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 27 April 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 27 April 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) 2022/39 of 12 January 2022

laying down rules on the format and timetables for the submission of national work plans and annual reports for data collection in the fisheries and aquaculture sectors, and repealing Implementing Decisions (EU) 2016/1701 and (EU) 2018/1283

Spain Annual Report on data collection in the fisheries and aquaculture sectors

2024

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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

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 colaborates 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). 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

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 Ugartea 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). 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 weigth=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 plannified 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

STOMACH

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)

STOMACHS

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

Here we summarise the main results achieved during the three-year period of the present test study, which have contributed to accomplish the aims of the test study.

i) To establish a framework for the inclusion of genetic-derived stomach content data into the fisheries and ecosystem assessment process, **we have understood the potential and limitations of genetic methods (specifically DNA metabarcoding) for obtaining trophic data** based on literature search and on the results genetic analyses of stomach contents of several commercial species. DNA metabarcoding allows for higher prey taxonomic identification accuracy (with no need of taxonomic expertise), higher prey detection capability (including degraded remains), and finer temporal and spatial diet shift detection. However, it does not provide information on prey age, size, developmental stage, or cannibalism, it is not able to discern between primary and secondary consumption, nor provide absolute measures of prey ingestion. Taking advantage of the multidisciplinary expertise of the working group, we **have also gained insight into the potential and limitations of genetics-derived trophic data as input for ecosystem models**. We have used DNA metabarcoding-derived trophic data as input for ecosystem models (specifically Ecopath) for three commercially relevant species in the area: MAC, HOM, and BWH. DNA metabarcoding-based data could be easily incorporated into the model, but it tended to increase the total relative impact and keystoneness for these species. Although further research is still needed, these results are encouraging and represent the first step for a future, informed incorporation of genetics-based trophic data in ecosystem models.

ii) **We have developed a protocol for genetic analysis of stomach content through DNA metabarcoding**. The main novelty of the method is the processing of entire stomachs—notably reducing the time needed for stomach processing in the laboratory (no need for content extraction) and limiting cross-contamination between samples—while maximising amplification of prey DNA over predator DNA thanks to the use of species-specific blocking primers.

iii) **The method has been applied to the stomach contents of several fish species** (HOM, MAC, ANE, PIL, HKE, BWH, SKJ, BET, YFT, ELE) and, when needed, species-specific blocking primers were developed. Results indicated an overall good performance of the method and the blocking primers, in most cases with more than 80% of sequences corresponding to prey. Additionally, for HOM, MAC, and BWH, **genetic-derived results were compared to those obtained visually** to assess the accuracy of genetics methods for determining the diet of fish. As expected, a notably larger number of prey were identified through genetics, including gelatinous organisms such as cnidarians, usually overlooked by visual means.

iv) In order to set the basics of a routine food-web monitoring program through genetic analyses of stomach contents, we have revised existing stomach sampling guides to identify those steps that need to be adjusted for genetic analysis, and **developed a stomach sampling protocol proposal that ensures an appropriate stomach collection and preservation for genetic analysis**. The protocol was specifically built upon the sampling guide developed within the ISSG stomachs working group (named "*At-sea sampling manual*"). Cross-contamination and stomach preservation were identified as the main issues potentially affecting the sample and data quality, and a "strategy of minimum changes" attitude was adopted to adjust the guide to meet the requirements of genetic analysis. Additionally, two questionnaires were distributed to "modelling experts" and "dietary DNA metabarcoding experts" **to assess the general perception on the potential and benefits of DNA metabarcoding for dietary analysis and as input data for ecosystem models**. DNA metabarcoding-derived data is perceived as useful input for ecosystem models, mainly complementing historical and visually based data. However, most modellers have not considered yet the use of genetics-based trophic data in their models due to lack of available data and lack of framework on how to informedly incorporate this kind of data into the models, although they are mostly willing to use it in the recent future.

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

Outcome 1 and 2 have been achieved and are available in form of a scientific paper (Canals et al. 2024, doi: 10.1111/jfb.15754). It was also presented in the 2023 and 2024 ISSG stomachs annual meetings (RCG NANSEA Baltic) and in international conferences (ICES ASC 2023, FSBI 2023). Regarding the outcome 3, a sampling strategy for routine monitoring of stomach content analyses through genetics was elaborated (see 2023 TROGEN report in the link below), which was presented and discussed in the 2024 ISSG stomachs annual meeting.

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

Genetic analysis of stomach contents is not going to be incorporated (for now) in regular samplings. Although we have demonstrated great potential of DNA metabarcoding for providing trophic data and potentially feed ecosystem models, there is not yet a clear, straightforward use of this data by end users, among others due to lack of an informed framework on how to incorporate this kind of data into ecosystem models. Discussions were promoted in proper fora (e.g., ISSG stomach meetings, international conferences, ICES WKFoodWeb), but the field is not mature enough, and further research is still needed to establish a proper framework. In any case, sampling guides and methodology for genetic analysis of stomach contents are ready to be applied in a future scenario of growing interest. The method (DNA metabarcoding) and the data it provides are indeed promising and can certainly fill important data gaps for more robust application of ecosystem-based approaches.

Annual reports of TROGEN (test study's project name in AZTI), the manuscript published (Canals et al. 2024) and the pdf version of the presentations presented in the ISSG meetings of 2023 and 2024 are available in the following link: AZTI test-study stomachs 2022-2024 (password: trogen_2022-2024).

(max 900 words per activity)

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.
    (a) Identification and delimitation of fishing grounds for each fishing gear. Estimation of fishing effort based onVessel Monitoring System (VMS) and Automatic Identification System (AIS) data.
    (b) Field surveys. Different survey technologies will be applied according to benthic habitats under study.
        (a) 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)
        (b) 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.
        (c) 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.
        (d) 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 rutinary marine fisheries surveys will be evaluated.

4. Expected outcomes

- Incorporation of the developed approach under rutinary 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.

(max 900 words per study)

HABITATS

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

The third year of the project has been focused on giving continuity to the acquisition of the necessary data for the subsequent assessment of the impact of mobile and static fishing gears on the seabed, and the work has therefore focused on the study of the environmental status of fishing grounds. Samples of surface sediments and macro infauna have been taken with dredges, samples of mega epifauna have been obtained with bottom trawls using a beam trawl net, while microbenthic samples have been obtained with a sediment grab.

The sampling stations were selected based on three factors:

• stations with similar characteristics but located in different isobaths,

• geographically close stations but with different levels of bottom fishing restrictions (partial or total closure to trawling), and

•stations characterized by different fishing effort intensities.

Sediment and fauna sampling was carried out in two oceanographic surveys. The first took place from April 23 to 30 and the second from June 23 to 30, 2024. Both campaigns were carried out onboard the R/V Emma Bardán of the General Secretariat of Fisheries (SGP).

Over the course of the campaigns, a total of 37 surface sediment samples were obtained. The results indicate a great variability in terms of mean grain size (64 -235 µm) and content of silt and clay (5.1-78%), sand (21.9-94.8%), gravel (0.01-4.44%) and organic matter (1.9 - 5.9%). An accumulation of muddy material is observed in the stretch of the continental shelf between Ondárroa and San Sebastián (DF01, DF02, DF16, DF42, DF43, DF45, DF46 and DF70), at depths of around 100 and 150 m and at two stations (DF35 and DF37) located in the easternmost part of the study area. The same spatial distribution is observed in the case of organic matter content, with the sediment from the same area having the highest content.

A total of 37 infauna (macrobenthos) samples were obtained and have been conserved for future laboratory analysis.

A total of 37 trawls have been carried out with a beam trawl. The results of the analysis of epifaunal communities indicate an average density, specific richness and biomass of 0.607 individuals·m^{-2} (±0.99 ind·m-2), 0.014 taxa·m^{-2} (±0.003 taxa·m^{-2}), and an average biomass of 2.210 g·m^{-2} (±3.185 g·m^{-2}). As for the spatial distribution of density, specific richness and biomass, the highest values are generally observed in the eastern area near Pasaia.

The processing of the 42 videos obtained with the ROV in the 2023 campaign has been initiated. To this end, we have started with the identification and manual labelling of thirteen benthic taxa in the videos, six from sedimentary substrate and seven from rocky substrate, using CVAT software. These organisms have been selected because they are common in the study area, conspicuous and sensitive to trawling pressures. This information will be used to train a model that will allow the automation of species identification in the videos and the subsequent calculation of densities and biomasses.

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

The oceanographic survey was successfully performed and the objectives set were achieved.

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

The preliminary results indicate that the data that are being obtained with the sampling techniques that are being developed within the HABITAT campaigns (2022, 2023 and 2024), generate valuable information for the subsequent analysis of the effects, on benthic communities, of fishing gears in contact with the bottom. Future work includes a detailed analysis of the results obtained in the 2024 campaigns and their posterior integration with those of the 2022 and 2023 campaigns.

The results obtained during the current study can contribute to the assessment and monitoring of the environmental and conservation status of benthic habitats and the impact produced by bottom-contact fishing gears. The incorporation of the developed approach in routine

campaigns is considered highly relevant, as it contributes to collecting information that allows developing knowledge to continue advancing towards efficient fisheries management, including spatially and temporally explicit management measures; and provides information for an ecosystem management of fisheries.

(max 900 words per activity)

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)

PETFISH

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

Along 2024, several achievements have been made:

- Information on bycatch has been updated with data collected along 2024. Since reporting bycatch became mandatory in 2018, up to 22 ETP species have been caught in the fleets monitored with AZTI's observers (excluding bonny fishes and commercial cartilaginous fishes). Each gear, given its intrinsic characteristics, catches different species, although in general, the species caught in greater numbers are the chimaera (*Chimaera monstrosa)*, sunfish (*Mola mola*), blue skate (*Dipturus batis*), marbled electric ray (*Torpedo marmorata*), flapper rays (*Dipturus intermedius*), common dolphins (*Delphinus delphis*) and, to a lesser extent, the Atlantic gannet (*Morus bassanus*).
- For the specific cases of common dolphin, northern gannet and sunfish, hot spots or areas of high bycatch were estimated using kernel densities. Kernel density distributions were estimated and plotted for the 2018-2024 period and by season. The results showed similar high-density zones for the three species, which were located between Arcachon and La Rochelle. At the temporal level, very localized high-density zones were observed for some species and seasons; this is the case for common dolphins in autumn and winter and sunfish in winter, summer and autumn. However, it is necessary to contrast these results with the cumulative effort of the fleet involved to better understand the distribution of the catch.
- The length measures and sex ratio of common dolphins were registered over 2022-2023-2024 and analysed. The analysis of the sex ratio resulted in a clear bias, with 80% of the individuals being male, while the length study revealed that the average length of the males corresponded to sub-adult individuals. Sex and age segregation in dolphins is relatively common and up to three groups have been described; the individuals captured here could be part of the so-called bachelor groups, groups composed of males.
- Two oceanographic surveys were conducted in 2024, allowing us to collect data on ETP species distribution for May and September. Some of the species recorded here are also caught incidentally by different fleets, such as northern gannet, common dolphin, bottlenose dolphin, norther fulmar, Balearic shearwater and great shearwater.
- Using the sightings collected in the aforementioned surveys, we estimated the encounter rates (sightings/km) for common dolphins and northern gannets along 2018-2024 and then compared with their bycatch rates. In the case of common dolphins, both indicators showed similar patterns, suggesting that the encounter rate may be a good indicator of their abundance and, therefore, of catches. However, in the case of the gannet, the same correlation was not observed, indicating that other factors could be influencing its capture. This analysis highlights the importance of considering multiple variables and approaches when studying the relationship between sightings and catches for different species.

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

- A expert committee gathering scientists with multidisciplinary background in ETP species ecology, sustainable fishery, ecosystem functioning, and fisheries monitoring has been created to share and discuss latest topics.
- The PET monitoring protocol has been refined to include not only the information required by EUMAP (EUMAP, 2017/1004/EC and 2016/1251/EU) but also to include additional data that will contribute to better understand the bycatch issue such as the number of individuals that were present during the fishing operations, the environmental conditions or the number of fishing vessels around. Protocols also contain now the information to conduct muscle, sex and body length sampling. Efforts are also being made to improve the usefulness of the database so that all data can be easily stored and extracted when needed.
- Integration of ecosystem level information is possible thanks to the annual oceanographic surveys that combine distribution and abundance patterns of top predators, fish species and oceanographic conditions, making possible to understand the biotic and

abiotic drivers of marine communities, including ETP species. An example of that is the use of the sightings recorded in the surveys as an index of abundance to better understand the variations in the bycatch rates.

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

The recording of the number of ETP species during the fishing operation, the number of vessels around, the environmental conditions, and the biological sampling of the cetaceans caught have been included into the regular sampling as a result of the test study.

The census of ETP species (both seabirds and cetaceans) during the fishing are useful to assess the selectivity of the gear/fishery. Two fisheries may have the same bycatch rate, based on specimens caught per day, but completely different behaviour. One may attract many individuals but catch only few of them, while the other may catch all the individuals that it has attracted. Information on selectivity, for example, is important for conducting Spatial Bycatch Risk assessments. Similarly, the recording of environmental conditions is also important to determine how they affect to the bycatch rates; for example, strong winds can affect the flight of some seabird species and facilitate their entanglement in the net. The collection of length measures and sex ratio are also important because they provide demographic information that can help assess how bycatch is affecting to the population, for example to immature individuals. In addition, given the difficulty to obtain samples of these species, muscle samples should also be collected, when possible, to obtain information on the diet that may help better understand the drivers leading bycatch.

(max 900 words per activity)

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 rutinary marine recreational fisheries surveys.

(max 900 words per study)

RECREATIONAL

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

This study finished in 2023 and has been incorporated as a routinary sampling

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

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

(max 900 words per activity)

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)

CULTIVOS

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

In 2024, 7 mollusc sampling campaigns have been carried out in the estuarine mollusc production areas of the Basque coast, and 6 water and mollusc sampling campaigns in the coastal mollusc production area of Mendexa.

In the five estuarine production zones/sub-areas (Hondarribia, Mundaka-Arketas, Mundaka-Portuondo, Mundaka-Kanala and Plentzia), monthly sampling was carried out between January and March, and between October and December to obtain samples of molluscs (mussels or oysters) for analysis of *Eschericia coli* (*E. coli*). In addition, in the sampling campaign carried out in May, samples of molluscs were taken for the analysis of *E. coli* and the pollutants required by current legislation (metals, PAHs, Dioxins and PCBs).

In Mendexa, 6 sampling campaigns were carried out by AZTI throughout 2024 to take samples of molluscs.

A total of 36 samples of molluscs (mussels or oysters) were taken for *E. coli* analysis, 6 samples for *Salmonella* analysis, 6 samples for metal analysis (Cd, Hg, Pb), 6 samples for PAHs analysis, 4 samples for dioxins and PCBs analysis (other samples were taken in BIOTOX project for biotoxins analysis). No sampling for phytoplankton or biotoxin analysis was carried out, as there was no mollusc production.

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

The original expected outcomes of the study have been achieved

Follow-up to the activities (what are the next steps, how the results will be used).

The analytical results obtained have enabled the classification of the mollusc production areas for 2024 (report sent in September to the Basque Government's Directorate of Fisheries and Aquaculture).

(max 900 words per activity)

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.

- **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:

- Stablish 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.

- **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

Stablish routine procedures for data collection and database management. This requires from stablishing 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-Irineo, 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, Loreleï 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)

IDAO

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

An extensive evaluation was conducted on millions of acoustic records from the main RFMOs, covering the period from 2012 to 2024. These records were used in the GLMM analysis to develop the BAI indexes, which rely on acoustic data from FADs employed by the purse seine fleet for tropical tuna fishing. Each observation was determined as the 90th percentile of a "virgin" segment of buoy trajectories, indicating a deployment that has the potential to attract tuna but has not yet been fished.

The methodology for producing the BAI indexes has been refined and improved over the past year, building on previous work for tropical tuna populations in the main oceans (Santiago, Uranga et al. 2019, Santiago, Uranga et al. 2020a, Santiago, Uranga et al. 2020b, Uranga 2021). To maximize the utility of this information source, ongoing efforts are focused on exploring enhancements and making the methodology adaptable to the specific needs of each area within each RFMO.

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

The primary objectives of this research are being met, and the use of these BAI indices is becoming well-established in various assessment committees that discuss tropical tuna stocks to provide scientific advice for decision-making. Besides their use in annual meetings, where they offer partially independent indicators from fisheries, continuous exploration is being conducted to address the necessary methodological improvements identified during the research. Collaboration with buoy suppliers and the fleet is ongoing to gather as much high-resolution information as possible.

Follow-up to the activities (what are the next steps, how the results will be used).

Future developments of these indices have identified several areas for improvement. These enhancements should be achieved through collaborative efforts between AZTI and various stakeholders, including the staff of different committees (IATTC, IOTC, ICCAT), tuna fleets, buoy suppliers, and organizations such as ISSF.

The identified areas for improvement span different domains: In data collection, there is a need to obtain new historical acoustic data from additional companies or associations and integrate them into the latest BAI. It is important to integrate data from various brands to assess if acoustic data can be standardized. Additionally, it is necessary to determine if it is beneficial to create indices based on brands or if all data can be merged into a standardized index. Regarding methodology, it is essential to review current processing steps and make progress in adapting them to each region within each RFMO. Finally, looking ahead, it is crucial to advance new steps to enhance the robustness and broaden the coverage of buoy models used by the fleet.

(max 900 words per activity)

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)

MARCADO

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

Electronic tagging.

Electronic archival tagging activities were carried out during spring-summer 2024 in the Bay of Biscay, both on bluefin tuna (*Thunnus thynnus*) and albacore tuna (*Thunnus alalunga*). We performed several tagging cruises onboard live bait commercial vessels, recreational boats and fishing charters.

The commercial bait boat used were F/V Nuevo Rober and F/V Planeta Neptuno 2 The F/V Nuevo Rober was used to perform the acoustic survey for bluefin tuna BFTindex24 (9 days), the albacores and bluefins caught with trolling lines during the survey (9 and 25 respectively) were tagged with internal data storage electronic tags (LOTEK LAT2810). Moreover, we moved to Canary Island chasing albacore tuna adult onboard the F/V Planeta Neptuno Dos, were 4 big albacores were tagged with PSAT tags.On the other hand, our aim was to tag as much as possible with recreational vessels, due to a better handling of the fish and no space constraints for scientist onboard, for which 12 fishing trips were carried out with recreational collaborators.

