried out. There is an international stretch of Miño between Spain and Portugal. There, the eel fishing is professional and land fishing is allowed only if sieves are used. The conic tackle was allowed only for 2 years after the publication of the regulation of the international stretch of Miño and until the sand barrier of the Miño estuary is dredged that will facilitate the entry of the migratory species.

#### **EMU\_ES\_Murcia (EMU\_ES\_Murc)**

Eel fishery is professional and the minimum landing size for eel is set at 38 cm. The number of boats varies between 30 and 40 per year. Eels are fished using a "paranza" (a fixed box made with net or/and canes) or bottom set long lines. This fishery takes place in the Mar Menor and catches are sold through the "Lo Pagán" guild. The MAr Menor is a hypersaline coastal lagoon.

#### **EMU\_ES\_Valencia (EMU\_ES\_Vale)**

Although there used to be a recreational fishery for adult eel, today in Valencia all fisheries are commercial only.

- Regarding glass eel fishery, actually there are 4 professional associations of glass eel fishermen, all of them in the province of Valencia. In the Albufera, Perelló-Perellonet-Mareny fishing association has the exploitation rights. Albufera's fishermen fish in different "Golas", the channels that connect the Albufera lagoon with the sea. In addition, there is another association which practices professional fishery of glass eel in the Molinell river mouth. All of them use fixed places for glass eel fishery and the only rig allowed on them is named "monot".

- The professional yellow/silver eel fishery is practised with a rig named "mornell", which is the only allowed and has standardised measures. These rigs could be placed in fixed or variable sites. There are several difference between province in the eel professional fishery:

O Valencia: There are 4 fishing associations: In the Albufera, -which is a 2100 ha costal lagoon between Turia and Júcar Rivers-, El Palmar, Silla, Catarroja associations exercise their rights to exploit the yellow and silver eel. Eel fishery in the Albufera has its own regulation and two types of fishing are considered: the fixed place fishing (named "redolins") and the traveling fishing. The fishermen community of El Palmar is the fishing organization with the major tradition and number of members, and the only one that is allowed to fish in fixed places in the lagoon. On the other hand, Molinell association operates in the Molinell river, which constitutes the channel that connects Pego-Oliva marsh (an agrarian landscape with a traditional economic activity) with the sea. They also use fixed places for eel fishery.

O Alicante: In this province, professional fishery occurs in 15 fishing preserves located between the El Hondo wetlands (Elche) and the salt flats of Santa Pola. In the fishing preserve of Alicante, a maximum number of fishing rigs (named "mornells") is allowed.

The fishermen guilds and associations give their catches data to the territorial service of each province responsible for the continental fishing. In the case of glass eel, they also report the fishing days.

#### **EMU\_ES\_Cantabria(EMU\_ES\_Cant)**

Nowadays, only professional glass eel fishery exists in Cantabria, mainly located in the Deva, Nansa, Pas and Campiazo river basin s. Recreational fishery was forbidden in 2015. Professional fishermen sell their catches in the market or in other licensed establishments. Fishermen fish in land and they are only allowed to use one sieve ( $\leq 1.2$  m2) per fishermen. Since 2005, fishermen report their catches.

#### **EMU\_ES\_Cataluña (EMU\_ES\_Cata)**

Eel fishery is professional. There are two RBDs in Catalonia: the Catalonia Inner River Basin, which include small and medium Rivers, and the Ebro RBD, which is the second largest river basin in Spain. The delta of the Ebro River is the most important eel fishing spot in Catalonia regarding the number of active fishermen with license and eel catches. The glass eel fishery is professional in the Ter, Muga and Fluvià Rivers (province of Girona; Catalonia Inner River Basin) and the delta of the Ebro River (province of Tarragona). In both areas, the fishing effort is regulated by the number of fishing licenses and sites. There are 8 fishing entities involved in eel fishery, 3 fishermen guild in the Girona rivers (12 licenses) and 5 fishermen guild in the Ebro (around 250 licenses). Fishing is only allowed for 6 months (October to March). Fishing methods of glass eel are basically by means of adapted fyke nets, placed in the river mouth, canals or along the estuary. Yellow and silver eel recreational fishing is only allowed with rods and 'catch and release' modality, except from the lagoons of the Delta, where there is a professional yellow and silver eel fishery.