Conventional Tagging

During the summer 2024 we carried out 2 tagging events with recreational anglers for conventional tagging, in which 178 tags were implanted in albacore and bluefin. Tunas were tagged by recreational anglers. Moreover, this year we have 9 recaptures of fish tagged with conventional tags. For the first time ever, two bigeye tunas tagged last years were recaptured close to the tagging area, this suggests site fidelity also for this specie.

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

Electronic tagging.

The tagging activities were successful in terms of tagged numbers and in terms of size of the albacores, which ranged between 59 and 91 cm fork length. As a result, internal electronic archival tagging was done on a total of 38 albacores along the Bay of Biscay between June and August onboard a recreational fishing charter. Overall, the crews were very helpful and kind. However, the number of tags deployed was higher in comparison to the previous year, due to a higher abundance of bluefin and albacore inshore. Moreover, we had an internal tag recapture and 4 of the PSAT tags implanted the previous year were physically recovered in waters of Galicia, Bay of Biscay, Turkey and English Channel where the team moved to found them using a goniometer.

Conventional Tagging

The tagging activities were successful in terms of tagged numbers and size of the tunas but more remarkable are the recoveries reported, . Tagging tunas is a fishery dependent activity and 2024 has been better than expected.

Follow-up to the activities (what are the next steps, how the results will be used).

During the following years we will continue carrying out tagging activities. The data, updated annually, are available to the scientific community through the International Commission for the Conservation of Atlantic Tunas according to its standards (ICCAT, 2008).

(max 900 words per activity)

BIOLOGICAL PARAMETERS FOR 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}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 (13C and 15N) 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)

BIOLOGICAL PARAMETERS FOR TUNA

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

Data collection activities:

During 2024 the project supported the collection of biological samples in the Indian Ocean and Atlantic Ocean. With a greater effort on bigeye tuna (Thunnus obesus) in the case of Indian Ocean. In addition, specific and selective sampling of individuals of the other two target tropical tuna species (yellowfin tuna and skipjack tuna) has been carried out in the Atlantic Ocean.

The project has implemented the logistics/plan for an improved process of biological sample collection in the Atlantic Ocean with the collaboration of the tuna freezer industry and its processing plants in Galicia. Additionally, the project has provided the means for the creation of the sampling network at EU level with the aim of carrying out coordinated sampling. Presentation of a joint proposal at EU level to further improve knowledge on the life cycle of tropical tunas was completed and funding was achieved.

Age and longevity estimates.

During 2024 the project defined of spine-otolith reading criteria with samples collected in both oceans. In the Indian Ocean, the work has focused on obtaining age data for the estimation of skipjack (Katsuwonus pelamis) growth parameters. Available data was analyzed and a protocol for age estimation of skipjack tuna in the western Indian Ocean using first dorsal fin spines was developed and presented at WPTT26:

PROTOCOL FOR AGE ESTIMATION OF SKIPJACK TUNA (KATSUWONUS PELAMIS) IN THE WESTERN INDIAN OCEAN USING FIRST DORSAL FIN SPINES (WPTT26) Patricia L. Luque1, Iraide Artetxe-Arrate1, Naiara Serrano1, Igaratza Fraile1, Iker Zudaire1.

Reproductive biology.

In the Indian and Atlantic Ocean, work was focused on the preparation, histological reading and fecundity estimation of the three tropical tuna species with the objective of presenting updated biological parameter estimates during 2025 at IOTC WPTT and ICCAT SPECIES GROUP

Additionally, the project has significantly contributed to further develop the most appropriate methodology to be able to carry out the necessary reproductive parameter estimates in tropical tunas and the validation of genetic markers as an alternative to histological processes for the estimation of those parameters.

Trophic ecology.

During 2024 project's contribution was the improvement of biological parameters related to trophic ecology and limited to the collection and pre-processing of stomachs of bigeye tuna in the Indian Ocean and yellowfin, skipjack and bigeye tuna in the Atlantic Ocean.

Stock structure delineation.

In 2024, data processed in 2023 related to the concentration of oxygen (δ18O) and carbon (δ13C) in 110 otoliths of yellowfin tuna (Thunnus albacares) allowed us to continuous investigating the population structure and connectivity of this species in the western Indian Ocean (FAO area 51), where fishing effort is highest. A review of different parameters was conducted and presented at IOTC WPTT26 Data preparatory meeting:

REVIEWOFTHESTOCK STRUCTUREOFYELLOWFINTUNA IN THE INDIAN OCEAN: FACTS AND GAPS (WPTT26-DP) IraideArtetxe-Arrate, Igaratza Fraile, Patricia Lastra-Luque, Giancarlo Morón Correa, Agurtzane Urtizberea, Natalia Diaz-Arce, Gorka Merino and Iker Zudaire.

The project has also support the publication of analyzed data:

Otolith stable isotopes highlight the importance of local nursery areas as the origin of recruits to yellowfin tuna (Thunnus albacares) fisheries in the western Indian Ocean (Iraide Artetxe-Arrate et al., 2025)

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

Most of the objectives foreseen for each working line were achieved, here are summarized the four main milestones:

1) Support the collection of biological samples in the Indian and Atlantic Ocean. With a greater effort on bigeye tuna (Thunnus obesus). In addition, specific and selective sampling of individuals of the other two target tropical tuna species has been carried out in the Atlantic Ocean.

2) Implement the logistics/plan for an improved process of biological sample collection in the Atlantic Ocean with the collaboration of the tuna freezer industry and its processing plants in Galicia.

3) Creation of the sampling network at EU level with the aim of carrying out coordinated sampling. Presentation of a joint proposal at EU level to further improve knowledge on the life cycle of tropical tunas. Funding was achieved.

4) Develop the most appropriate methodology to be able to carry out the necessary biological parameter estimates in tropical tunas, with emphasis on the definition of spine-otolith reading criteria with samples collected in both oceans and the validation of genetic markers as an alternative to histological processes for the estimation of reproductive parameters.

5) To provide greater knowledge of the life history characteristics of these species, habitat use and stock structure of tropical tuna fisheries in the Atlantic and Indian Oceans

Follow-up to the activities (what are the next steps, how the results will be used).

In 2025 the activities related to the estimations of biological parameters will continue and routine sampling program implemented for the Atlantic and Indian Ocean with the support of new CINEA funding project ITUNNES.

(max 900 words per activity)

REMASMUEST

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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 moluscs (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 statuaries 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 qudrat 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 stablished 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)

REMASMuest

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

1. Bivalve molluscs (clams and cockles):

Bivalve molluscs were sampled in three estuaries (Oka 79 sampling stations, Butroe 63 stations and Bidasoa 22 stations) in two periods (summer and winter). All specimens retained in the sediment (40x40 cm and 15 cm deep) and sieved by a 2 mm mesh were collected. The sampling was carried out on foot, in the intertidal zone, at low tide.

2. Sea urchin (*Paracentrotus lividus*):

This resource was not sampled this year because the weather conditions were not suitable during the scheduled dates. This task was suspended at the end of the year.

3. Gooseneck barnacle (*Pollicipes pollicipes*):

On the one hand, 58 samples were obtained from 13 areas in the coastal rocks between Orio and Donostia (Gipuzkoa). This way, detailed information is obtained from this area.

On the other hand, 11 points were sampled along the Basque coast (Bizkaia and Gipuzkoa). This action was not indicated in the initial plan.

In both cases, the sampling was carried out on foot, accessed by sea using a boat, and consisted of the scraping of rocks (square of 30x30 cm) in the intertidal zone.

4. Anemones (*Anemonia viridis)*:

After suspending the sea-urchin task, it was decided to schedule this task. This resource was sampled in the vicinity of the fishing port of Hondarribia, at 36 sampling stations (collecting samples and taking photographs) by means of autonomous diving. Sample size: 50x50 cm.

5. Gelidium (*Gelidium corneum*):

30 stations were sampled on the eastern stretch of the Basque coast, between Orio and Hondarribia.

The sampling consisted of a visual inspection of the landscape, and sampling of algae in squares of 50x50 cm to evaluate the weight of the resource. The sampling was carried out by autonomous diving suit with displacement between points by boat.

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

The objective foreseen has been reached in all resources, except in the case of sea-urchin, which was not carried out because weather conditions were not suitable and safety during the scheduled dates in year 2024. On the other hand, barnacles were sampled along the entire Basque coast.

Task carried out in 2024:

Resource	Location	Sampled zone	Sampling stations (number)	Date
Bivalves (winter)	Butroe estuary	Plentzia (Bizkaia)	63	February 12 and 13
Bivalves (winter)	Bidasoa estuary	Hondarribia (Gipuzkoa)	22	March 11
Bivalves (winter)	Oka estuary	Sukarrieta, Axpe-Busturia, Kanala, Arketas (Bizkaia)	79	March 11 and 12
Bivalves (summer)	Butroe estuary	Plentzia (Bizkaia)	63	July 22 and 23
Bivalves (summer)	Oka estuary	Sukarrieta, Axpe-Busturia, Kanala, Arketas (Bizkaia)	79	August 21 and 22
Bivalves (summer)	Bidasoa estuary	Hondarribia (Gipuzkoa)	22	August 22
Gooseneck barnacle (BC)	Gipuzkoa East coast	Jaizkibel, Mompás (Gipuzkoa)	4	June 4
Gooseneck barnacle (BC)	Bizkaia Centre coast	Plentzia, Gaztelugatxe, Aketxe, Ea (Bizkaia)	16	June 5
Gooseneck barnacle (BC)	Bizkaia West coast	Bilbao (Bizkaia)	2	June 6
Gooseneck barnacle (Orio-Donostia)	Orio-Donostia coast	Orio, Donostia (Gipuzkoa)	13	July 9-11
Gelidium	Orio-Hondarribia coast	Jaizkibel (Gipuzkoa)	15	June 20
Gelidium	Orio-Hondarribia coast	Pasaia-Orio (Gipuzkoa)	14	June 19
Sea anemones (*Anemonia viridis*)	Hondarribia port	Hondarribia (Gipuzkoa)	36	December 13

Follow-up to the activities (what are the next steps, how the results will be used).

This data collection activity is routinely and will be carried out yearly. Next year it is planned to take up the sea urchin task again, and not to do the anemone task.

(max 900 words per activity)

REMASVARBIO

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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 moluscs (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 80º 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 where 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*):

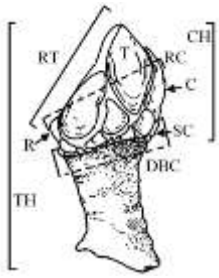
The photographs taken at each of the sampling stations were processed using ImageJ software. ImageJ is a public domain Java image analysis program inspired by NIH Image for Macintosh. Versions for Windows, Mac OS, Mac OS X and Linux are available on the web at http://rsbweb.nih.gov/ij/. There is also 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 (ind·m^{-2}) and biomass (kg·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 where studied (between 1983 and this days) related to human activities and environemtal factors such as light, temperature (both positive action) and wind (negative action or casting off).

(max 900 words per activity)

REMASVarbio

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

1. Bivalve molluscs (clams and cockles):

Bivalve molluscs samples were processed in three estuaries (Oka 79 sampling stations, Butroe 63 stations and Bidasoa 22 stations) in two seasons (summer and winter). Clams were found in 46, 19 and 10 sampling stations respectively in winter, and in 45, 26 and 14 in summer. Furthermore, cockles were collected in, respectively, 42, 15 and 0 stations in winter, and in 44, 37 and 2 in summer. The estimated stock for the Oka, Butroe and Bidasoa estuaries was 15.3, 0.4 and 0.6 t in winter, respectively, and 9.6, 0.7 and 0.7 t in summer. Since 1998, the clam resource in the Oka estuary has shown a downward trend, despite the slight recovery in recent years, while no trend has been shown in the case of cockles. In the Butroe estuary, globally there is no clear trend for clams, while cockle stock shows a statistically significant decreasing trend. In the Bidasoa estuary, the clam reflects a decrease since 2014, breaking the recovery trend observed between 2008 and 2013; for cockles, biomass and summer stock show a significant trend towards reduction since 2004.

2. Sea urchin (*Paracentrotus lividus*):

In 2024 there was not samples to process because it was not possible to obtain them.

3. Gooseneck barnacle (*Pollicipes pollicipes*):

58 samples from 13 points in the coastal area between Orio and Donostia (Gipuzkoa) were processed. The resulted average biomass was 2.36 $kg \cdot m^{-2}$ and the exploitable biomass was 0.88 kg m^{-2}. The estimated total biomass in the study area in 2024 was 5,508 kg and the exploitable fraction 2,088 kg.

Moreover, other 11 points were sampled along the Basque coast (Bizkaia and Gipuzkoa). Generally, it was concluded that some barnacle areas of the Basque Country were overexploited in 2024; specifically, five out of the eleven areas were in a worrying situation.

4. Anemones (*Anemonia viridis*):

Images from the 29 stations sampled near the fishing port of Hondarribia were processed. Sea anemones were found in 10 stations: in total 103 specimens were counted and measured. In 2024, a total stock of 3,336 kg was estimated, being 2,512 kg exploitable (> 15 g in fresh weight). The average density in stations with presence of sea urchin was 41 $ind \cdot m^{-2}$, and the average biomass 0.8 $kg \cdot m^{-2}$.

5. Gelidium (*Gelidium corneum*):

Samples from 30 stations in the eastern section of the Basque coast, between Orio and Hondarribia, were processed.

The downward trend observed in the time series starting in 1983 seems to have stagnated in the years 2015-2016 (both in coverage and biomass), and although a slight improvement has been seen in recent years (in biomass), in 2024 we have found the lowest values ever estimated in our dataset: 1806 tonnes drained weight

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

The objectives foreseen for each resource were achieved: samples of bivalve molluscs, barnacles, anemones and *Gelidium* were processed; with respect to sea-urchin, since there was not possible to take samples, it was decided not to evaluate their situation in 2024.

On the other hand, the situation of barnacles along the entire Basque coast (initially not planned) was also assessed.

Follow-up to the activities (what are the next steps, how the results will be used).

This activity is routinely and will be carried out yearly.

(max 900 words per activity)

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)

GENGES

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

During 2024, we focused on aims 1, 2 3 and 6 with the following resutls:

The connectivity analyses of anchovy showed that the population structure in the northeastern Atlantic does not match the stocks defined by ICES, highlighting several aspects that should be considered for proper anchovy management.

The libraries generated for the bottom anchovy will serve to conduct a connectivity study of this species in the Northeast Atlantic.

The skipjack tuna shows high connectivity between the Atlantic and Indian Oceans. However, a series of specific genetic markers were found that could confer adaptive characteristics. Further research is needed to understand the role of these markers in the species' adaptive potential.

The tools previously designed for monitoring the bluefin tuna contain markers representative of the complete genome of the bluefin tuna. The genetic differentiation between the two main populations in the Mediterranean Sea and the Gulf of Mexico, respectively, is homogeneously distributed across the entire genome, which implies a demographic disconnection between both populations. Complete chromosome sequences could help reveal differentiation between different spawning areas within the Mediterranean Sea. The genomic regions that differentiate between groups of potentially adapted bigeye tuna in different areas of the Indian Ocean and the eastern Pacific Ocean harbor genes related to spawning time, suggesting that these groups could represent adaptive differences in the species' spawning behavior.

The connectivity analysis of hake shows high connectivity in the area where the stock boundary defined by ICES is located, potentially causing issues for accurate stock assessment. Additionally, migration rates are highly variable across the species' distribution area, and the migratory distance decreases at the distribution extremes (north, south, and the Mediterranean Sea), suggesting that these areas may be especially vulnerable to events affecting this genetic flow. This is particularly important in the case of potential adaptation stored at the genomic level and distributed unevenly on a spatial scale, meaning it will only affect populations under specific environmental conditions. More studies are required to understand the origin of the inversions detected for hake and determine whether they are involved in local adaptation phenomena. These results have been presented at international conferences, and the paper on the population structure and connectivity of hake in the northeastern Atlantic is almost finished to be sent to co-authors.

The new libraries prepared with the RAD-seq method will be valuable for defining the population structure of the black anglerfish, which is still unknown, thanks to the addition of numerous samples that covered the entire distribution of the species in the northeastern Atlantic and the Mediterranean Sea. Meanwhile, the analysis of the complete genomes of pure and hybrid anglerfish individuals will allow us to attempt to date the hybridization event and understand the potential genomic causes of the reduced number of hybrids (reduced fertility or viability of offspring) to comprehend its effect on the conservation of both species.

The CKMR pilot study to test the markers selected for the SNP arrays confirms that the selected markers for both species are reliable, as the population structure markers (hake and anglerfish) and/or species identification markers (anglerfish) would allow the unequivocal detection of relatives. The results confirmed the need to analyze a larger number of individuals to detect parent pairs of the species in the northeastern Atlantic

These results have been traslated to the relevant ICES working groups and to ICCAT.

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

With these results, we have contributed to or competed OUTCOMES 1,2,3, 6 and 11

Follow-up to the activities (what are the next steps, how the results will be used).

We will continue advancing towards completing all the OUTCOMES, and ensuring the results are traslated to end-users. In particular, we will:

- Determine the connectivity between populations of commercial fish species such as hake, anchovy, bottom anchovy, anglerfish, and skipjack tuna to define management units and allocate catches to their origin.
- Evaluate the genetic diversity and adaptive potential of commercial fish species to determine their resilience to pressures such as fishing and climate change.
- Develop genetic tools for monitoring changes in the distribution and behavior of commercial fish species and populations, enabling the development of tailored evaluation and management measures.
- Transfer the knowledge and data acquired to the assessment and evaluation groups, as well as to decision-making stakeholders.

(max 900 words per activity)

SECWEB

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

Support the operation and functioning of the RCG´s Secretariat for a fluent regional coordination of data collection activities.

2. Duration of the data collection activity

01/01/2023 – 31/12/2023: Spain commits to begin the administrative procedure aimed to ensure the allocation of funds for facing this payment.

3. Methodology and expected outcomes of the data collection activity

The Secretariat´s organizational structured has been set up and pilot tested throughout SecWeb project. The key functions of the RCG´s Secretariat have been determined in close collaboration with all RCGs, in particular with RCG and Intersessional Subgroups (ISSGs) chairs. A business model has been developed. In addition, good practices in communication within and among the RCGs have been promoted and installed. The overall capacity to reach out to a wider public and increase the visibility of the work and output of the RCGs has been boosted with the development of a dedicated website and the consolidation of a visual identity.

RCG chairs and the RCG´s network in general have acknowledged the added value of having an RCG´s Secretariat to the overall aim of improving data collection activities.

Based on SecWeb project outputs the proposed data collection activity will connect the whole RCG network and stakeholders to work together on common goals. The Secretariat provides fluent administrative and coordination support for more efficient regional coordination liberating national experts involved in data collection activities from heavy burden administrative tasks.

Overall expected outcomes

ü A full-time dedicated Secretariat support service for the RCGs enables a consistent approach to administering RCG activities, facilitates communication, and enhances the intersessional work, supporting also the work of sub-groups.

ü A dynamic and permanently updated website will be kept available including as features:

- Integration – allowing seamless synchronization with third-party information needs and requests.
- Responsive display – to serve content across multiple devices, screens, and browsers.

- User experience- maintaining a satisfactory user experience throughout the website sections.
- Accessibility – To any interested visitor in a user-friendly way across the website sections.
- Retention- keeping visitors coming back to the website.
- Links to relevant restricted access sites and virtual environments.

ü The Visual identity for the RCGs is increasingly consolidated and visibility and understanding of the work by the RCGs is enhanced for the relevant stakeholder groups.

ü A regularly updated Stakeholders' database improves the communication function among the RCGs' experts and the stakeholders' community.

ü Internal communication protocols and help-desk in place makes it easier for any new comer to efficiently join, adopt responsibilities, and contribute to the RCGs objectives and work commitments.

ü The public description of the secretariat functions, operational working protocols and commitments will build trust and enhance the whole network transparency and accountability.

(max 900 words per activity)

SECWEB

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).

During the reporting period, Spain accomplished the formal procedures to guarantee the continuity of the support to the Secretariat to the RCGs network.

It formalised the contractual process with Fundación CETMAR (as the RCG Secretariat Service provider) by focusing on two priority assignments:

- first one to provide the basic Secretariat support services to the Spanish participation in all the different RCGs with the exception of RCG LDF.

- the second one was to provide specific support and assistance of the RCG Secretariat to the RCG LDF annual technical meeting.

Both assignments were fully accomplished without significant deviations. The Secretariat has delivered support services to all RCGs and is also currently involved in the implementation of SECWEB 2.0 project. The SECWEB 2.0 is aimed at evolving the on-line working environment, tools and services of the RCGs Secretariat for the RCGs community. In order to maintain these support structure and services beyond 2026..

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

The Secretariat service provider elaborated and submitted on the 7th March 2025 a detailed report explaining the extent to which the activities of the RCGs were implemented and main achievements were there also described. Such report is now available at the relevant RCG's Website Section at: https://www.fisheries-rcg.eu/wp-content/uploads/2025/05/ActivityReport_RCGs-Secretariat_2024-2025_final.pdf

Follow-up to the activities (what are the next steps, how the results will be used).

For the year 2025, and first bimester of 2026 it is foreseen that the RCG Secretariat continues active and delivering support to the full network of the RCGs. As reported, the Intersessional work has increased substantially and it is expected that 2025 keeps a similar pace and intensity of service demands. Also, this will be a crucial year for the Secretariat progressing with the developments foreseen under SecWeb2.0. also expected to have a positive impact in the functioning of the RCGs work. The Secweb2.0 project is expected to end in May 2026. One of the challenges foreseen for the year 2025 will be for Spain and all the other MSs to discuss and agree on the administrative, legal and financial model that can enable a long term solution to stabilise this service.

(max 900 words per activity)

Section 2: Biological Data

Text Box 2.1: List of required species/stocks

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), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

The Spanish vessels participate in two fisheries in this area. One targeting cod (*Gadus morhua*) and the other targeting redfish (*Sebastes mentella*).

In the case of the redfish fishery, there were no Spanish vessels in the fishery.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program (no effort in the fisheries), so no action can be taken.

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

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), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

All deviations are explained in tables

Sebastes spp., *A. bairdii, C. rupestris*

These deviations are related to the inactivity of the Spanish fleet targeting *Sebastes mentella* in the Irminger Sea, and the Spanish fleet targeting deep water species in Hatton Bank in 2024. As a result, the species associated with these fisheries (*Sebastes* spp., *A. bairdii, C. rupestris*) could not be sampled.

These types of deviations are unavoidable.

Actions to avoid deviations

Sebastes spp., *A. bairdii, C. rupestris*: the deviations associated with these species are due to circumstances outside the sampling program (no effort), so no action can be taken.

Regarding other species the deviations generated are due to other circumstances outside the sampling program like species not present in the sampled trips, so no action is necessary.

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

MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

All deviations are explained in tables.

Some elasmobranch species covered by the commercial sampling scheme did not appear on the trips selected for sampling: *Etrmopterus spinax, Mustelus asterias, M. punctulatus, Myliobatis aquila, Prionace glauca, Pteroplatytrygon violacea, Scyliorhinus stellaris, Torpedo marmorata and T. torpedo*, so they could not be sampled.

In adittion to the species planned to be sampled for length, a total to 179 species (4470 samplings, 124564 individuals) were sampled in the framework of the concurrent sampling.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program (species not present in the sampled trips), so no action is necessary.

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

THE OUTERMOST REGIONS. (EU WATERS AROUND CANARY ISLANDS (FAO AREA 34.1.2))

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

All deviations are explained in the tables.

Actions to avoid deviations

Sampling from the market in the small-scale fisheries (SSF) of the Canary Islands is a difficult issue, as the number of samples per species depends on the weather, the catches and the variability of the market. Nevertheless, the IEO team is constantly trying to find the best way to obtain samples of the target species, by increasing the number of visits to the main markets, finding another possible market place, increasing contacts with traders, etc. Even so, it was not possible to meet the targets. We expect better results next year.

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

OTHER REGIONS. (NORTH-WEST ATLANTIC (FAO AREA 21). NAFO)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

All deviations are explained in tables

The deviations are related to the absence of the target species during the observed trips and they are unavoidable.

Additionally, a moratorium continues for both fisheries in Divisions 3L and 3M for *Pandalus borealis*.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program (absence of the species during sampled trips or the ongoing moratorium). Therefore, so no action is necessary.

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

OTHER REGIONS. (EASTERN CENTRAL ATLANTIC (FAO AREA 34). CECAF)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

All deviations explained in tables.

The deviations are related to the non-presence of the species in the observed trips, also to the non-activity or the lower activity of the fleets in some fishing areas and to the refusals to have observers on board.

No length samplings were allowed at all in 2024 for *Brama brama* in Vigo fish-market.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program.

On the one hand, species not present in the sampled trips, so no action is necessary.

On the other hand, the not activity and the decreasing activity of the fleets in some fisihing areas, (changes in the strategy followed by the fleet) is very umpredictable and higly dependant of the SFPA with third countries. These are all external circumstances related to the fishing activity and therefore no action can be taken.

Regarding the difficulties in developing scientific observations on board due to logistical problems, the team in charge of coordinating the embarkments will intensify the contacts with the shipowners to try to overcome the obstacles. However, the poor conditions on board are not so easy to resolve and the logistics with the third countries in Africa are not expected to improve, so we do not know when our efforts will produce positive results.

Regarding the local authorities reluctance to length samplings on-shore, no action has been taken so far, but it is expected to improve in the following years by better contacts with authorities.

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

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), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not appilcable

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

OTHER REGIONS. (INDIAN OCEAN (FAO AREA 51 AND 57). IOTC)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.
Deviations from the work plan No deviations. Actions to avoid deviations Not appilcable *(One text box of max. 1 000 words per region/RFMO/RFO/IO)*

OTHER REGIONS. (WESTERN CENTRAL PACIFIC (FAO AREA 71). WCPFC)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.
Deviations from the work plan No deviations. Actions to avoid deviations Not appilcable *(One text box of max. 1 000 words per region/RFMO/RFO/IO)*

OTHER REGIONS. (EASTERN CENTRAL PACIFIC (FAO AREA 77 AND 87). IATTC)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.
Deviations from the work plan No deviations. Actions to avoid deviations Not appilcable *(One text box of max. 1 000 words per region/RFMO/RFO/IO)*

OTHER REGIONS. (ANTARCTIC AND SOUTHERN INDIAN OCEAN (FAO AREA 48, 58 AND 88). CCAMLR)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

Text Box 2.2: Planning of sampling for biological variables

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), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling scheme identifier: ESP_IEO_P5_AtSea

Deviations from the work plan

The deviations related to *Sebastes mentella* are unavoidable as there was no fishery targeting this species.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program (no effort in the fisheries), so no action can be taken.

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

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), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling scheme identifier: ESP_IEO_P5_AtSea

Deviations from the work plan

There was no fishing effort by Spanish vessels targeting *Sebastes mentella* fishery in the Irminger Sea, or targeting deep-water species in Hatton Bank in 2024. As a result, the species associated with these fisheries (*Alepocephalus bairdii, Coryphaenoide rupestris* and *Sebastes mentella*) could not be sampled. This deviation is unavoidable.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program (no effort in the fisheries), so no action can be taken.

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP_IEO_P1_Biological_Specific:

Deviations from the work plan

Some general considerations about the planning of sampling for biological variables (Age, Weight, Sex, Maturity) according to this identifier

The field "Achieved number of samples" reflects the number of sampling events.

- In the case of planned sampling (P) on landings, the number of sampling events may be greater than the number of PSUs (the planned PSUs were established as the minimum number of sampling events that would be necessary to perform during the year). Considering that each PSU should be associated with a set of data (live weight, sex, maturity, age) representative of the landing fraction of a target population from a given area in a given time period (quarterly, annually, triennially), some PSUs may need to be split into two or more sampling events to achieve this objective. This is the case when the sample (usually boxes) obtained at the fish market is too small and additional samples are needed (e.g. during the winter months, the quantities landed are sometimes small and more difficult to obtain due to bad weather). For demersal species, it is difficult to adequately represent the length distribution of landings in a single sampling event, so additional samples targeting the tails of the length distribution are sometimes needed. In addition, sampling may be intensified during the peak spawning season if deemed necessary.·
- In the case of opportunistic sampling (O) on surveys, each sampled haul is considered as a sampling event.

“Achieved number of individuals measured at national level” is sometimes higher than planned (>150%) because:

- Some variables, such as “age” or “maturity”, require a larger number of samples to obtain representative age-length keys for the target stocks. This increase in the sampled number not involving additional costs, since work plan in laboratories is carried out according to the requirements of the working groups to which the data must be provided.
- When the originally planned sample size was not sufficient to ensure data quality, the sample size was increased when it was possible, to improve quality levels.

“Achieved number of individuals measured at national level” in some parameters were lower than planned (<90%) in some cases:

- Although the methodology used to collect the data from landing samples is designed to achieve a representative sample of each of the commercial categories of the target species, the individuals from the commercial landings have often been gutted, making it impossible to carry out a complete sampling (weight or even sex or maturity data).
- In certain periods, the bad weather, does not allow the commercial fleet to operate and prevents the purchase of the necessary samples.

Actions to avoid deviations

Although we try to adjust the number of samples planned, one of the main difficulties is the inability to obtain samples due to low landings and the market variability. However, shortfalls in biological samples from the commercial fleet are usually compensated by samples collected during research surveys, the number of which cannot be planned because as it depends on adaptive sampling.

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP_AZTI_Biological_Specific:

Deviations from the work plan

All deviations have been explained in the table, together with the actions to avoid these deviations in the future.

Actions to avoid deviations

All deviations have been explained in the table, together with the actions to avoid these deviations in the future.

Regarding the logistical problems with some shipowners, we are continuity working to solve them, but we can't avoid these problems completely.

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Type: Research survey at sea

Deviations from the work plan

All deviations (Number of individuals =0) have been explained in the table.

Table 2.2, Column Q: 'Achieved number of samples' for the cases where the sampling scheme type is 'Research survey at sea'

Although the guidelines say 'For research surveys at sea, put "NA" (where 'NA' means 'not available'), we have entered in this column the number of hauls in which the reported individuals were collected. We believe that these numbers are more informative than a simple 'NA'. For surveys, hauls are considered sampling units.

Actions to avoid deviations

All deviations related with non ocurrence of the species in the survey are unavoidable.

The deviatiosns related with survey problems are explained in table 2.6 for each survey.

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

MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP_IEO_P2_Biological_Specific

Biological variables related to the population should be collected from commercial samples every year (Group 1 species) or every three years (Group 2 species) according to the rules of the GFCM-DCRF Manual. As 2024 was the second year of the triennial period 2023-2025 this Annual Report does not present the results of the commercial sampling of the triennial species.

As planned, the estimation of the biological parameters and their uncertainties has been carried out using the INBIO 2.0 tool ("Estimation of biological parameters and their uncertainties through simulation techniques"), developed by the IEO in R environment.

Deviations from the work plan

Regarding the biological variables, the number of individuals achieved for some of them is out of the threshold:

In the GSA01, the sampling of *Engraulis encrasicholus* and *Sardina pilchardus* was lower than planned (see AR comments in Table 2.2) due to the dramatic landings drop in the sampling ports. In the case of *Merluccius merluccius* the low sampling is related to the short length range and the protocol of sampling (a fix number by length class). Finally, the compliance with sampling of *Parapenaeus longirostris* was affected by technical problems in the purchase of samples in the last months of the year.

In the GSA05, *Engraulis encrasicolus* was sampled lower than planned due to the low landings (see AR comments in Table 2.2). In the case of sex and maturity of *Mullus surmuletus* the low sampling is related to the length range and the protocol of sampling (a fix number by length class).

In the GSA06, the sampling of *Merluccius merluccius* was lower than planned due to the short length range and the protocol of sampling (a fix number by length class). The age variable of *Engraulis enchasicholus* was sampled higher than planned because otholits have been

collected from all specimens. *Parapenaeus longirostris* also was sampled higher than planned due to the wide length range of the species this year.

Actions to avoid deviations

For the species with biological parameters sampled lower than planned, deviations could be avoided by increasing the number of individuals in each sampling/trip. However, this point depends on the availability of catches of these species, which was the main drawback for the 2024 sampling.

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Type: Research survey at sea

Deviations from the work plan

All deviations (Number of individuals =0) have been explained in the table.

Table 2.2, Column Q: 'Achieved number of samples' for the cases where the sampling scheme type is 'Research survey at sea'

Although the guidelines say 'For research surveys at sea, put "NA" (where 'NA' means 'not available'), we have entered in this column the number of hauls in which the reported individuals were collected. We believe that these numbers are more informative than a simple 'NA'. For surveys, hauls are considered sampling units.

Actions to avoid deviations

All deviations related with non ocurrence of the species in the survey are unavoidable.

The deviatiosns related with survey problems are explained in table 2.6 for each survey.

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

THE OUTERMOST REGIONS. (EU WATERS AROUND CANARY ISLANDS (FAO AREA 34.1.2))

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P3_BioSpec

Deviations from the work plan

All deviations explained in tables.

Actions to avoid deviations

Sampling from the market in the small-scale fisheries (SSF) of the Canary Islands is a difficult issue, as the number of samples per species depends on the weather, the catches and the variability of the market. Nevertheless, the IEO team is constantly trying to find the best way to obtain samples of the target species, by increasing the number of visits to the main markets, finding another possible market place, increasing contacts with traders, etc. Even so, it was not possible to meet the targets. We expect better results next year.

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

OTHER REGIONS. (NORTH-WEST ATLANTIC (FAO AREA 21). NAFO)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.1.

Sampling scheme identifier: ESP_IEO_P5_AtSea

Deviations from the work plan

All deviations are detailed in the tables.

The deviations are related to the absence of the target species during the sampled trips and are unavoidable

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling program (absence of the species during sampled trips). Therefore, so no action is necessary

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Type: Research survey at sea

Deviations from the work plan

All deviations (Number of individuals =0) have been explained in the table.

Table 2.2, Column Q: 'Achieved number of samples' for the cases where the sampling scheme type is 'Research survey at sea'

Although the guidelines say 'For research surveys at sea, put "NA" (where 'NA' means 'not available'), we have entered in this column the number of hauls in which the reported individuals were collected. We believe that these numbers are more informative than a simple 'NA'. For surveys, hauls are considered sampling units.

Actions to avoid deviations

All deviations related with non ocurrence of the species in the survey are unavoidable.

The deviatiosns related with survey problems are explained in table 2.6 for each survey.

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

OTHER REGIONS. (EASTERN CENTRAL ATLANTIC (FAO AREA 34). CECAF)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P3_BioSpec

Deviations from the work plan

The lack of biological data for the species from the purse seine fleet (*Engraulis encrasiculos* and *Sardina pilchardus*) was because that fleet had no activity during 2024 (the EU-Morocco SFPA expired in July 2023), which prevented collection of the biological material expected under the sampling scheme ESP-IEO_P3_BioSpec.

The deviations in this case are unavoidable.

Actions to avoid deviations

Not applicable.

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P3_AtSea_Africa

Deviations from the work plan

All deviations are explained in tables.

Most of deviations are related to the lower activity of the fleets in some fishing areas and to the refusals to have observers on board.

The lack of weight data at sea from *Merluccius* spp (from demersal trawlers targeting demersal fish) is due to the difficulty of taking accurate individual weight measurements onboard.

None of them can be avoided.

Actions to avoid deviations

The deviations generated are due to circumstances outside the sampling programme (changes in the strategy followed by the fleet and decrease in activity). These are all external circumstances related to the fishing activity and therefore no action can be taken.

Regarding the difficulties in developing scientific observations on board due to logistical problems, the team in charge of coordinating the embarkments will intensify the contacts with the shipowners to try to overcome the obstacles. However, the poor conditions on board are not so easy to resolve and the logistics with the third countries in Africa are not expected to improve, so we do not know when our efforts will produce positive results.

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

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), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P4_AtSea_all

Deviations from the work plan

Auxis rochei and ***Sarda sarda*** **At Sea:** It was not possible to obtain samples on board. The biological variables can be collected either on board or ashore, depending on availability. The variables are collected mainly in port (the samples were purchased and they were analyzed in the laboratory).

Coryphaena hippurus **At Sea**: It was not possible to obtain samples for age and maturity on board. The biological variables can be collected either on board or ashore, depending on availability. In this case these variables wwere collected mainly in port.

Katsuwonus pelamis **At Sea**: It was possible to obtain samples on board. Biological variables can be collected either on board or ashore, depending on availability. In this case the variables were collected mainly in port (the samples were purchased and they were analyzed in the laboratory).