(max. 900 words)

## **Section 4: Impact of fisheries on marine biological resources**

### **Text Box 4.2: Incidental catches of sensitive species**

#### **North Sea and Eastern Arctic. Eastern Arctic, Norwegian Sea and Barents Sea (ICES areas 1, 2, FAO area 27)**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species:

Sampling scheme **ESP-IEO\_P5\_AtSea**

See Text Box 4.2: Incidental catches of sensitive species. Other regions. North-West Atlantic (FAO area 21). NAFO.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### **Text Box 4.2: Incidental catches of sensitive species**

#### **North-East Atlantic. North-East Atlantic and Western Channel (ICES areas 5, 6, 7 (excl. 7d), 8, 9, 10, 12 and 14, FAO area 27)**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species:

Sampling scheme **ESP-IEO\_P5\_AtSea**

See Text Box 4.2: Incidental catches of sensitive species. Other regions. North-West Atlantic (FAO area 21). NAFO

Sampling scheme **ESP\_IEO\_P1\_AtSea**

- Has an assessment of the relative risk of bycatch for the different gear types/métiers taken place and been taken into account for the sampling design?

Yes/No

The métiers operating in the Bay of Biscay and Iberian waters have been considered in the risk analysis carried out by the FishPi2 project (MARE/2016/22), published in 2019, when the Spanish at-sea sampling program was already running. Besides, the main objective of the "ESP\_IEO\_P1\_AtSea" sampling scheme is the sampling of commercial catches, so that the mentioned risk analysis was not taken into account for its design or selection of métiers. However, the record and sampling of incidental catch of sensitive species (marine mammals, reptiles, birds and fish) is carried out by the on-board observers. No specific sampling protocol is applied for indicator species of vulnerable marine ecosystems.

- What are the gear types/métiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

According to the conclusions obtained from the FishPi2 project, in the Bay of Biscay (BB) and Iberian (IB) waters the métiers with highest risk of bycatch of sensitive species are, in descending order: set gillnet [GNS], trammel net [GTR], bottom otter trawl [OTB], and set long lines [LLS]. The first and third ones are included in the "ESP\_IEO\_P1\_AtSea" sampling scheme.

MARE 2016-22 - MARE 2016-22 strengthening regional cooperation - European Commission (europa.eu)

- What are the methods to calculate the observation effort?

The observation effort was calculated taking into account the total effort of each sampling stratum, trying to reach 1% of coverage.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

Yes, the guidelines of the expert groups on bycatch (WGBYC) as well as sampling of commercial catches (WGCATCH) have been followed.

Additional information on observer protocols:

The on-board observers collect the following data: identification of species, number and weight of individuals, length measurements,

location and timing of bycatches. In relation to marine mammals, data on the use of acoustic deterrent devices ("*pingers*") on board are also collected: presence/absence, number and model.

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

Yes. All hauls are sampled in the métiers of the national fishing grounds with daily trips. However, not all hauls are sampled in trawlers operating in ICES Subarea 7, whose trips last 12 days on average. In this case, both types of hauls, sampled and unsampled, are properly identified and recorded.

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

Yes

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

Yes

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

Sampling scheme **ESP-AZTI\_AtSea\_PET\_ICES**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

The risk assessment carried out by WGBYC and fishPi project has been considered where in the case of cetaceans bycatch in the Bay of Biscay, the PTB\_8abd is considered as a high risk metier.