Prionace glauca **At Sea**: there was an error in planning given that age, fecundity and maturity variables are not required by end users.

***Thunnus thynus* At Sea**: In this case, all captured individuals of bluefin tuna are transferred live to fattening cages, which make imposible to collect any individual variables.

***Xiphias gladius* At Sea**: Fishing vessels targeting swordfish for sale in a fresh condition commercialise whole fish, meaning that only damaged specimens are available for obtaining biological variables on board. On vessels with freezer capacity, the majority of specimens were gutted before being frozen, and biological variables were collected on board. During 2024 all variables in the Atlantic stocks were collected on board.

The aim of the age sampling is to fill in the gaps of size and sex (mainly bigger lengths) by stock and given the size composition of the 2024 catches, it was not possible to collect new anal fin spines for age and growth studies, we have focused on laboratory work for processing and reading the samples already collected in previous years.

The fecundity of *Xiphias gladius* in the Mediterranean (BIL 95) appears in the sampling plan by mistake. This is not a target variable because it is not required by end user on the Mediterranean stock.

Actions to avoid deviations

Deviations are due to problems inherent to the large pelagic fisheries (availability on board, transference to fattening cages, etc..). The objectives are considered to be met.

The mistake in the planning of Prionace glauca and Xiphias gladius was solved in the WP 25-27.

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

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P4_OnShore

Deviations from the work plan

***Prionace glauca* On shore**: there was an error in planning given that age, fecundity and maturity variables are not required by end users. Regarding the collection of weight on shore, it was almost not possibly taking individual weights because the way of landing (grouped by category without possibility to unpacked the groups) made impossible the collection of the variable.

***Thunnus alalunga* (atlantic stocks) On shore**: dorsal fin spines had been collected for several years in the past to provide estimates of age, growth and longevity by direct reading of annual increment bands. The results were used to produce annual lengt-age keys (ALKs) and were used in the modelling of the stock using different stock assessment methods.

A von Bertalanffy growth equation was estimated for North Atlantic stock and presented in ICCAT Albacore Working Group. *V. Ortiz de Zárate and E.A. Babcock. 2016. Estimating individual growth variability in albacore (Thunnus alalunga) from the North Atlantic stock: Aging for assessment purposes. Fisheries Research, 180, 54-66.*

Actually, the Albacore Working Group recommended focusing on a growth study of the adult fraction the albacore population and on differential growth by sex.

The Spanish albacore fishery in the Atlantic targets the juvenile and sub-adult fractions of the albacore population therefore is not possible to collect the necessary large fish samples that are not available to these fleets. In this scenario the collection of dorsal fin spines was not continued.

The selectivity pattern of the Spanish fleets targeting albacore in the Atlantic leaves out the adult population that integrates the spawning population in the North Atlantic stock. Most of the catches are of immature fish in the Bay of Biscay. This is not a spawning area and therefore is not an appropriate area to encounter spawning individuals to study the maturity stages, fecundity or sex ratio, in essence the reproductive biology of albacore.

***Xiphias gladius* On shore**: the fresh swordfish are comercialized whole, so all biological variables are only from damaged individuals on board. Depending on availability of individuals, the biological variables can be also collected in port. During 2024 all variables, except weight, in the Atlantic stocks were collected on board.

The aim of the age sampling is to fill in the gaps of size and sex by stock and given the size composition of the 2024 catches, it was not possible to collect new anal fin spines for age and growth studies, we have focused on laboratory work for processing and reading the samples already collected in previous years.

The fecundity of *Xiphias gladius* in the Mediterranean (BIL 95) appears in the sampling plan by mistake. This is not a target variable because it is not required by end user on the Mediterranean stock.

Age of *Thunnus albacares* and ***Thunnus obesus*:** Collecting skeletal structures to ageing studies causes deterioration of the specimens and is therefore subject to owner's authorization.

Actions to avoid deviations

Deviations are due to problems inherent to the large pelagic fisheries (landings whole, landed by categories unpacked, etc..). The objectives are considered to be met.

The mistake in the planning of *Prionace glauca* and *Xiphias gladius* was solved in the WP 25-27.

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

OTHER REGIONS. (INDIAN OCEAN (FAO AREA 51 AND 57). IOTC)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P4_AtSea_all

Deviations from the work plan

In addition to the individuals reported in Table 2.2, 46 individuals of *Isurus oxyrinchus* were sampled for weight and sex variables.

Actions to avoid deviations

No deviations

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

OTHER REGIONS. (WESTERN CENTRAL PACIFIC (FAO AREA 71). WCPFC)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P4_AtSea_all

Deviations from the work plan

No deviations because there was any plan for other biological variables in this area.

Actions to avoid deviations

No deviations

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

OTHER REGIONS. (EASTERN CENTRAL PACIFIC (FAO AREA 77 AND 87). IATTC)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Sampling Scheme Identifier: ESP-IEO_P4_AtSea_all
Deviations from the work plan In addition to the individuals reported in Table 2.2, 104 individuals of *Isurus oxyrinchus* were sampled for weight and sex variables. 930 individuals of *Prionace glauca* were sampled for sex and 249 for weight. Actions to avoid deviations No deviations *(One text box of max. 1 000 words per region/RFMO/RFO/IO)*

OTHER REGIONS. (ANTARCTIC AND SOUTHERN INDIAN OCEAN (FAO AREA 48, 58 AND 88). CCAMLR)

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 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.
Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR
Deviations from the work plan No deviations. Actions to avoid deviations Not applicable. *(One text box of max. 1 000 words per region/RFMO/RFO/IO)*

Text Box 2.3: Data collection for diadromous species 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/3ilgtrT. - 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 obtanined 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 keeped 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 keeped 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_Anda)

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 lyce, 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 lyce, 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 pars 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, pars 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 pars 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 weigth), 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 weigth), 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)

Were the planned numbers achieved? Yes/ No. If the answer is No, explain why not, and what measures were taken to avoid non-conformity

Anguilla anguilla

EMU_ES_Basq – NO

The target for 100% abundance recruit sampling was not fully achieved due to a mistake in the NWP (National Work Programme), where the planned target should have been 5 sampling events instead of 6. The sampling takes place from October to February, covering 5 months with 5 sampling events. This error will be corrected in the next update of the multiannual plan, in coordination with the National Correspondent.

Besides, the target for 100% standing stock and silver eel sampling was not fully achieved due to the persistent rainfall during the autumn that generated high accumulations, which impeded sampling work, and even caused some overflows.

EMU_ES_Astu – YES

1) Yes, the abundance of recruits was estimated using the glass eel fishery catch and effort data.

2) Yes, the planned numbers were achieved. However the samplings were collected from November to February.

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

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

EMU_ES_Gali – NO

While fish traps operated normally, electrofishing was nearly impossible due to high water and only could be completed in the Miño system, where sampling took place early.

EMU_ES_Murc

Sampling for yellow and silver eels: YES

Random sampling achieved higher number of silver eels than planned numbers.

Sampling for recruits (eelglass): NO

The 3 planned samples could not be carried out, because the specific network was stolen in the first sampling.

EMU_ES_Vale – YES
The internal protocol indicates that 150 elvers should be measured from each batch that enters. This year the conditions allowed sampling more than one batch.

EMU_ES_Cant –NO

The electrofishing for all species numbers weren't achieved due to budget restrictions.

EMU_ES_Cata – NO

All numbers achieved except for the length and weight of the glass eel from commercial based sampling (50 individuals from 4 sites and 3 times) due to administrative problems in the negotiation of the collaborative contract with the fishermen. A modification of data collection is planned for future years.

Besides, catch and effort sampling was not carried out due to administrative problems in the award of the technical assistance contract.

EMU_ES_Nava – NO

Some sampling could not be carried out as planned due to heavy rainfall in September and October, months when electrofishing sampling for salmon and eel is carried out. High river flows prevented sampling at the largest river points.

EMU_ES_Anda - NO

During the sampling carried out in 2024, seven of the established census stations could not be surveyed. In the case of the Barbate River, since sampling is carried out between December and April and only when the moon's brightness is less than 60%, the weeks available to carry out the work are limited. The Barbate River is the last to be sampled, so if sampling is delayed due to adverse weather conditions, points may remain unsampled. In the case of the Guadaira River, access to the area was inaccessible because rains made it inaccessible. One point on the Guadalete River was not sampled because riparian vegetation (*Arundo donax*) had grown too large, preventing the traps from being placed. Finally, the Guadarranque and Barbate rivers are very close, so they are sampled as a whole, resulting in a total of nine sampling stations. With the material we had available, only 4 points could be sampled per week, so one point was left unsampled. New traps have been purchased to be able to make more than 4 points per week

Salmo salar

Navarra – NO

Biometric data on salmon catches from recreational fishing were not collected, as fishing for these species was prohibited in the Bidasoa River in 2024.

Galicia - NO

The catch at the salmon fishery was lower than the number of samples planned in most of the rivers. Besides, electrofishing was not carried out due to unfavorable weather conditions.

Cantabria - NO

The electrofishing for all species numbers weren't achieved doubt to budget restrictions. Catch sampling objectives were not achieved because the number of individuals finally caught was lower than the number of samples planned.

Basque Country – NO

The smolt trap in the Urumea was not sampled because the diverting channel of the paper mill, where the rotary screw trap was installed, stopped working in 2020. This issue will be addressed and corrected in the next update of the multiannual plan, in coordination with the National Correspondent.

The number of electrofishing points targeting parr in the River Mayor and River Lea was updated in AR 2017, reducing from two points to one per river. Additionally, the Lea trap no longer exists. At the end of December 2018, the existing fish passage was demolished due to significant hydraulic deficiencies. Although there is a new fish passage, the station has not been reestablished. These issues will be addressed and corrected in the next update of the multiannual plan, in coordination with the National Correspondent.

Asturias – NO

Porcia, Esva, Eo and Deva river underwater visual census sampling was not carried out due to adverse meteorological conditions.

Besides, Saja is a river of Cantabria not Asturias, This actual mistake in WP has been solved in the WP 2025-2027.

Salmo Trutta

Navarra – NO

Biometric data on sea trout catches from recreational fishing were also not collected, as fishing for these species was prohibited in the Bidasoa River in 2024.

Galicia – NO

While fish traps operated normally, electrofishing was nearly impossible due to high water and only could be completed in the Miño system, where sampling took place early.

Cantabria – NA

There is no specific sampling for sea trout (scientific sampling neither recreational fisheries) and did not appear in the sampling of other species.

Asturias – NA

There is no specific sampling for sea trout (scientific sampling neither recreational fisheries) and did not appear in the sampling of other species.

Basque Country – NA

There is no specific sampling for sea trout (scientific sampling neither recreational fisheries) and did not appear in the sampling of other species.

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.

Sampling scheme identifier: SelfOnShore_recreational (off site surveys)

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

In the case of highly migratory species [SelfOnShore_recreational (off site surveys)], 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). Considering that reporting of all catches is mandatory, sampling is not necessary since the entire population is covered (census).

For other species see table 2.4 and annex 1.1

(max 900 words per region)

Sampling scheme identifier: SelfOnShore_recreational (off site surveys)

In response to the recommendations of the EWG 24-08 STECF meeting, additional information regarding the SelfOnShore_recreational scheme has been incorporated into the 2025–2027 Work Plan. More detailed information about the scheme is provided in Annex 1.1.

Furthermore, in accordance with RD 327/2011, release data are collected exclusively for the species *Thunnus thynus*. This was an oversight in the previous Work Plan, which has since been rectified.

Deviations from the work plan

No deviations

Actions to avoid deviations

Not applicable

(max. 900 words per region)

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.

Sampling scheme identifier: ESP-AZTI_OffSiteSurveysRecreational

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

In the case of highly migratory species [SelfOnShore_recreational (off site surveys)], 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). Considering that reporting of all catches is mandatory, sampling is not necessary since the entire population is covered (census).

For other species see table 2.4 and annex 1.1

(max 900 words per region)

Sampling scheme identifier: ESP-AZTI_OffSiteSurveysRecreational

Deviations from the work plan

The routine survey, conducted prior to 2022 and based on the telephone list of licensed fishers, could not be carried out in recent years due to issues related to data protection regulations (access to contact information of licensed fishers is not allowed). To address this issue, a new offsite survey for marine recreational fishing (MRF) in the Basque Country was designed in 2022 and implemented in 2023. Additionally, a routine on-site sampling design was established in 2024, based on the results of the MRF pilot study conducted in 2022–2023.

Short description:

Sampling scheme aiming at collecting catch and effort data from marine recreational fisheries (MRF) in the Basque Country (BC), using onsite methods (surveys). Information is taken for all targeted species, including those for which reporting is mandatory, such as seabass (*Dicentrarchus labrax*) and tunids (e.g., northern albacore). Cod, pollack and elasmobranchs are not target species for this fishery in the BC.

The results from the offsite survey will be combined with data collected through the new routine on-site sampling scheme. We are currently working on the estimates. The initial plan was to calculate both the annual total catch and the annual percentage of catch released alive for all sampled species. However, setting up the methodology for these estimates has proven more complex than anticipated. At present, we

realistically expect to have the catch estimates ready by the end of 2025, but we are less certain about the timeline for estimating the percentage of catch released alive. It may not be ready by 2025.

More detail scan be found in Annex 1.1: ESP-AZTI_OffSiteSurveysRecreational.

Actions to avoid deviations

The deviation (change of the sampling scheme) has resulted in an improvement of the data collection.

(max. 900 words per region)

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)], 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). Considering that reporting of all catches is mandatory, sampling is not necessary since the entire population is covered (census).

For other species see table 2.4 and annex 1.1

(max 900 words per region)

In response to the recommendations of the EWG 24-08 STECF meeting, additional information regarding the SelfOnShore_recreational scheme has been incorporated into the 2025–2027 Work Plan. More detailed information about the scheme is provided in Annex 1.1.

Furthermore, in accordance with RD 327/2011, release data are collected exclusively for the species *Thunnus thynus*. This was an oversight in the previous Work Plan, which has since been rectified.

Deviations from the work plan

No deviations

Actions to avoid deviations

Not applicable

(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.

Sampling scheme identifier: ESP_IEO_P5_AtSea

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea

Deviations from the work plan

Sampling frame identifier: OTM_DEF_100-119

The deviations are due to the inactivity of the Spanish fleet in these areas and are considered unavoidable.

Actions to avoid deviations

The deviations resulted from circumstances outside the sampling program (no fishing effort). Therefore, no action can be taken.

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

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.

Sampling scheme identifier: ESP_IEO_P1_AtSea

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)

Sampling scheme identifier: ESP_IEO_P1_AtSea

Deviations from the work plan

All deviations explained in table 2.5.

Actions to avoid deviations

Work with the is underway fleet to reduce the refusal rate on-board.

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

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.

Sampling scheme identifier ESP_IEO_P1_OnShore

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)

Sampling scheme identifier ESP_IEO_P1_OnShore

Deviations from the work plan

Sampling scheme identifier: ESP_IEO_P1_OnShore

In the sampling scheme "ESP_IEO_P1_OnShore", a mistake was detected in the WP, in the columns "Average number of PSUs during the reference period" and "Planned number of PSUs". The correct values are in green:

Sampling frame identifier Average number of PSUs during the reference period Planned number of PSUs Planned number of PSUs	Average number of PSUs during the reference period	Average number of PSUs during the reference period	Planned number of PSUs	Planned number of PSUs
	WRONG	RIGHT	WRONG	RIGHT
IEO_P1_M_CN	4437	4437	884	1124
IEO_P1_M_GC	1305	1305	260	96
IEO_P1_M_NEAFC	1566	762	312	132
IEO_P1_M_Unsampled	28971	13054	0	0

According to the corrected reference number of PSUs and the corrected planned number of PSUs, the Achieved % of PSUs in 2024 becomes as follows.

Sampling frame identifier	Average number of PSUs during the reference period	Planned number of PSUs	Total number of PSUs in the implementation year	Achieved number of PSUs in the implementation year	Achieved % of PSUs	Divergence (%) of implementation year vs. reference period	Indication if AR comments required concerning number of PSUs achieved
IEO_P1_M_CN	4437	1124	4849	955	85%	109%	X
IEO_P1_M_GC	1305	96	1433	135	141%	110%	
IEO_P1_M_NEAFC	762	132	685	186	141%	90%	
IEO_P1_M_Out of frame	13054	0	11461	0	NA	88%	

Frame identifier IEO_P1_M_CN: According to the corrected "Planned Number of PSUs", the current values for "% PSU Achieved" for IEO_P1_M_CN is 85%. The deviation below 90 percent is due to execution problems by the company subcontracted for sampling, which

have already been discussed in previous annual reports. Despite this, this year an improvement has been achieved compared to the previous year both in on-shore event (from 838 to 955 port-days) and in sampled fishing trips (from 1592 to 2170).

Actions to avoid deviations

The sampling execution problem of the outsourced company will be solved with the new contract in 2026. However, to solve the execution problems of the subcontracted company, the IEO team in charge of coordinating the sampling will continue to maintain close contact to reach the required levels.

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

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea

Deviations from the work plan

Sampling frame identifiers: OTM_DEF_100-119 and OTB_DWS_100-129.

All deviations explained in tables.

The deviations are due to the inactivity of the Spanish fleet targeting *Sebastes mentella* in Irminger Sea (Frame: OTM_DEF_100-119), and targeting deep water species in Hatton bank (Frame. OTB_DWS_100-129) in the year 2024. None of them can be avoided.

Actions to avoid deviations

The deviations resulted from circumstances outside the sampling program (no fishing effort). Therefore, no action is necessary.

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

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.

Sampling scheme identifiers: ESP-AZTI_AtSea_ICES

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)

Sampling scheme identifiers: ESP-AZTI_AtSea_ICES

Deviations from the work plan

OTB: We had problems with subcontracted external observers. The company had difficulty finding staff, which has led to a lack of observers on board at certain times of the year. This has occurred during the 8-abd OTB trips.

SSF: the observer from AZTI was on sick leave for much of the year and much of the sampling could not be carried out.

PTB & PTB_8abd: On other cases, the ships have trainee personnel on board, which leaves no room for an observer to board and makes it difficult to cover the planning at certain times.

In addition, the two sampling schemes for ESP-AZTI_AtSea_ICES & ESP-AZTI_AtSea_PET_ICES are actually the same sampling scheme. In both samplings we collect information about the catch, and the bycatch of ETP species following the same protocol. This has been ammended in the NWP 2025-2027. Therefore, it is artificial to divide the sampling in two schemes.and the sampling coverage shall be analyzed as a single sampling scheme. In that sense, this year due,mainly to the closed period (januaru-february), the sampling coverage has been reduced

Actions to avoid deviations

We are working in solving the problems with subcontracted observers.

The observer fom AZTI who was on leave is now back at work, and we expect that he will be able to complete the sampling for SSF

The problem with trainee personnel on board is complicated, as sometimes there are very few available ships, and no option to choose another ship to sample.

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

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.

Sampling scheme identifiers: ESP-AZTI_AtSea_PETs_ICES

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)

Sampling scheme identifiers: ESP-AZTI_AtSea_PETs_ICES

Deviations from the work plan

Desviations have been explained in the table

As explained in the textbox above, the two sampling schemes ESP-AZTI_AtSea_ICES & ESP-AZTI_AtSea_PET_ICES are actually the same sampling scheme. In both samplings we collect information about the catch, and the bycatch of ETP species, following the same protocol. This has been ammended in the NWP 2025-2027. Therefore, it is artificial to divide the sampling in two schemes.and the sampling coverage

shall be analyzed as a single sampling scheme. In that sense, this year due,mainly to the closed period (januaru-february), the sampling coverage has been reduced.

Actions to avoid deviations

PTBbb: We will try to fulfil the sampling objectives, But it is reasonable that the sampling effort is reduced if the fishery is closed for two months.

OTB 8abd and 8c: we had problems with shipowners to cover area 6, In addition, there were some logiyical problems with the subcontractor in charge of this samplimng. We are working to solve both problems

SSF: Observer from AZTI was on leave for much of the year and much of the sampling could not be carried out. He is back to work and in 2025 we plan to fulfil the sampling objectives

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

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.

Sampling scheme identifiers: ESP-AZTI_OnShore_ICES

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)

Sampling scheme identifiers: ESP-AZTI_OnShore_ICES

Deviations from the work plan

Desviations have been explained in the table

Actions to avoid deviations

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

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.

Sampling scheme identifier: ESP_IEO_P2_AtSea

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)

Sampling scheme identifier: ESP_IEO_P2_AtSea

Deviations from the work plan

Results lower than planning:

In some cases, it was not possible to reach the number of trips planned to be sampled during 2024 due to the decision of fishermen to change the target species of the trip (sampling frame **OTB_DEF_Mall05** and **OTB_DEF_Men05**) (see AR comments in Table 2.5).

On the other hand, GSA07 observers often find difficulties to get on board (see AR comments in Table 2.5)

Finally, in the sampling frame **OTB_DEF_North06**, the sampling was reduced but the results were sufficient to estimate the volume and length of the catches (see AR comments in 2.5).

Actions to avoid deviations

Work is being done to minimize refusals, but collaboration is sometimes difficult to achieve. The limited space available on board in some fleets is also a problem with a difficult solution. In the case of GSA07, from 2026 onwards the sampling will be done on shore to reach information of OTB fisheries.

When unexpected problems occur (temporary fishing closures, fisherman's decisions, bad weather, etc.) the sampling team redistributes the sampling effort. On the other hand, sampling effort is increased when the quality of the length distributions is not considered as good as it should be.

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

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.

Sampling scheme identifier: ESP_IEO_P2_OnShore

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)

Sampling scheme identifier: ESP_IEO_P2_OnShore

Deviations from the work plan

In the sampling frame **PS_SPF_05**, the sampling was reduced but the results were sufficient to estimate the volume and length of the catches (see AR comments in 2.5).

Actions to avoid deviations

The percentage of sampling is near the sampling target and the reduction was incidental, so no actions are going to be done.

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

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.

Sampling scheme identifier: ESP_IEO_P2_ StockSpecific

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)

Sampling scheme identifier: ESP_IEO_P2_ StockSpecific

Deviations from the work plan

The objective of Sampling scheme StockSpecific is to reinforce the length information of target species of the concurrent sampling. This year in the sampling frames OTB_DWS02_stock (Target species: *Aristeus antennatus*) and GTR_DEF05_stock (target species *Mullus surmuletus*) the sampling was reduced, but the results, along with the results of the concurrent sampling, were sufficient to estimate the volume and length of the catches.

LLS_DEF06_stock and **LLS_DEF07_stock:** In these cases, the number of fishing trips with landings of hake has dropped dramatically, and the sampling was lower than planned.

Actions to avoid deviations

The low number of trips of LLS_DEF focusing on hake does not allow to reach the planned sampling, so there are not any possibility to avoid desviations.

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

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.

Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias

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)

Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias

Deviations from the work plan

All deviations are explained in tables.

Actions to avoid deviations

The deviations are related to the difficulties in developing scientific observations on board due to logistical problems. As in previous years, the team in charge of coordinating the embarkments will intensify the contacts with the shipowners to try to overcome the obstacles and we expect better results next year. However, we do not know when our efforts will produce positive results.

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

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea

Deviations from the work plan

One trip less than planned due to logistical problems in a particular case.

Actions to avoid deviations

Improved coordination and planning among vessel operators, observer deployment teams and fishiries administration to anticipate and address logistical constraints.

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

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.

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

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 (SFPAs) 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

Additional description on sampling frames

ESP-IEO_P3_AtSea_Africa - OTB_CRU_>=40_0_0

The observation programme on board shrimper 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)

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

Deviations from the work plan

All deviations are explained in tables.

However somo information is needed to better understand status in 2024

The situation of the SFPAs, by country, is described bellow:

Morocco:The last Protocol of the SFPA between the EU and Morocco (2019-2023) expired in July 2023. There is currently no SFPA in force and the signing of a new Protocol remains uncertain.

Mauritania: The latest SFPA between the EU and Mauritania and its implementing Protocol were signed in December 2021, allowing the use of these licenses until 2027.

Guinea-Bissau: The last Protocol of the SFPA between the EU and Guinea-Bissau (2019-2024) expired in June 2024. A new protocol was signed and applied provisionally on September 2024 and is expected to enter into force until 2029, once both parties ratify it.

Senegal:The last Protocol of the SFPA between the EU and Senegal (2019-2024) expired in November 2024. This protocol included fishing possibilities for trawlers targeting black hake. However, due to failures in Senegal's monitoring, control and surveillance systems in the fight against illegal, unreported and unregulated fishing, the EU decided not to renew it. As a result, European vessels had to leave Senegalese waters when the agreement expired.

The Gambia: A new SFPA between the EU and The Gambia (2019-2025) was signed in July 2019. Fishing opportunities for black hake trawlers are also included.

Although fishing activities in NW Africa was conducted regularly during 2024, except for the purse seine fleet (PS_SPF_0_0_0), sampling actions were hindered by different issues, depending on the fishing ground or métier. Under these circumstances, only some métiers/stocks could be sampled at low levels.

There was no activity of the purse seine fleet (PS_SPF_0_0_0) in Morocco during 2024due to the EU-Morocco SFPA expired in July 2023.

Regarding freezer shrimper bottom trawlers (OTB_CRU_>=40_0_0), the deviations were due to the logistical problems of the on-board observer program which only allowed sampling on 3 out of 4 trips.

For at-sea sampling, the hake trawl fleet (OTB_DEF>=70) made fewer trips than planned due to the difficulties associated with this fleet and the embarkments in African ports. Finally, 5 of the 16 planned trips were carried out, all in the fresh fleet (planned one per month) and none in the freezer fleet (planned one per quarter).

No on-board scientific observation was carried out in metier MCF_>=70_0_0, due to the difficulty in finding suitable on-board observer candidates.

Actions to avoid deviations

Deviations due to changes in the strategy followed by the fleet are all external circumstances related to the fishing activity and no actions can be taken by us to avoid the deviation.

Regarding the difficulties in developing scientific observations on board due to logistical problems, the team in charge of coordinating the embarkments will intensify the contacts with the shipowners to try to overcome the obstacles. However, the poor conditions on board are not so easy to resolve and the logistics with the third countries in Africa are not expected to improve, so we do not know when our efforts will produce positive results.

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

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.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Deviations from the work plan

LL_MED_AtSea program has achieved a 55% of the planned number of PSU. This circumstance is in part due to the recovery plan for Mediterranean stock of Thunnus alalunga. This recovery plan reduce drastically the allowed landing for this species and so the number of PSU in the year were 78% of the reference period. We have compensated for this lack of information increasing the LL_MED_Port program, achieving a 154% over the planned number of PSU.

LLSWO_ATL_AtSea: program has achieved a 500% of the planned number of PSU. In 2024, fishing trips were shorter than in previous years, and the number of sampled trips increased compared to the initial plan. However, the total number of at-sea sampling days remained similar to those planned in the sampling frame, with comparable coverage.

PS_MED_BFT_AtSea: sampling coverage was 600% due to the increment of the number of PSU in 2024 (6) in comparison with the PSUs in the reference period (1). All captured specimens were transferred to a fattening cage and one year after fattening period ended, they were sacrificed and sampled.

PS_ATL_AtSea_IEO: sampling coverage was 80% due to the decrease of the number of PSU in 2024 (64) in comparison with the PSUs in the reference period (114).

TRAP_MED_SmallTunas: sampling coverage was 85% due to changes in the Mediterranean traps that decreased till 64% of its activity in comparison with the reference period.

Actions to avoid deviations

Most of deviations are due to changes in the fishery (increase or decrease in fisheries…) and are unavoidable.

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

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.

Sampling scheme identifier: ESP_IEO_P4_OnShore_all

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)

Sampling scheme identifier: ESP_IEO_P4_OnShore_all

Deviations from the work plan

LL_MED_Port: sampling coverage was 154% over the planned number of PSU to compensate the 55% of sampling in LL_MED_AtSea_All.

BB_BFT_CantabrianSea_IEO_Port: there was no effort in the directed fishery for this species in the Cantabrian Sea because the BFT quotas were transferred to the fleets operating in the Strait of Gibraltar.

The **BB_BFT_Strait_Port** and **HAND_BFT_Strait_Port:** sampling coverage was over 300% due to the transference of quota from the Cantabrian Sea and also due to the ICCAT requirements for species under recovery plans, in this case BFT.

BB_ALB_CantabrianSea_IEO_Port: sampling coverage was 173% over the planned number of PSU due to increase in the PSU targeting ALB in the area. This higher percentages on sampling coverage compared with the reference period 2017-2019, was due to the higher geographical distribution along the Bay of Biscay of this fleet. The sampling was increased to cover the spatial distribution of fleet activity landing at different fishing ports along the Cantabrian coast. Also TROL_ALB_CantabrianSea_IEO_Port increase its activity.

LLSWO_ATL_Port: sampling coverage was 73%. This lack of information obtained in port was compensated with the trips sampling at sea in the frame LLSWO_ATL_AtSea. The sampling carried out throughout the year was sufficient to obtain a good quality length distribution of the catches.

BB_MSP_Canary_Port: The changes in the fleet´s operativity, already started in 2023, reduced the accessibility to sampling on shore.

BB_TROP_Dakar_Port (sampling coverage 33%) there was a significant decrease in the activity of the bait boat fishery (since 2023). The landings in Dakar only reached the 11% of the trips in reference period and the the number of vessels operating in this metier is 3, while in the reference year was 7.

Actions to avoid deviations

Most of deviations are due to changes in the fishery (quota transfer, fleet operativity, decrease in fisheries…) and are unavoidable. Nevertheless all the sampling plans were revised for the next period to be adapted to the fishing activities.

BB_TROP_Dakar_Port: The sampling plan was revised for the next triennial period and adapted to the new number of bait boats.

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

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.

Sampling scheme identifier: ESP_IEO_P4_OnShore_sp

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)

Sampling scheme identifier: ESP_IEO_P4_OnShore_sp

Deviations from the work plan

PS_ATL_Port (sampling coverage 48%) didn't reach the planned sampling due to the decrease in fishery targeting tropical tunas in Atlantic Ocean.

Actions to avoid deviations

Although the deviations due to changes in the fishery are unavoidable, in the case of PS_ATL_Port, the sampling plan was revised for the next triennial period and adapted to the new number of purse seine vessels operating in Atlantic.

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

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.

Sampling scheme identifier: ESP_IEO_ P4_AtSea_all

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)

Sampling scheme identifier: ESP_IEO_ P4_AtSea_all

Deviations from the work plan

No deviations

Actions to avoid deviations

Not applicable

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

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.

Sampling scheme identifier: ESP_IEO_P4_OnShore_sp

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)

Sampling scheme identifier: ESP_IEO_P4_OnShore_sp

Deviations from the work plan

PS_IND_Port: sampling coverage was sligthly below the target (81%) according the decrease in PSU. However the sampling coverage of the total is keeping.

Actions to avoid deviations

The deviations due to changes in the fishery are unavoidable

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

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.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Deviations from the work plan

PS_WPAC_AtSea_IEO: sampling coverage was 200% due to the increment of the number of PSU in 2024 (35) in comparison with the PSUs in the reference period (11). Also PS_EPAC_AtSea_IEO increased its activity in Pacific Ocean (343%).

The observer coverage on these vessels is voluntary, as there is a mandatory 100% observer coverage under the regional observer programme.

Actions to avoid deviations

The deviations due to changes in the fishery are unavoidable.

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

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.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Deviations from the work plan

No deviations

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

Text Box 2.6: Research surveys at sea

FLEMISH CAP GROUNDFISH 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 GROUNDFISH 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).

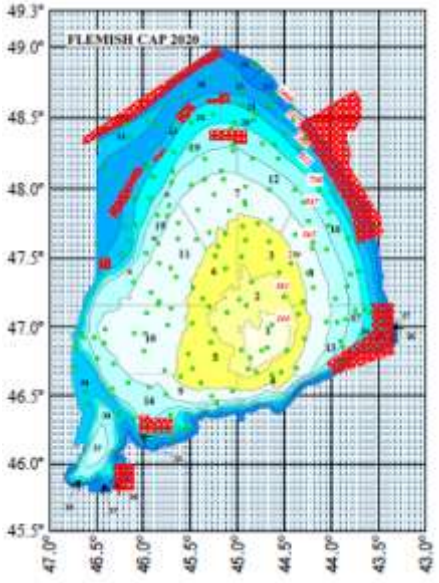
- Collection of invertebrates data, with special attention to corals and sponges, to allow identification of potentially vulnerable marine ecosystems.
- Collection of marine litter data classified in different items or codes, according to their characteristics.

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)

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

Summary Report of the FLEMISH CAP International Survey COORDINATION MEETING (FCCM) 2024

https://digital.csic.es/handle/10261/387629

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

2024 EU-Spain and Portugal Survey results, including abundance indices and length distributions of the main commercial species and age distributions for cod, redfish, Northern shrimp, American plaice, roughhead grenadier and Greenland halibut, provide independent information about the stock status of commercial fisheries.

The results are regularly submitted to the NAFO Scientific Council as Scientific Council Research (SCR) documents and serve as a foundation for many subsequent studies.

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

Results are used in the assessment of the following stocks: Cod (Div. 3M), American plaice (Div. 3M), Redfish (Div. 3M), Northern shrimp (Div. 3M), Greenland halibut (SA 2 and Div. 3KLMNO), Roughhead grenadier (SA 2+3).

Biological samples for histological assessment of sexual maturity of cod, redfish, American plaice were taken.

Stomach samples were collected for trophic studies. Biennial sampling (even years). See table 4.1.

The results of the survey provided new information on deep-water corals and sponges to enhance the mapping and preliminary identification of vulnerable marine ecosystems (VMEs). The data was made available to the NAFO WGESA to support improved mapping of VME species in the NAFO Regulatory Area (Divs. 3LMNO).

Additionally, oceanographic monitoring and marine litter data collection continues in the area.

7. Extended comments

New links to survey manual:

https://www.nafo.int/Portals/0/PDFs/Studies/s46/S46-print.pdf

https://digital.csic.es/bitstream/10261/95007/1/scr13-021_protocols_EU.pdf

3M Flemish Cap 2024 Survey Plan (in English, pp. 44–57)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

Link to the SeaDataNet survey database:

https://csr.seadatanet.org/report/21033533

(max. 450 words per survey)

3LNO GROUNDFISH 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 GROUNDFISH 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:

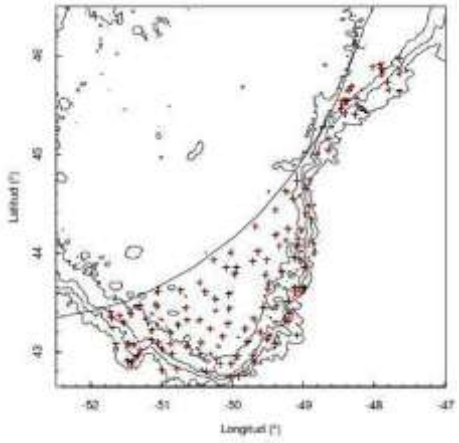
- Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, maturity and the collection of otoliths and gonads. For other species only length and length-weight sampling are performed.
- Collection of oceanographic data from the area using 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-ieo/bitstream/handle/10508/632/PROTOCOLO%20CAMPA%C3%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)

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

There is no international coordination group for this survey.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The results of this survey, including biomass indices with their errors and length distributions, as well as the calculated biomass based on conversion of length frequencies for Greenland halibut, American plaice, Atlantic cod, yellowtail flounder, redfish, witch flounder, roughhead grenadier, thorny skate and white hake are presented as Scientific Council Research (SCR) documents and serve as a foundation for many subsequent studies.. In addition, age distributions are presented for Greenland halibut and Atlantic cod.

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

Results are used in the assessment of the following stocks: Northern shrimp (Div. 3LNO), Greenland halibut (SA 2 and Div. 3KLMNO), American plaice (Div. 3LNO), Atlantic cod (Div. 3NO), Yellowtail flounder (Div. 3LNO), Redfish (Div.3LN & Div.3O), Witch flounder (Div.3NO), Roughhead grenadier (SA 2 and Div. 3KLMNO) , Thorny skate (Div.3LNO) and White hake (Div.3NO).

Biological samples for histological assessment of sexual maturity of Atlantic cod, Greenland halibut and Silver hake were taken.

Stomach samples were collected for trophic studies. Biennial sampling (even years). See table 4.1.

The results of the survey provided new information on deep-water corals and sponges to enhance the mapping and preliminary identification of vulnerable marine ecosystems (VMEs). The data was made available to the NAFO WGESA to support improved mapping of VME species in the NAFO Regulatory Area (Divs. 3LMNO).