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

Based on the final report from ICES WKEMBYC (ICES 2020), in the BoB there are several high-risk metiers regarding cetaceans (in this specific sampling scheme common dolphins). These include, PTB, PS, GNS and GTR. However, in the case of the Spanish fleet in this region, PTB\_8abd, is the most relevant metier considering common dolphins bycatch rates.

- What are the methods to calculate the observation effort?

The coverage agreed is the 2% of the total effort for this metier. This 2% is based on FAO'S 2019, report "FAO. 2019. Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries:

Methodology for data collection. FAO Fisheries and Aquaculture Technical Paper No. 640. Rome, FAO."

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

The sampling design follows the best practice guidelines provided by ICES WKPICS 1,2,3 and WGCATCH expert groups.

Additional information on observer protocols (if already filled in Annex 1.1, indicate where it can be found):

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

Yes. The observers involved in this survey, are experience observers with high training in the identification of these species.

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?



These metiers are not covered under this sampling scheme.

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at “haul level”?

In this sampling scheme, the main objective is the data collection of cetaceans and other megafauna bycatch. The metier sampled is the PTB\_8abd. For this metier the most important phase to check during the fishing operation is the pre-sorting, period, once the codend is onboard. The observer is instructed to check in detail this part of the fishing operation. In addition, and once this checking is finished, the observer also checks the conveyor belt to identify any other rare species bycatch and is instructed to indicate the % of the observed period.

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## **Text Box 4.2: Incidental catches of sensitive species**

### **Mediterranean Sea and Black Sea (GFCM GSA 1-29, FAO area 37)**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species:

Sampling scheme **ESP-IEO\_P2\_AtSea**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

Not yet. The RCGMed&BS 2021 has planned a workshop to agree at regional level the list of high risk métiers on bycatch by group of sensitive species. In 2022.

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

Spanish Mediterranean: following the results of the three pilot studies on bycatch (2018: study of bycatch in bottom trawlers; 2019: study of bycatch in set longliners; 2021: study of bycatch in set nets), the metier with the highest risk of bycatch per species/taxa of PETS is OTB\_DEF.

- What are the methods to calculate the observation effort?

The PSU is the fishing trip. The observation effort should be up to 0.5 % of the average number of fishing trips of the previous years in the sampling stratum.

Methods: Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection. FAO Fisheries and aquaculture Technical Paper N° 640. Rome, FAO.

Link: <http://www.fao.org/gfcm/publications/series/technical-paper/640/en/>

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

Y

Sampling design and protocol: Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection. FAO Fisheries and aquaculture Technical Paper N° 640. Rome, FAO.

Link: <http://www.fao.org/gfcm/publications/series/technical-paper/640/en/>

Additional information on observer protocols:

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

Y

Y

Observers sampling protocol (handbook): MED2. Manual de instrucciones para observadores a bordo

Link: [http://www.ieo.es/es\\_ES/web/ieo/pndb](http://www.ieo.es/es_ES/web/ieo/pndb) (section P2: Evaluación de recursos pesqueros en el Mediterráneo)

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

Not sampling planned in gill nets and hook and line fisheries

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

Y

Observers sampling protocol (handbook): MED2. Manual de instrucciones para observadores a bordo

[http://www.ieo.es/es\\_ES/web/ieo/pndb](http://www.ieo.es/es_ES/web/ieo/pndb) (section P2: Evaluación de recursos pesqueros en el Mediterráneo)

Additional information on sampling schemes

No Additional information

Additional description on sampling frames

No Additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## Text Box 4.2: Incidental catches of sensitive species

### The outermost regions. EU waters around Canary islands (FAO area 34.1.2)

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species

Sampling scheme **ESP-IEO\_P3\_AtSea\_Canarias**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

Yes

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

Trawlers

- What are the methods to calculate the observation effort?