Additionally, oceanographic monitoring and marine litter data collection continues in the area

7. Extended comments

New links to survey manual (in Spanish):

https://digital.csic.es/handle/10261/328269

3LNO Groundfish (1st part, 3NO Platuxa 2024 Survey Plan (in English, pp. 15–32)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

Link to the SeaDataNet survey database:

https://csr.seadatanet.org/report/21033396

(max. 450 words per survey)

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:

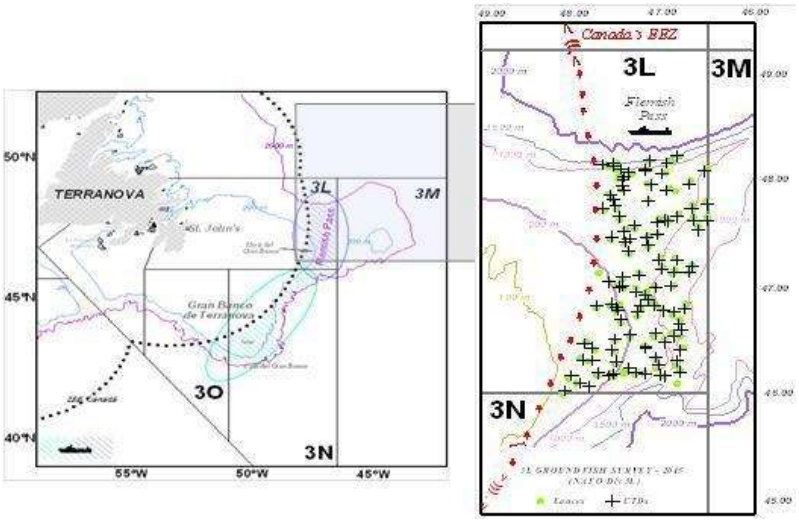
- Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, and the collection of otoliths and gonads. For other species only length and length-weight sampling were performed.
- Collection of oceanographic data data from the area using a 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 Bllack 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%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 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)

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

There is no international coordination group for this survey.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The results of this survey, including biomass indices with their errors and length distributions, as well as the calculated biomass based on conversion of length frequencies for Greenland halibut, American plaice, Atlantic cod, yellowtail flounder, redfish, witch flounder, roughhead grenadier, thorny skate and white hake are presented as Scientific Council Research (SCR) documents and serve as a foundation for many subsequent studies.. In addition, age distributions are presented for Greenland halibut and Atlantic cod.

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

Results are used in the assessment of the following stocks: Northern shrimp (Div. 3LNO), Greenland halibut (SA 2 and Div. 3KLMNO), American plaice (Div. 3LNO), Atlantic cod (Div. 3L), Yellowtail flounder (Div. 3LNO), Redfish (Div.3LN & Div.3O), Witch flounder (Div.3L), Roughhead grenadier (SA 2 and Div. 3KLMNO) and Thorny skate (Div.3LNO).

Biological samples for histological assessment of sexual maturity of Atlantic cod and Greenland halibut were taken and otoliths samples of 4 species were taken for the growth studies (see Table 2.2).

Stomach samples were collected for trophic studies. Biennial sampling (even years). See table 4.1.

The results of the survey provided new information on deep-water corals and sponges to enhance the mapping and preliminary identification of vulnerable marine ecosystems (VMEs). The data was made available to the NAFO WGESA to support improved mapping of VME species in the NAFO Regulatory Area (Divs. 3LMNO).

Additionally, oceanographic monitoring and marine litter data collection continues in the area.

7. Extended comments

New links to survey manual (in Spanish):

https://digital.csic.es/handle/10261/328269

3LNO Groundfish (1st part, 3NO Platuxa 2024 Survey Plan (in English, pp. 68–82)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

Link to the SeaDataNet survey database:

https://csr.seadatanet.org/report/21033396

(max. 450 words per survey)

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

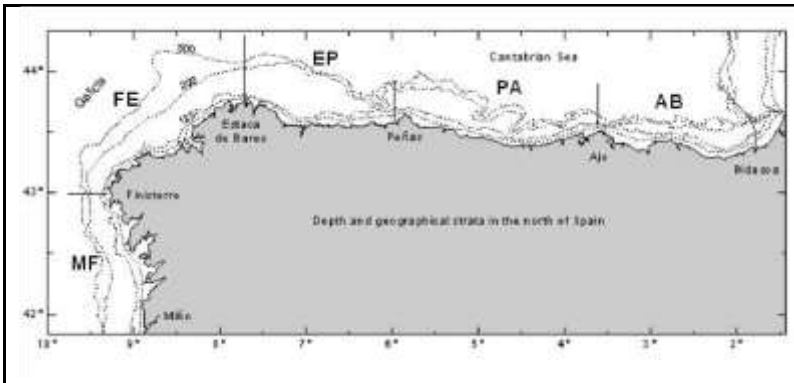
- Estimation of abundance indices by age of megrim (*Lepidorhombus boscii* and *L. whiffiagonis*), blue whiting, horse mackerel and mackerel, as well as indices by size class of hake and monkfish (*Lophius budegassa* and *L. piscatorius*),
- Estimation of the recruitment strength of the species mentioned, 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%20Revision%2011_Manual%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)

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

ICES. 2025. International Bottom Trawl Survey Working Group (IBTSWG). ICES Scientific Reports. 7:33. 208 pp. https://doi.org/10.17895/ices.pub.28562888

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Data obtained are used for calibration of assessment models of groundfish on the South Platform within the ICES WGBIE, especially the southern stock of hake (*Merluccius merluccius*), megrims (*Lepidorhombus whiffiagonis* y *L. boscii*), and anglers (*Lophius budeggassa*, and *L. piscatorius*), on the Iberian continental shelf. Moreover, survey data are provided to WGNEP to provide information for assessment of Norway lobster (*Nephrops norvegicus*), to WGDEEP of assessment of deep species (*Phycis blennoides, Molva macrophthalma, Helicolenus dactylopterus*, ...), to WGEF of assessment of elasmobranch species (*Galeus melastomus, Scyliorhinus canicula, Etmopterus spinax*, rays…) and to WGWIDE to provide information for the assessment of blue whiting (Micromessistius poutassou), North Eastern Atlantic mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*) and boarfish (*Capros aper*). They are also used in the calibration of assessments of the southern stocks of horse mackerel on 9a (*Trachurus* spp.), anchovy (*Engraulis encrasicholus*) and mackerel (*Scomber* spp.) to WGHANSA.

7. Extended comments

(max. 450 words per survey)

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%20Revision%2011_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf

The whole area (7224 km2) 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)

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

https://ices-library.figshare.com/articles/report/International_Bottom_Trawl_Survey_Working_Group_I_BTSWG_outputs_from_2024_meeting_/28562888?file=52944146

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Data obtained are used for assessment models of groundfish on the South Platform within the ICES WGBIE, especially the southern stock of hake (*Merluccius merluccius*), and Norway lobster (*Nephrops norvegicus*) on the Iberian continental shelf. Moreover, survey data are provided to WGCEPH of cephalopods species like octopus (*Octopus vulgaris*), cuttlefish (Sepia officinalis and squid (*Loligo vulgaris* and *Loligo forbesii*), to WGEF of assessment of elasmobranch species (*Galeus melastomus, Scyliorhinus canicula, Etmopterus spinax*, rays…)

and to WGWIDE to provide information for the assessment of blue whiting (*Micromessistius poutassou*), North Eastern Atlantic mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*) and boarfish (*Capros aper*). They are also used in the calibration of assessments of the southern stocks of horse mackerel on 9a (*Trachurus* spp.) anchovy (*Engraulis encrasicholus*) and mackerel (*Scomber* spp.) to WGHANSA

7. Extended comments

The number of valid hauls was 45 valid (96% planeed no deviations), Overall a total of 164 fish species, 60 crustaceans and 60 mollusks were recorded. during the survey. Length distribution of all fish and main species of crustacean and cephalopods were recorder. Biological samples were studied for the most important species. 43 CTD casts were carried out in the survey area.

(max. 450 words per survey)

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

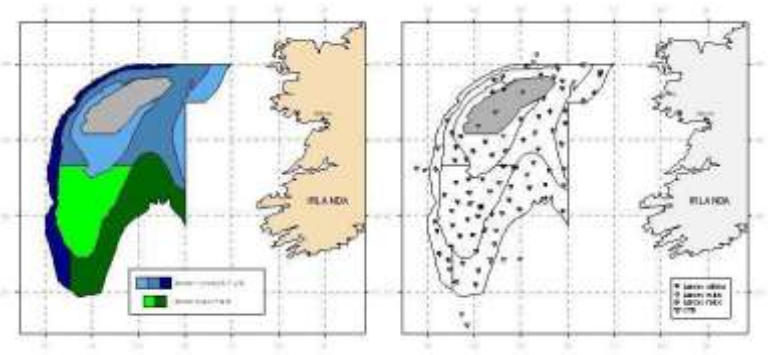
- To estimate stratified abundances indices by age of megrims (*L. whiffiagonis*) and by length of hake (*Merluccius merluccius*), monkfishes (*Lophius budegassa* and *L. piscatorius*), four spotted megrim (*L. boscii*), Norway lobster (*Nephrops norvegicus*) and other fish species.
- To estimate recruitment 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. dactilopterus*….)
- 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%93%20Revision%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)

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

ICES. 2025. International Bottom Trawl Survey Working Group (IBTSWG). ICES Scientific Reports. 7:33. 208 pp. https://doi.org/10.17895/ices.pub.28562888

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Data obtained are used to calibrate the assessment models of groundfish stocks on the ICES areas 7c-k in the working group WGBIE, hake, megrims and anglers. Moreover, data of the survey are provided to working group WGNEP for the assessment of Norway lobster (*Nephrops norvegicus*), WGCSE for the assessment of haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangius*) and cod (*Gadus morhua*), to working group WGDEEP of assessment of deep species (*Phycis blennoides, Argentina* sp., *Molva macrophthalma, M. molva and Helicolenus dactylopterus*), to working group WGEF of assessment of elasmobranch species (*Galeus melastomus, Deania calcea, Scyliorhinus canicula, Scymnodon ringens*…) and to the working group WGWIDE to provide information for the assessment of blue whiting (*Micromessistius poutassou*) and boarfish (*Capros aper*), WGCEPH squids (*Loligo forbesi, Todarodes sagitatus, Ilex coindetii*…)

7. Extended comments

In 2024, only 69 valid standard hauls could be carried out instead of the 80 planned ones due to the vessel's engine breaking down after last haul in the norther sector.The hauls were carried out normally in the northern sector, but the southern sector was affected and several hauls (15) in the south eastern area could not be carried out. Consequently, the results of the last survey are likely to be biased in the southern sector and some species that are usually abundant in that southern area (e.g. *Nephrophs norvegicus*) may be affected.

(max. 450 words per survey)

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

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 nº 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, Netherland 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)

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

http://hdl.handle.net/10793/1911

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

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. 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.

7. Extended comments

(max. 450 words per survey)

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

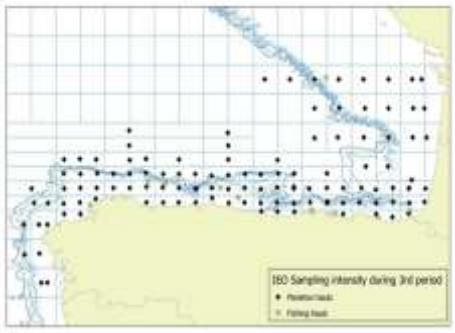
- This survey (CAREVA) provides indices for the strength of the SSB and a relative abundance index of Atlantic mackerel (*Scomber scombrus*) spawning stock.
- Egg production and spawning area estimation for both mackerel and horse mackerel.
- Fecundity estimation
- Determine the egg distribution area 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,%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, 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)

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

Triennial survey. Next in 2025.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

7. Extended comments

(max. 450 words per survey)

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

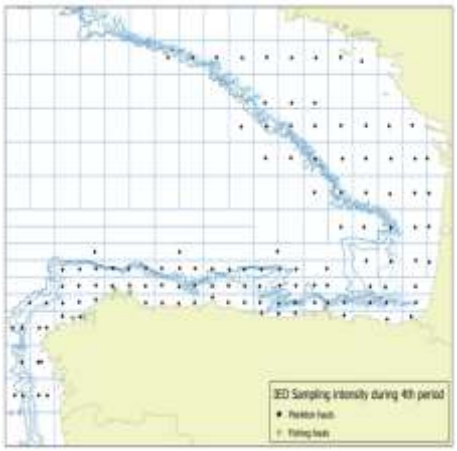
- This survey (JUREVA) provides indices for the strength of the SSB and a relative abundance index of horse mackerel (*Trachurus trachurus*) spawning stock.
- Egg production and spawning area estimation for both mackerel and horse mackerel.
- Fecundity estimation
- Determine the egg distribution area 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

- 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)

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

Triennial survey. Next in 2025.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

7. Extended comments

(max. 450 words per survey)

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://ices-library.figshare.com/articles/report/SISP_6_-_Manual_for_mackerel_and_horse_mackerel_egg_surveys_sampling_at_sea/19051136

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)

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

Triennial survey. Next in 2025.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

7. Extended comments

(max. 450 words per survey)

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

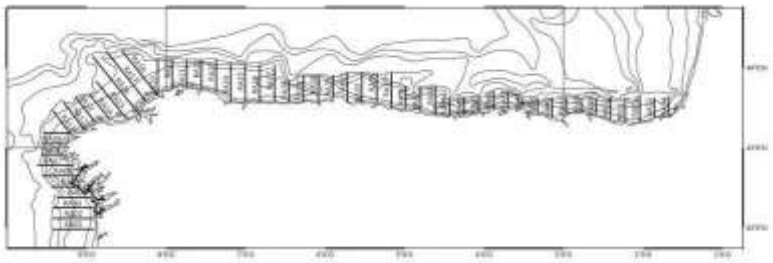
2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

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

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)

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

WGACEGG: https://doi.org/10.17895/ices.pub.25296220.v1

WGHANSA: https://doi.org/10.17895/ices.pub.26003356.v2

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

This survey provides a series of both quantitative and qualitative indices for several fish species.

Biomass indices for the main pelagic fish species (sardine, anchovy, horse mackerel, mackerel, blue whiting, chub mackerel); of which those for anchovy in 9a, horse mackerel in 8c and sardine (both 8c and 9a) are used as independent survey indices for assessment purposes in ICES WHANSA and WIDE working groups. Together with these, the survey also provides ancillary variables such as SST, SSS, CTD casts, marine mammal and bird observations and marine surface litter, as well as biological information from fishing stations, which are used for further analysis within the MSFD measures.

The results of the survey are also presented annually to the WGACEGG group to discuss and analyse the methods and results of the survey.

7. Extended comments

(max. 450 words per survey)

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.

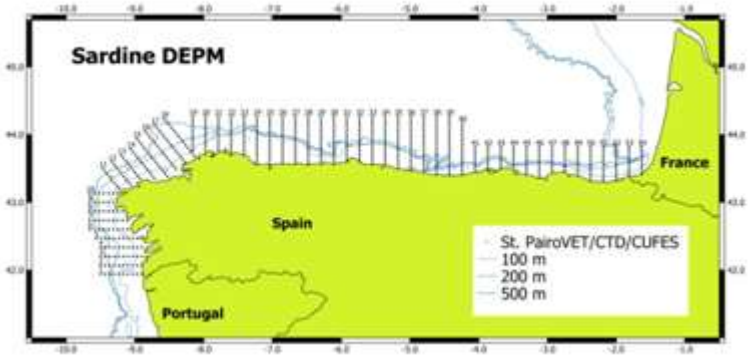
https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR%20332.pdf

SAREVA survey consisted of ichthyoplankton, hydrographic and adult sampling:

(a) 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.

(b) CTD profiles are obtaine in each PairolVET station. A sensor continuously register temperature, salinity and fluorescence at 5 m depth on the transects.

(c) 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 Portugués 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)

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

Triennial survey. Next in 2026

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

7. Extended comments

(max. 450 words per survey)

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

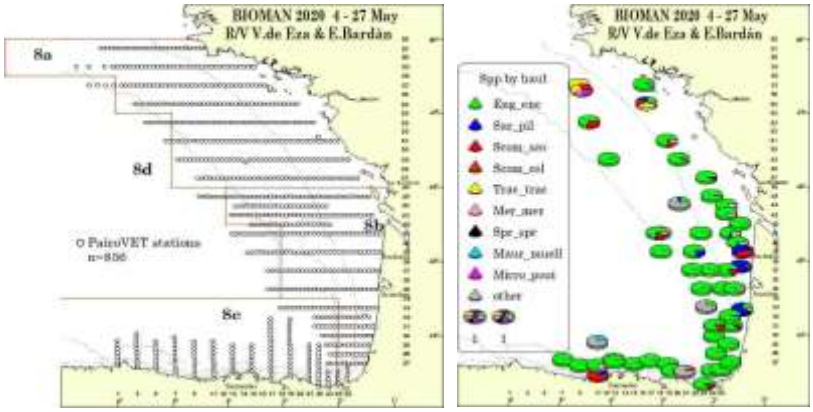
2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

The DEPM is applying following the protocol accorded at WGACEGG. In (ICES -Cooperative Research Report 332). https://ices-library.figshare.com/articles/report/Pelagic_survey_series_for_sardine_and_anchovy_in_ICES_subareas_8_and_9_Towards_an_ecosystem_approach/18624050

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



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

Spain&Portugal/Vizconde de Eza for plankton sampling. Spain/ Miguel Oliver&Emma Badán, Portugal/Vizconde de Eza for adults sampling

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)

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

ICES (2024) Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic (WGACEGG; outputs from 2023 meeting). ICES Scientific Reports. 6:21. 227 pp.

September 2024. DOI: 10.17895/ices.pub.25296220

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

- Anchovy total biomass, percentage by age numbers by age, biomass by age, weight by age and length by age, estimated by DEPM in 8abcd used for the assessment at WGHANSA (1987-2024).
- Anchovy daily fecundity (and associated parameters W; F; S; R) and total daily egg production in area 8abcd (not explicitly used for the assessment at WGHANSA but of relevance as biological indicators and contributing to the direct Biomass inputs) (1987-2024)
- Sardine total biomass, percentage by age, numbers by age, biomass by age, weight by age and length by age. Estimated by DEPM in 8abd used for the assessment at WGHANSA (2001_2014_2017_2020-2024)
- Sardine total daily egg production in 8abd (1999_2002-2024)
- Salinity, temperature and fluorescens vertical profiles (not explicitly used for the assessment at WGHANSA but of relevance to estimate the Biomass)
- Marine birds and mammals, human activities, debris and microplastics distribution used for different studies at international level.
- eDNA analysis used for different studies at international level.

7. Extended comments

(max. 450 words per survey)

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

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 echo-sounder 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)

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

Link to the ICES WGACEGG 2023 report: https://ices-library.figshare.com/articles/report/Working_group_on_acoustic_and_egg_surveys_for_small_pelagic_fish_in_Northeast_Atlantic_WGACEGG_outputs_from_2023_meeting_/25296220

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Survey's data and estimates were utilized till 2024 in the ICES expert groups of both stock assessment of pelagic fish species (WGHANSA, WGWIDE, WKCOLIAS) and acoustic and egg surveys for small pelagic fish in NE Atlantic (WGACEGG). The latter group reviews the results and establishes standardized protocols to properly conduct both this survey and other ones of similar methodology in the ICES areas 7, 8 and 9. The acoustic estimates from this series were of a special importance for the former anchovy stock in Division 9a, since they provided a time-series of biomass indicators which were used in the assessment of the southern component of the stock. Age structured anchovy estimates were incorporated in the SS3 stock assessment model used for the assessment of the new anchovy stock in 9a south, which was developed during the 2024 ICES WKBANSP benchmark assessment workshop on anchovy stocks.

7. Extended comments

During the years 2021 and 2022, ECOCADIZ was cancelled due to unforeseen circumstances. In the year 2022, in the WGHANSA report, Volume 4, it is explained on page 101 that the Pelago survey and fishery information was enough to provide an accurate biomass index.

Consequently, this issue was brought to the attention of the RCG and is documented in the Intersessional Subgroup (ISSG) 2024-2025 report of the RCG NANSEA and RCG BALTIC, specifically on page 6: the RCG chairs indicated that Spain will not be continuing the ECOCADIZ survey due to the lack of use of data for stock assessment.

Additionally, the document from ICES 2024 WGHANSA includes several references to ECOCADIZ with the same approach (e.g. on page 136 and 137).

During the ICES WKBANSP Benchmark assessment workshop on anchovy stocks, a data consistency analysis of acoustic surveys' age-length data of Gulf of Cadiz anchovy was presented (Zúñiga et al., WD 2024). Intra-consistency tests for the ECOCADIZ survey series result in low correlations or not correlation at all. Removing outliers did not show any improvement.

The work of the WGHANSA working group after the last benchmark has been along the lines of using the PELACUS (only for the western stock), PELAGO and ECOCADIZ RECLUTAS surveys as independent indices of the fishery, and leaving the BOCADEVA and ECOCADIZ index out of the models, which would no longer be requested in the data calls. In any case, the new approved assessment model in SS3 for the new anchovy southern stock was designed without including ECOCADIZ and BOCADEVA data for the future.

For these reasons, no survey took place in 2024 and it is not included in the WP from 2025 onwards.

(max. 450 words per survey)

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:

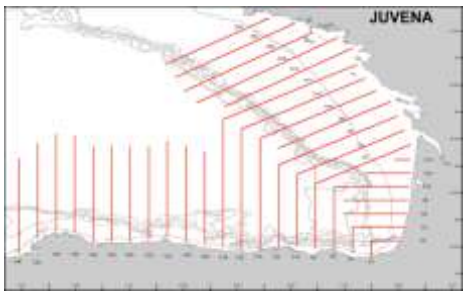
- Studying the biological condition of juvenile anchovy and its influence on the recruitment process.
- Caracterizing the hydrographic conditions and the abundance and distribution of the components of the pelagic ecosystem relevants to understand the dynamics of the recruitment.
- Studying the interactions 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://ices-library.figshare.com/articles/report/Pelagic_survey_series_for_sardine_and_anchovy_in_ICES_subareas_8_and_9_Towards_an_ecosystem_approach/18624050

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., Martınez, 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 Alvariño, 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)

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

https://www.ices.dk/community/groups/pages/wgacegg.aspx

https://www.researchgate.net/publication/388701199_Acoustic_surveying_of_anchovy_Juveniles_in_the_Bay_of_Biscay_JUVENA_2024_Survey_Report

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The main use of the results of the surveys is to provide assessment advice for anchovy stock in the Bay of Biscay. In particular the JUVENA survey provides assessment information on the recruitment level of anchovy in the Bay of Biscay. These results are reported to ICES WGACEGG, where the validity of the results is checked, and to ICES WGHANSA, where the results are used as input for the ICES CBBM assessment model for anchovy in the Bay of Biscay along with information on anchovy abundance provided by Bioman and PELGAS surveys, as well as the anchovy catches from the fleet.

7. Extended comments

(max. 450 words per survey)

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 and in this link

https://www.azti.es/en/proyectos/deep-sea-longline-campaign-estimate-abundance-of-sharks/

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 Matxitxako (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.

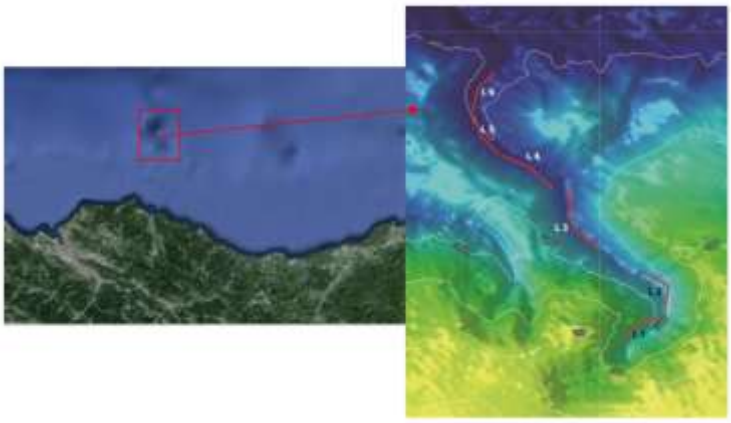
For the analysis of effort and CPUEs hauls' catches were grouped in four depth strata: 650-1050 m, 1051-1450 m, 1451-1850 m and 1851-2250 m.

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):

EFFORTst: ((P + E + C) / total hooks) x min

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

CPUEst = kg / 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)

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

https://doi.org/10.17895/ices.pub.25964749.v3

https://doi.org/10.17895/ices.pub.26935504.v1

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The series of data of elasmobranch and deep water species (abundance, Nº species, sex, maturity, length, position, date and haul information) are submitted to the ICES WGDEEP and WGEF

7. Extended comments

(max. 450 words per survey)

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, equiped 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) (m2/mn2) 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 wich abundance (nº 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. Hidrological 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)/



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)

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

http://www.medias-project.eu/medias/website/

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Standardised data obtained has been used for tuning assessments models developed by IEO,CSIC within the framework of GFCM for the most important species exploited by the purse seine fishery along the Iberian Peninsula (GSAs 1 and 6). MEDIAS data are also used for scientific papers and PhD and Master Theses.

Number and weight of all species or taxon captured during the survey and mean yields of most abundant species were estimated. Sheets including mean standardized abundance and biomass and length frequency distribution during 2024 survey were also prepared, including a summary of historical data series for density and size indicators. It is included in the national report.

7. Extended comments

During the MEDIAS 2024 acoustic evaluation survey carried out in the waters of the Spanish continental shelf in the Mediterranean Sea, in order to evaluate the sardine and anchovy stocks of GSA06 and 01, both GSA's were covered in its entirety. All the planned transects (111) were covered in GSA06 and GSA01. On the other hand, in GSA01 several identification fishing hauls were carried out at night, as planned, to improve the echo-trace identification.

Furthermore, problems with the ship's schedule prevented GSA 5 from being covered as planned and therefore it was not possible to complete all the planned days (48). However, it was possible to maintain the coverage of previous years and thus maintain the historical series of the survey.

(max. 450 words per survey)

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.

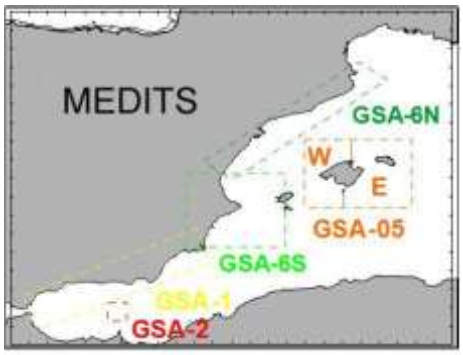
Sampling follows a stratified scheme, according to depth limits: 30, 50, 100, 200, 500 and 800 m. Hauls duration is 30 and 60' at <200 and >200 m depth, respectively. Hauls are performed during daylight.

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/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)

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

The last MEDITS Coordination Meeting took place in Naxxar (Malta) on 3 and 4 April 2024. The report is not yet available.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Standardised data obtained has been used for tuning assessment models XSA (Extended Survivors Analysis) and a4a (Statistical Catch at Age) developed by IEO within the framework of GFCM WG for Demersal Stock Assessment, for the most important species exploited by the trawl fisheries along the Iberian Peninsula (GSA1 and 6) and Balearic Islands (GSA5).

MEDITS data are also used for scientific papers, contributions to congresses, PhDs and Master theses, as well as in several projects funded at national and European level.

Number and weight of all taxon captured during the survey and mean yields were estimated. Sheets including mean standardized abundance and biomass and length frequency distributions were also prepared. This information is part of the National Reports and the Outline Reports, presented to the Secretaría General de Pesca (National Authority of the DCF) and to the annual MEDITS coordination meeting, respectively.

7. Extended comments

In 2024 the Spanish Medits coordinators have changed. The new national coordinator would be Francesc Ordinas, and the current regional coordinators would be José Luis Pérez (IEO Málaga) for GSA01 and GSA02, Antonio Esteban (IEO Murcia) for GSA06 and Francesc Ordinas (IEO Baleares) for GSA05.

The 2024 Spanish MEDITS survey was performed from:

-27 April to 29 june covering GSA1 (Northern Alboran), GSA2 (Alboran Island), GSA5E (Mallorca-Menorca in Balearic Islands), and GSA6 (Northern Spain) and

-10 to 22 August covering GSA5W (Ibiza-Formentera in Balearic Islands)

A total of 70 days, on board of the R/V Miguel Oliver and according to the standardised stratified depth strata: 30-50, 51-100, 101-200, 201-500 and 501-800 m.

A total of 297 valid trawl hauls (62 in GSA1, 9 in GSA2, 44 in GSA5W, 58 in GSA5E and 124 in GSA6) were performed by several scientific teams of the IEO. Only one haul (in GSA6) were considered null.

The following two tables summarize some data collected during the survey:

GSA	Total catches		Number of species/taxa identified			
	Individuals*	Weight (kg)	Fishes	Crustaceans	Molluscs	Other invertebrates and Algae
1	204576	4326	136	60	66	106
2	52054	1050	64	30	27	42
5E	621623	11560	149	79	66	190
5W	592116	6592	126	61	66	157
6	904441	8569	156	84	77	158

(*) Not including algae and some colonial species.

GSA	Number of individuals/samples		
	Length frequencies	Biological sampling	Otoliths and Illicia
1-2	48591	9756	701
5E	51957	12337	785
5W	44627	9613	672
6	104062	16763	1618

(max. 450 words per survey)

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:

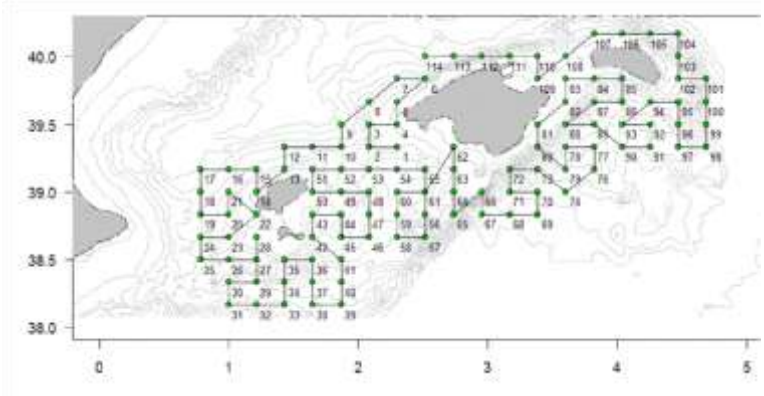
- Determine the influence of hydrographic scenarios on the structure, distribution and abundance of larval populations of large and medium pelagic species with special attention to the targeted species.
- Completing the database for the development of habitat models for the tuna species, models based 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)

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

The survey is not internationally coordinated. The last report available is

https://digital.csic.es/bitstream/10261/356966/1/INFORME%20DE%20CAMPANA%20TUNIBAL-2023_IEO_CSIC_20240509.pdf

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Preliminar results of a taxonomic review consisted of a count of the number of *Thunnus thynnus* larvae positive stations (BFT) detected during the campaign, at least 48 of the 124 stations in the systematic sampling grid carried out during TUNIBAL0624.

An additional 231 samples were obtained at different depths for nitrates, nitrites, silicates, and chlorophyll and 15 samples to enviromental DNA.

A priori analysis was carried out on the database generated during the campaign. A summary of the survey and the data collected on board is freely accessible on the online platform "PanEuropean Infrastructure for Ocean & Marine Data Management" (TUNIBAL 2024-06 (seadatanet.org) at https://csr.seadatanet.org/report/21033398).

7. Extended comments

(max. 450 words per survey)

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

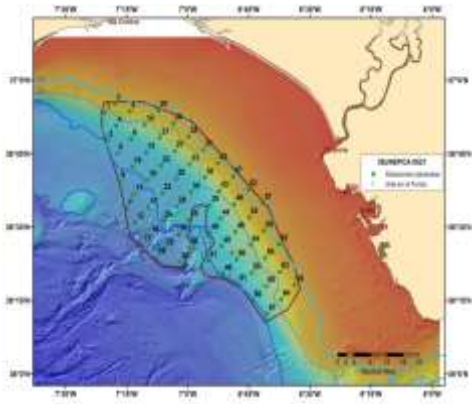
- To obtain estimates of Nephrops burrows densities in the Gulf of Cádiz from a randomized isometric grid of UWTV stations spacing 4 nautical miles using the underwater images.
- To define the Nephrops distribution in the Gulf of Cadiz
- To obtain density estimates of bentho-demersal macrofauna species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

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/Havfisken; 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)

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

UWTV surveys design and methodologies have been developed and standardized by the Expert Group on Nephrops surveys (WGNEPS) which have been adopted in UWTV survey (ISUNEPCA). The following link corresponds to the 2022 report (last available). Reports have not been updated on the WGNEPS web site at the moment.

https://ices-library.figshare.com/articles/report/Working_Group_on_Nephrops_Surveys_WGNEPS_outputs_from_2022_meeting_/22211161?file=39495295

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The Nephrops abundance estimates obtained in UWTV30 survey (ISUNEPCA) are used by ICES Working Group for the Bay of Biscay and Iberian waters Ecoregion (WGBIE) to provide a fishery independent estimate of the stock size, exploitation status and catch advice for Nephrops in FU 30 (ICES Division 9a, Gulf of Cadiz). Beam trawl results were used to know the presence of other burrowing megafauna which co-occurring with Nephrops and that could be source of confusion in the identification of Nephrops burrows. Environmental sampling is used to characterize the Nephrops habitat. Results are also presented in the Working Group on Nephrops surveys (WKNEPS) that is the coordination group for Nephrops UWTV and trawl surveys within ICES and has a quality assurance and development role.

Abundance index is used in the assessment of this stock in the WGBIE and also results of the survey are presented in WGNEPS.

7. Extended comments

A new UWTV30 survey area was established in the WGBIE 2023 (ICES, 2023) since nowadays new and more accurate information is available. The information used for this purpose are:

- The Andalusia Regional Government monitoring system instead traditional VMS,
- information obtained from the bottom trawl survey index time series (SpSGFS-cspr-WIBTS-Q1 (G7511) and SpGFS-caut-WIBTS-Q4 (G4309)) (1994-2020 period),
- beam trawl and sediment samples obtained in the ISUNEPCA UWTV survey (U9111) during 2017–2019,
- more detailed seabed morphology information and new information about the relationship between sediments and habitats in the Gulf of Cadiz.

The new area coverage, established in WGBIE 2023, is 2332,13 Km2 (approximately 22% less than the previous area). A new sampling grid with stations spacing 3.5 nm, instead 4 nm is used currently, to ensure good coverage and accurate burrow surfaces. A total of 78 TV stations were planned and 76 completed. However, 2 stations were revisited again due the bad visibility on the bottom, 3TV station was considered null and 3 were not carried out due to lack of time. CTD stations (temperature and depth profiles) were not carried out during the survey due to technical problems with the equipment. Additionally, 6 beam trawl hauls and 2 mini box-corer samples were conducted.

(max. 450 words per survey)

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.

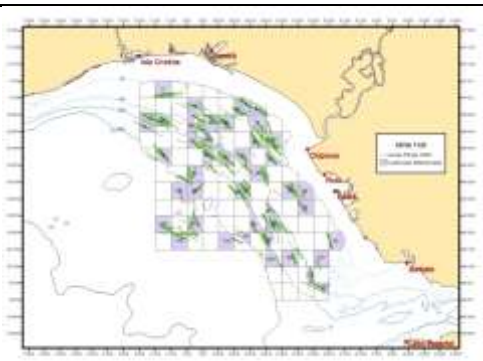
Manual for the International Bottom Trawl Surveys

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

The whole area (7224 km2) 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)

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

https://ices-library.figshare.com/articles/report/International_Bottom_Trawl_Survey_Working_Group_I_BTSWG_outputs_from_2024_meeting_/28562888?file=52944146

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Data obtained are used for assessment models of groundfish on the South Platform within the ICES WGBIE, especially the southern stock of hake (*Merluccius merluccius*), and Norway lobster (*Nephrops norvegicus*) on the Iberian continental shelf. Moreover, survey data are provided to WGCEPH of cephalopods species like octopus (*Octopus vulgaris*), cuttlefish (Sepia officinalis and squid (*Loligo vulgaris* and *Loligo forbesii*), to WGEF of assessment of elasmobranch species (*Galeus melastomus, Scyliorhinus canicula, Etmopterus spinax*, rays…) and to WGWIDE to provide information for the assessment of blue whiting (*Micromessistius poutassou*), North Eastern Atlantic mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*) and boarfish (*Capros aper*). They are also used in the calibration of assessments of the southern stocks of horse mackerel on 9a (*Trachurus* spp.) anchovy (*Engraulis encrasicholus*) and mackerel (*Scomber* spp.) to WGHANSA.