Checked for birds, mammals and reptiles in all fishing hauls. Checked for fishes in random hauls.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

Yes

Additional information on observer protocols:

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

Yes

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

No

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

Yes

Additional information on sampling schemes

ESP-IEO\_P3\_AtSea\_Africa; ESP-IEO\_P3\_AtSea\_Canarias: Onboard observers are instructed to collect data on by-catch species. A specific datasheet is designed to collect information on turtles, including measurements, physical state and geographic position. Moreover, if other rare specimens (marine mammals and birds) would appear the observer on board is required to identify and record their catch.

Additional description on sampling frames

Though no mitigation devices are used in the trawler fleets (OTB\_CRU\_>=40\_0\_0, OTB\_DEF\_>=70\_0\_0; OTB\_MCF\_>=70\_0\_0), no marine mammals or birds have been caught. Each haul is checked for birds, mammals and reptiles. For fishes it is checked in random hauls only.

It must be noted that Spanish onboard observer program in the trawler fleets was not originally designed for the recording of incidental by-catch of pets but to monitor and record data of retained catches and discards and to collect sampled in order to estimate discards and to calculate biological variables/parameters of commercial species.

(One text box (max. 1 000 words) per region/RFO/IO)

## **Text Box 4.2: Incidental catches of sensitive species**

### **Other regions. North-West Atlantic (FAO area 21). NAFO**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

#### Additional information on planning the observation of incidental catches of sensitive species

##### Sampling scheme **ESP-IEO\_P5\_AtSea**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

No assessment of the relative risk of bycatch have been taken place as the only gear type monitored in the area is OTB

The main objective of the "ESP\_IEO\_P5\_AtSea" sampling scheme is the sampling of commercial catches.

Furthermore, the record and sampling of incidental catch (all protected sea birds, mammals, reptiles and fish species) is carried out by the observers for all fisheries.

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

OTB\_MDD\_40-60-130-280 (NAFO 3LMNO) and OTB\_DWS\_100-129 (ICES 12, 6b1).

- What are the methods to calculate the observation effort?

The sampling effort is allocated according to the scientific experience gained from the study of fisheries in the area. The number of fishing trips was calculated based on data from previous years in order to keep the coverage from previous years and to comply with the requirements of the end users.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

Y

Working Group to Reflect on the Rules Governing Bycatches, Discards and Selectivity in the NAFO Regulatory Area (WG-BDS).

ICES Working Group on Bycatch of Protected Species (WGBYC).

ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC).

##### Additional information on observer protocols:

Observers on board have instructions for collecting data on incidental by-catch species. Specific forms designed for recording data of by-catch including measurements, photographs, physical condition of the carcass and geographic location are included in the observers manual. Observations of marine mammals and seabirds are also collected by observers opportunistically.

Observers collect the following data: identification of species, number and weight of individuals, length measurements and hauls data of by catch.

Pictures of by catch species are taken by observers using a camera for data validation at the Lab.

However the onboard observer instructions do not indicate the need to record if the codend is (or not) checked for every haul or if and wich percentage of the sorting process has been checked.

The bycatch data are stored in a national data base and submitted to end users when data are required.

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

Y.

Observers remain on board during the entire trip that can last around 1-3 months. Then, they do not sample all hauls. However all hauls, sampled and unsampled, are recorded.

When in a haul there is a significant occurrence of a sensitive species, the observer has to sample the haul.

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

Not sampling planned in gill nets and hook and line fisheries

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

Yes

Additional information on sampling schemes

No additional information

Additional description on sampling frames

OTB\_MDD\_40-60-130-280 (Bottom trawlers operating in NAFO SA3 targeting Greenland Halibut, Cod, Redfish, Skates, Squid and Shrimp)

In the NAFO fishery the by-catch of Greenland sharks (*Somniosus microcephalus*) has been analyzed

<https://www.nafo.int/Portals/0/PDFs/sc/2017/scr17-023.pdf?ver=2017-08-29-103932-237>

The data analysis shows that Greenland sharks is not abundant and that this species appears in these divisions sporadically and in depths of more than 300 meters.

OTB\_MDD\_40-60-130-280 (Bottom trawlers operating in NAFO SA3 targeting Greenland Halibut, Cod, Redfish, Skates, Squid and Shrimp) and OTB\_DWS\_100-129 (Bottom trawlers operating in Hatton targeting deepwater species)

A specific sampling protocol is applied for sampling indicators of benthic invertebrates in OTB fisheries. The sampling design is done to check the sorting process of 10% hauls and when there is an important occurrence of organisms as well.

(One text box (max. 1 000 words) per region/RFO/RFO/IO)

## Text Box 4.2: Incidental catches of sensitive species

### Other regions. Eastern Central Atlantic (FAO area 34). CECAF

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species

Sampling scheme **ESP-IEO\_P3\_AtSea\_Africa**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

Yes

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

Trawlers

- What are the methods to calculate the observation effort?

Checked for birds, mammals and reptiles in all fishing hauls. Checked for fishes in random hauls.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

Yes

Additional information on observer protocols:

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES

is the observer instructed to indicate if the cod-end was NOT checked in a haul?

Yes

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

No

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)?  
Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at “haul level”?

Yes

Additional information on sampling schemes

Member State may add specific contextual information related to a region and the implementation year(s), for instance highlighting new developments not yet detailed in the quality document, regional adaptation and/or perspectives for the future. Insert the information under the same sampling scheme identifier as in Table 2.5.

Onboard observers (ESP-IEO\_P3\_AtSea\_Africa; ESP-IEO\_P3\_AtSea\_Canarias) are instructed to collect data on by-catch species. A specific datasheet is designed to collect information on turtles, including measurements, physical state and geographic position. Moreover, if other rare specimens (marine mammals and birds) would appear the observer on board is required to identify and record their catch.

Additional description on sampling frames

Member State may add complementary description to what includes the ‘Sampling frame description’ column of Table 2.5. Insert the information under the same identifier and name as in columns ‘Sampling frame identifier’ and ‘Sampling frame description’ of Table 2.5, and in the same order (Sampling frame identifier + Sampling frame description).

Though no mitigation devices are used in the trawler fleets (OTB\_CRU\_>=40\_0\_0, OTB\_DEF\_>=70\_0\_0; OTB\_MCF\_>=70\_0\_0), no marine mammals or birds have been caught. Each haul is checked for birds, mammals and reptiles. For fishes it is checked in random hauls only.

It must be noted that Spanish onboard observer program in the trawler fleets was not originally designed for the recording of incidental by-catch of pets but to monitor and record data of retained catches and discards and to collect sampled in order to estimate discards and to calculate biological variables/parameters of commercial species.

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## **Text Box 4.2: Incidental catches of sensitive species**

**Other regions. Atlantic Ocean and adjacent seas (FAO areas 21, 27, 31, 37, 41, 47, 34, 48).**

**ICCAT**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species

Sampling scheme **ESP\_IEO\_P4\_AtSea\_all**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

Yes.

Cortés, E., A. Domingo, P. Miller, R. Forselledo, F. Mas, F. Arocha, S. Campana, R. Coelho, C. Da Silva, F.H.V. Hazin, H. Holtzhausen, K. Keene, F. Lucena, K. Ramirez, M.N. Santos, Y. Semba-Murakami, and K. Yokawa (2015). Expanded ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. Collect. Vol. Sci. Pap. ICCAT 71:2637–2688.

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

Longliners and purse seiners.

- What are the methods to calculate the observation effort?

In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.

In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs

Additional information on observer protocols:

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.

The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at “haul level”?

The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## Text Box 4.2: Incidental catches of sensitive species

### Other regions. Indian Ocean (FAO area 51 and 57). IOTC

<p>General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.</p>
<p>This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.</p> <p>Additional information on planning the observation of incidental catches of sensitive species:</p> <p>Sampling scheme <b>ESP_IEO_P4_AtSea_all</b></p> <p>- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?</p> <p>Yes.</p> <p>Murua, H., J. Santiago, R. Coelho, I. Zudaire, C. Neves, D. Rosa., I. Zudaire, Y. Semba, Z. Geng., P. Bach, H. Arrizabalaga, P. Bach, J.C. Baez, M.L. Ramos, J.F. Zhu &amp; J. Ruiz (2018). Updated Ecological Risk Assessment (ERA) for shark species caught in fisheries managed by the Indian Ocean Tuna Commission (IOTC). Submitted to 21th IOTC Scientific Committee. IOTC-2018-SC21-14_Rev.1.</p> <p>- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?</p> <p>Longliners and purse seiners.</p> <p>- What are the methods to calculate the observation effort?</p> <p>In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.</p> <p>In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.</p> <p>- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.</p> <p>The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs</p> <p>Additional information on observer protocols:</p> <p>- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?</p> <p>The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.</p> <p>- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?</p> <p>As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.</p> <p>The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices</p> <p>- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul</p>



level”?
The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).
Additional information on sampling schemes
No additional information
Additional description on sampling frames
No additional information
(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## Text Box 4.2: Incidental catches of sensitive species

### Other regions. Western Central Pacific (FAO area 71). WCPFC

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.
<p>This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.</p> <p>Additional information on planning the observation of incidental catches of sensitive species:</p> <p>Sampling scheme <b>ESP_IEO_P4_AtSea_all</b></p> <p>- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?</p> <p>No</p> <p>- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?</p> <p>Longliners and purse seiners.</p> <p>- What are the methods to calculate the observation effort?</p> <p>In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.</p> <p>In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.</p> <p>- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.</p> <p>The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs</p> <p>Additional information on observer protocols:</p> <p>- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?</p> <p>The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.</p> <p>- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how</p>

much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.

The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at “haul level”?

The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

#### **Text Box 4.2: Incidental catches of sensitive species**

##### **Other regions. Eastern Central Pacific (FAO area 77 and 87). IATTC**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species:

Sampling scheme **ESP\_IEO\_P4\_AtSea\_all**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

No

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

Longliners and purse seiners.

- What are the methods to calculate the observation effort?

In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.

In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate

references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs

Additional information on observer protocols:

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.

The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

## **Text Box 4.2: Incidental catches of sensitive species**

### **Other regions. Antarctic and Southern Indian Ocean (FAO area 48, 58 and 88). CCAMLR**

General Comment: This text box fulfils Article 5(2)(a) and (b), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2 point 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

This text box is complementary to information on the sampling schemes provided in the quality document (Annex 1.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species:

Sampling scheme **ESP\_IEO\_P5\_AtSea-CCAMLR**

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?

No assessment of the relative risk of bycatch for different gears has been done as the only gear type monitored in the area is LLS.

The objectives of the "ESP\_IEO\_P5\_AtSea\_CCAMLR" sampling scheme is the sampling of retained and discarded catch, incidental catch and potential VMEs.

The record and sampling of incidental catch (sea birds, mammals and reptiles) is carried out routinely although the incidence has been found to be very low.

- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

LLS\_DWS\_0\_0\_0 in 88.1 and 48.6 CCAMLR subareas.

- What are the methods to calculate the observation effort?

There are two observers designated on board and the observer's coverage for the LLS fleet is 100%. A tally period of a minimum of 25% of the hooks in every haul must be observed for each of the observers.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

Y

The Scheme of International Scientific Observation (SISO) meets periodically in a Workshop. The last meeting was in 2017. Forms and procedures are reviewed and all recommended changes are submitted to the Scientific Committee for their approval.

There is a Working Group on Incidental Mortality Associated with Fishing but it has not met since 2011.

The Working Groups on Fish Stock Assessment (FSA) and Statistics, Assessments and Modelling (SAM) meet annually and usually make recommendations to the SC about improvements in the data collection.

Additional information on observer protocols:

Observers on board have instructions for collecting data on incidental by-catch species. Specific forms designed for recording data of by-catch including measurements, photographs, physical condition of the carcass and geographic location are included in the observers manual and forms. Observations of marine mammals and seabirds are also collected opportunistically by observers.

Observers collect the following data on incidental catch: identification of species, number and weight of individuals, length measurements and haul data.

Pictures of the incidental catch species are taken by observers using a digital camera for data validation at the Lab when in doubts.

The self-training guide is useful for seabird identification. (Annex 1.1)

All vessels must carry the guide "Fish the Sea not the Sky" on board and have it visible to the crew:  
<https://www.ccamlr.org/en/document/publications/fish-sea-not-sky>

The incidental catch data are stored in the CCAMLR data base and submitted to end users when required to the CCAMLR Secretariat and agreed by the original data base owners.

- Does the on-board observer protocol contain a check for rare specimens in the catch at opening of the cod-end? If YES is the observer instructed to indicate if the cod-end was NOT checked in a haul?

NA.

This is a LLS fishery.

- In gill nets - and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

Yes.

Observers should monitor interactions of seabirds and marine mammals with fishing gear in all CCAMLR fisheries. It is critical that an observer differentiates between observations recorded during assigned observation periods and those recorded when the observer is alerted by the vessel, as this has an effect on mortality calculations. For example, if the crew delivers a dead bird to the observer and tells him that it was found during the turning of the gear, this should be made clear in the scientific observation logbook

- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul

level”?
Yes.
The observers form includes the number of hooks observed
A specific sampling protocol is applied for sampling indicators of benthic invertebrates in lonliners operating in the Southern ocean for all areas. The sampling design is done to check the sorting process of 25% of the hauls and when there is an occurrence of invertebrate organisms above the established threshold. The protocol is available in the CCAMLR web page:
<a href="https://www.ccamlr.org/en/compliance/vulnerable-marine-ecosystems-vmes">https://www.ccamlr.org/en/compliance/vulnerable-marine-ecosystems-vmes</a>
Additional information on sampling schemes
No additional information
Additional description on sampling frames
No additional information
(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

### Text Box 4.3: Fisheries impact on marine habitats

General comment: This text box fulfils Article 5 paragraph 2(a) and 2(b), Article 6 paragraph 3(a), 3(b) and 3(c) of Regulation (EU) 2017/1004 and Chapter 2, section 4.2 of the EU MAP Delegated Decision annex. It contains information on additional studies on the fisheries impact on marine habitats. This text box applies to the work plan and the annual report.
1. Aim of the study
No additional studies planned.
2. Duration of the study
3. Methodology and expected outcomes of the study
(max 900 words per study)

## Section 5: Economic and social data in fisheries

### Text Box 5.2: Economic and social variables for fisheries data collection

General comment: This Text box fulfils Article 5(2)(d), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 5 of the EU MAP Delegated Decision annex. It is intended to specify data to be collected under Tables 7, 8 and 9 of the EU MAP Delegated Decision annex.
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### 1. Description of clustering

The fleet segmentation is carried out assessing for each vessel: the main gear used during the year under study; the length of the vessel; and the fishing ground where most of its activity takes place. To be included in any segment, vessels must have at least one day of activity. Once we have classified all vessels into different segments, we perform the clustering.

This clustering is carried out to maintain statistical confidentiality in those segments where there is a low number of vessels. When this happens, we unify segments that are similar to other segments. This clustering consists, in general, of unifying these segments with others that are slightly smaller or larger than them, but that use the same gear and fish in the same Region.

When this is not possible, segments that use different gears can be unified (for instance, DFN with PMP), or even segments that fish in a region next to other region can also be unified. However these vessels are not included in the economic survey as they are not really representative of the segment.

### 2. Description of activity indicator

Activity indicator based on salaries is not applied in the Spanish Fleet because this data is subsequently obtained from the Economic Survey. However, we consider this variable is not representative of the real activity, since the salary obtained by the shipowner may come from other sources of income independent of fishing activity.

### 3. Deviation from the RCG ECON (ex. PGECON) definitions

No deviation

(max. 900 words)

## Section 6: Economic and social data in aquaculture

### Text Box 6.1: Economic and social variables for aquaculture data collection

General comment: This text box fulfils Article 5(2)(e), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 6 of the EU MAP Delegated Decision annex. It is intended to specify data to be collected under Tables 10 and 11 of the EU MAP Delegated Decision annex.

### 1. Description of the threshold application

Data extracted on 27/10/2021 12:54:25 from [ESTAT]

Dataset: **Production from aquaculture  
excluding hatcheries and  
nurseries (from 2008 onwards)  
[FISH\_AQ2A\$DEFAULTVIEW]**

Last updated: 14/10/2021 23:00

Time frequency: Annual  
Aquaculture method: All methods  
Aquatic environment: Total  
Species: total fishery products  
Fishing regions: Total fishing areas  
Unit of measure: Tonnes live weight

TIME	2019	2019		
GEO (Labels)	Tonnes	%Production	€	%Value
European Union - 27 countries (from 2020)	1.114.378,9683		3.478.757.685	
Belgium	86	0,01%	538.016	0,02%
Bulgaria	11.959,376	1,07%	29.676.074,321	0,85%
Czechia	20.989	1,88%	41.236.773,6226	1,19%
Denmark	40.221,41	3,61%	:	:
Germany (until 1990 former territory of the FRG)	37.998,4	3,41%	137.934.192	3,97%
Estonia	1.061,9693	0,10%	3.748.344,48	0,11%
Ireland	34.977	3,14%	157.663.391	4,53%
Greece	128.747,9	11,55%	508.064.962,98	14,60%
Spain	306.507,43	27,50%	632.217.529,6929	18,17%
France	194.328,3152	17,44%	758.561.530,7051	21,81%
Croatia	20.443,945	1,83%	120.687.212,389	3,47%
Italy	126.476,95	11,35%	399.013.411,197	11,47%
Cyprus	8.079,1	0,72%	43.752.799,9	1,26%
Latvia	626,4	0,06%	1.847.880	0,05%
Lithuania	3.775,2	0,34%	11.975.235,1568	0,34%
Hungary	17.315,12	1,55%	35.985.338,3406	1,03%
Malta	13.823,4378	1,24%	161.912.204,98	4,65%
Netherlands	45.750	4,11%	78.412.142,76	2,25%
Austria	4.250,025	0,38%	29.654.489,9372	0,85%
Poland	39.730,54	3,57%	104.191.372,8055	3,00%
Portugal	12.880,76	1,16%	108.029.648,6126	3,11%
Romania	:	:	:	:
Slovenia	2.138,2	0,19%	6.391.935,08	0,18%
Slovakia	2.688,69	0,24%	7.099.933,8355	0,20%
Finland	15.295,8	1,37%	62.369.684,5	1,79%
Sweden	11.600	1,04%	37.793.580,68	1,09%

Special value

: not available

No thresholds apply

2. Deviation from the RCG ECON (ex. PGECON) definitions

No deviation

(max. 900 words)

## **Section 7: Economic and social data in fish processing**

### **Text Box 7.1: Economic and social variables for fish processing data collection**

General comment: This text box fulfils Article 5(2)(f), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 7 of the EU MAP Delegated Decision annex. MS should provide justification for complementary data collection for fish processing.

This text box is optional, since all information on the sampling schemes is available in Annex 1.2 document template. MS is invited to highlight additional information here on sampling schemes and sampling frames deemed necessary to understand the actual sampling design planned for the region and the implementation year(s).

The data collected by the industrial survey is used as structural statistics to respond to the regulatory needs imposed by the EU  
(max. 900 words)