7. Extended comments

The number of valid hauls was 45 valid (no deviations), Overall a total of 150 fish species, 46 crustaceans and 54 molluscs were recorded. during the survey. Length distribution of all fish and main species of crustacean and cephalopods were recorder. Biological samples were studied for the most important species.

CTD stations (temperature and depth profiles) were not carried out during the survey due to technical problems with the equipment.

(max. 450 words per survey)

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 (Po) and total production (Ptotal) 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

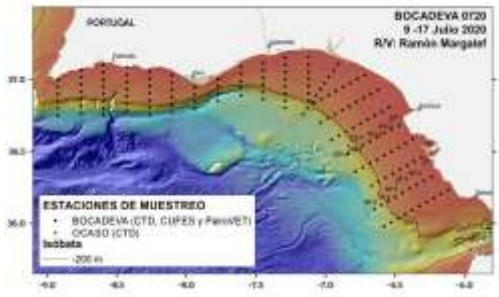
Vertical sampling (PairoVET)

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 µm 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 µm 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)

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

Triennial survey. Next in 2026

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

7. Extended comments

Unfortunately, BOCADEVA surveys have been cancelled for the future. Therefore, the last survey in the series has been carried out in 2023.

The survey has been cancelled given that ECOCADIZ index and BOCADEVA index will no longer be used in the models and no longer requested in data calls.

The work of the WGHANSA working group after the last benchmark has been along the lines of using the PELACUS (only for the western stock), PELAGO and ECOCADIZ RECLUTAS surveys as independent indices of the fishery, and leaving the BOCADEVA and ECOCADIZ index out of the models, which would no longer be requested in the data calls. In any case, the new approved assessment model in SS3 for the new anchovy southern stock has been designed in such a way that ECOCADIZ and BOCADEVA surveys has been included in the model only to inform on the past stock dynamics until 2023, but from 2024 onwards, neither of these two surveys series will be considered in the model. For that reason, the survey is not included in the WP from 2025 onwards.

(max. 450 words per survey)

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

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 echo-sounder 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)

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

Link to the ICES WGACEGG 2023 report: https://ices-library.figshare.com/articles/report/Working_group_on_acoustic_and_egg_surveys_for_small_pelagic_fish_in_Northeast_Atlantic_WGACEGG_outputs_from_2023_meeting_/25296220.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

Survey's data and estimates are utilized in the ICES expert groups of both stock assessment of pelagic fish species (WGHANSA, WGWIDE, WKCOLIAS) and acoustic and egg surveys for small pelagic fish in NE Atlantic (WGACEGG). The latter group reviews the results and establishes standardized protocols to properly conduct both this survey and other ones of similar methodology in the above ICES areas. The acoustic estimates from this series are of a special importance for anchovy in Division 9a and sardine in 8c-9a stocks, since they provide a direct estimate of the recruitment (age-0 fish) of these species in one of their main recruitment areas. Anchovy stock in 9a has been benchmarked in ICES in 2024 and the time-series of Age 0 anchovy estimates is now considered as an input in the assessment model of the anchovy southern stock as a Recruitment Index.

7. Extended comments

The survey was conducted on board R/V Ramón Margalef, routinely used in this survey series. The survey was shortened ca. 3-4 days regarding the usual duration of the survey. The start and direction of the acoustic sampling was the usual E to W direction. The 21 foreseen acoustic transects were sampled. Because of time constraints, 17 transects (132 CTD-LADCP casts) from the 23-transect sampling grid of oceanographic variables could be finally performed. A total of 19 valid fishing hauls were carried out for echo-trace ground-truthing purposes (in accordance with the historical mean of about 20 hauls per survey). Top predator census by an onboard observer was not carried in this year's survey with the census been restricted to the spring PELAGO acoustic survey counterpart.

ECOCADIZ-RECLUTAS surveys protocols are detailed in Doray et al. (2021; Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. ICES Techniques in Marine Environmental Sciences Vol. 64. 100 pp. https://doi. org/10.17895/ices.pub.7462.

The ICES Acoustic data portal is the relevant international database to upload the survey series data in the ICES areas. Currently, our data has not been yet uploaded in this database but it is expected to be uploaded soon. Detailed and aggregated data are available to scientific community. Estimates are provided to WGACEGG, WGHANSA, WGWIDE and WKCOLIAS, both graphically and in a tabulated way, in their reports. Additional working documents (i.e, survey reports) containing more detailed information are also presented in these WGs.

WGACEGG is generating a common database (grid maps and grid files of: NASC by species, Eggs sampled by CUFES, oceanographic variables; species composition of hauls) from surveys under its scope (IFREMER, IPMA, AZTI and IEO). At a national scale, survey data are stored in the SIRENO database.

(max. 450 words per survey)

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.

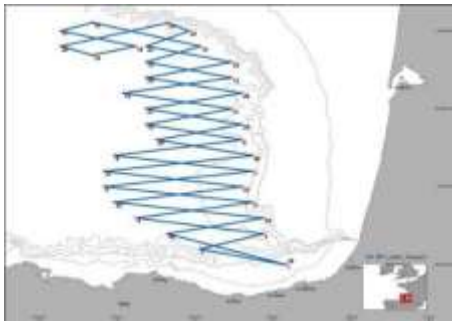
- Secondary objectives include:

- 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."*



Further details on the methodology used can be found here:

https://www.azti.es/en/proyectos/bft-juvenile-acoustic-index-in-the-bay-of-biscay/

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)

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

https://www.iccat.int/Documents/CVSP/CV079_2022/n_3/CV079030141.pdf

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The BFT Index campaign by AZTI is used to provide an abundance indicator for bluefin tuna in the Bay of Biscay. Here are some of the main uses of the collected data:

- Stock assessment of Atlantic bluefin tuna: The data could help to evaluate the biomass of bluefin tuna, especially juveniles, using acoustic methods that provide more accurate and less biased information than catch per unit effort data. There is a recommendation from ICCAT to continue and extend the survey for future assessment process.
- Sustainable management: The data is crucial for the sustainable management of bluefin tuna fishing, allowing institutions to make informed decisions about fishing quotas and conservation measures.
- Scientific research: The data is also used to better understand the spatial distribution and behavioral patterns of bluefin tuna and other marine predators in the Bay of Biscay ecosystem.
- Improvement of survey techniques: The campaign uses scientific probes based on active acoustic surveying, facilitating the acquisition of more reliable and precise data.

7. Extended comments

(max. 450 words per survey)

ACOUSTIC SURVEY FOR JUVENILE ANCHOVY SARDINE IN THE WESTERN IBERIA-IBERAS

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 Sardine in the Western Iberia (Not mandatory surveys)**

Acronym: **IBERAS**

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

1. Objectives of the survey

- The main objective of this survey was to achieve a biomass' estimation by echo-integration of the sardine Young of the Year over the main recruitment area of the Ibero-Atlantic sardine stock:
- Determine the distribution area and density of the main pelagic fish species inhabiting the surveyed area

- Determine the main biological characteristics (length, sex, maturity stage and age) of the main pelagic fish species
- Characterise the main oceanographic conditions of the surveyed area
- Determine the distribution area and density of apical predators over the surveyed area

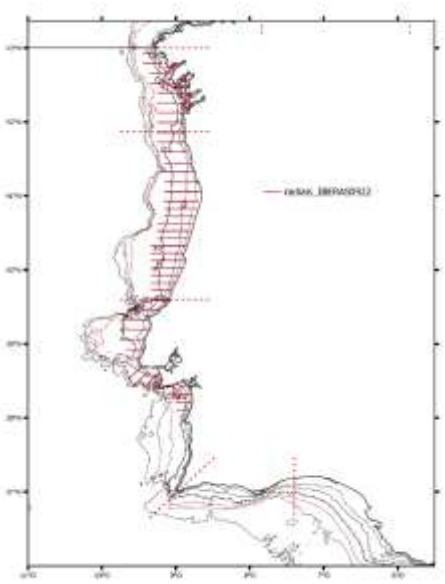
2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

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

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 8/6 nmi from shoreline up to 100-150 (i.e. main expected distribution area of sardine recruitment). Backscattering energy attributed to fish species after scrutinisation of the echograms, groundtruthed by pelagic trawl hauls. Biomass estimates using echo-integration method. Pelagic fishing stations for echo-trace allocation and biological characterisation. 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 conductivity, temperature and depth sensors and SSS, SST and SSF.

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.



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

Spain Portugal /RV Angeles Alvariño or RV Ramon Margalef.

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.

The survey is a cooperative research between IEO (Spain) and IPMA (Portugal), while vessel is provided by IEO together with scientific and technician staff, IPMA is also contributing through the use of extra biological samples obtained at the dedicated rented purse seiners and also with scientist and technician staff. Both acoustic data and biological samples are shared and analysed by both Institutions. There is no particular cost sharing agreement in place for this survey.

(max 450 words per survey)

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

WGACEGG: https://doi.org/10.17895/ices.pub.25296220.v1

WGHANSA: https://doi.org/10.17895/ices.pub.26003356.v2

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators). Specify in which context the results are used (on a routine basis), both in international and national context.

The survey targets only juvenile sardine and anchovy. Recruitment indices for sardine are calculated with data collected in Division 9aCN and for anchovy from the western spawning fraction of Division 9a. The results are reported annually to the WGHANSA group for stock assessment recommendations.

7. Extended comments

(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)
Deviations from the work plan No deviation. Actions to avoid deviations Not aplicable. *(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 diciembre 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.

- Pontevendra 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_Murcía (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 explotation 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 forbiden 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 (≤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)

Deviations from the work plan

EMU_ES_Cantabria (EMU_ES_Cant)

The work plan has been improved:

- Glass eel recruitment data (CPUE) from the four rivers where it is fished has been included.(Campiazo, Pas, Nansa and Deva);
- Protocol to estimate glass eel recruitment. SUDOANG. Monthly sampling (November to March) at two samples points per river (Nansa and Deva)

EMU_ES_Cataluña (EMU_ES_Cata)

Eel fishing is professional. There are two RBDs in Catalonia: the Interior River Basin of Catalonia, which includes small and medium-sized rivers, and the Ebro RBD, which is the second largest river basin in Spain. The Ebro River delta is the most important eel fishing point in Catalonia in terms of number of active licensed fishers and eel catches. The glass eel fishery is professional in the Ter, Muga and Fluvià rivers (province of Girona; inland hydrographic basin of Catalonia) and in the Ebro river delta (province of Tarragona). In both areas, the fishing effort is regulated by the number of licenses and fishing sites. There are 6 fishing entities dedicated to eel fishing, 3 fishers guild in the Girona rivers (summing up a total of 10 licenses and 17 authorised extraction sites) and 3 fishing entities in the Ebro (summing up a total of 61 licenses and 155 authorised extraction sites). Fishing for professional fishers during 2024 was only allowed for a maximum of 4 months and 20 days (distributed among the months of March and April and October, November and December). Fishing methods for glass eel are basically by means of adapted fyke nets, placed at the mouth of the river, canals or along the estuary.

Recreational fishing for yellow and silver eel has been prohibited since 2023. According to the catch of yellow and silver eel for the professional fishing sector, only the Delta lagoons are authorised. The authorised period for yellow and silver eel during 2024 was only 4 months distributed from September to December and the number of licenses authorised was 11, coming all from 1 fishing guild.

During the year 2024, the months in which fishing was allowed were modified to adapt to the new regulations, so that catches were only made from March to April and from October to December for glass eel, summing a maximum of 4 months and 20 days. For the yellow and silver eel for professional fishing a total of 4 months were authorised distributed from September to December.

EMU_ES_País Vasco (EMU_ES_Basq)

Because 2024 was the first year in which the commercial glass eel fishery was implemented, the description of the data collection was not collected in the NWP. The catches are reported as first sale notes for both boat and shore-based fisheries. Effort is collected through logbooks.

Actions to avoid deviations

Changes will be incorporated into the new workplan.

(max. 900 words)

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea

Results

Data was collected on incidental catches of Greenland sharks (*Somniosus microcephalus*) in one sampled trip (IEO). This data will be reported to the WGBYC in 2025.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea

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:

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea

Results

No fishing effort in this sampling scheme (Frame identifiers: OTM_DEF_100-119, and OTB_DWS_100-129).

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P1_AtSea

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:

- 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/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), publish 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/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?

According to the conclusions obtained from the FishPi^2 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

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

Sampling scheme identifier: ESP_IEO_P1_AtSea

Results

No bycatch of ETPS in the observed trips in this sampling scheme.

Deviations from the work plan

No deviations

Actions to avoid deviations

Not applicable

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

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.

Sampling scheme identifier: ESP-AZTI_AtSea_PET_ICES

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:

- 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)

Sampling scheme identifier: ESP-AZTI_AtSea_PET_ICES

Results

In 2024, 29 cetaceans were bycaught in 10 fishing operations, all of them were common dolphins.

28 common dolphins were bycaught in PTB_DEF in the 8abd and 1 common dolphin in OTB_DEF 8abd. All of them arrived already dead onboard and were released, after biological data and samples were taken.

Onboard observers were present during all pre-sort operation, where cetacean bycatch can be properly observed.

In the same frame identifier, 11 seabirds were bycaught, all of them northern gannet (*Morus bassanus)*. 8 of them in PTB_DEF 8abd in 5 different fishing operations, and he other 3 in OTB_DEF 8abd in 2 different fishing operations.

Regarding the results of the interactions in the case of the PTB, 4 gannets were found alive and 1 dead, while in all the other cases the result of the interactions is unknown.

Deviations from the work plan

The sampling effort in sampling scheme identifier "ESP-AZTI_AtSea_PETs_ICES" needs to be analyzed together with the effort in "ESP-AZTI_AtSea_ICES", in PTBbb. Both sampling scheme were planned separately in 2022, but now they are the same sampling scheme, sampling pair trawkers on board, including the catch an the by-catch. This has already been amended in the NP 2025.

In addition, this year, the sampling effort for PTB in the Bay of Biscay has been reduced together with the fishing effort, due to the closure period (januaru-february).

Actions to avoid deviations

We will try to fulfil the sampling objectives, But it is reasonable that the sampling effort is reduced if the fishery is closed for two months.

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

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.

Sampling scheme identifier: ESP_IEO_P2_AtSea

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:

- 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 Nº 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 desing 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 Nº 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 (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 (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)

Sampling scheme identifier: ESP_IEO_P2_AtSea

Results

Sampling of bycatch is carried out in the metiers OTB_DEF and OTB_DWS, in all GSAs where the Mediterranean Spanish fleet is operating. In previous 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 métier with the highest risk of bycatch per species/taxa of PETS was OTB_DEF.

The following two tables summarize some data collected in 2024.

Table 1. Number of observed trips with PETS.

Area	Sampling Scheme	Number of PSUs in 2024	Observed PSUs in 2024	PSUs with PETS
GSA01	OTB_DEF_West01	7229	53	2
GSA01	OTB_DEF_East01	6981	48	18
GSA01	OTB_DWS_01	3123	35	8
GSA02	OTB_DWS_02	174	12	11
GSA05	OTB_DEF_Mall05	1304	22	16
GSA05	OTB_DWS_Mall05	2257	47	11
GSA05	OTB_DEF_Men05	0	0	0
GSA05	OTB_DWS_Men05	857	21	2
GSA06	OTB_DEF_South06	22170	77	2
GSA06	OTB_DEF_North06	19934	45	3
GSA06	OTB_DWS_South06	3466	33	7
GSA06	OTB_DWS_North06	6765	33	0

Table 2: Species and number of individuals reported in the 2024 sampled trips

Area	Metier	Specie	Dead	Unknow status
GSA01	OTB_DES	*Centrophorus granulosus*	1	0
		Galeus atlanticus	0	55
		Heptranchias perlo	0	2
		Leucoraja circularis	4	0
		Leucoraja naevus	27	94
		Oxynotus centrina	0	1
		Raja brachyura	1	0
		Raja polystigma	4	0
	OTB_DWS	*Centrophorus granulosus*	2	0
		Galeus atlanticus	2	14
		Leucoraja circularis	2	0
		Leucoraja naevus	1	0
GSA02	OTB_DWS	*Galeus atlanticus*	661	350
		Leucoraja circularis	1	5
		Oxynotus centrina	0	3
GSA05	OTB_DEF	*Dasyatis pastinaca*	0	1
		Leucoraja naevus	7	122
		Raja polystigma	0	12
	OTB_DWS	*Centrophorus granulosus*	8	5

		Dasyatis pastinaca	0	3
		Leucoraja naevus	0	53
		Raja polystigma	0	28
GSA6	OTB_DEF	*Leucoraja naevus*	1	0
		Raja montagui	11	0
	OTB_DWS	*Centrophorus granulosus*	0	1
		Centroscymnus coelolepis	0	2
		Oxynotus centrina	0	99

Deviations from the work plan

No deviations

Actions to avoid deviations

No deviations

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

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.

Sampling scheme identifier: ESP_IEO_P3_AtSea_Canarias

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

- 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/RFMO/RFO/IO)

Sampling scheme identifier: ESP_IEO_P3_AtSea_Canarias

Results

No incidental catches of sensitive species in the observed trips.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea

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

- 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 adicional 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 ivisions 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/RFMO/RFO/IO)

Sampling scheme identifier: ESP_IEO_P5_AtSea

Results

Data was collected on incidental catches of Greenland sharks (*Somniosus microcephalus*) by OTB_MDD_40-60-130-280. This data will be reported to the WGBYC in 2025.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

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

- 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)

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

Results

Frame identifier: OTB_CRU_>=40_0_0, OTB_DEF_>=70_0_0 and OTB_MCF >=70_0_0:

All fishing hauls were checked for birds, mammals and reptile's incidental mortality. Rest of species listed in Table 1D which includes some bony and cartilaginous fishes and invertebrate species were checked in random hauls sampled and subsequently recorded as discards.

No incidental catches were recorded in OTB_CRU_>=40_0_0 and OTB_DEF this year. (OTB_MCF >=70_0_0 without embarkments).

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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

- 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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Results

LLSWO_ATL_AtSea: The onboard observer program in longliners in the Atlantic Ocean observed marine turtles as incidental bycatch in 2024.

LL_MED_AtSea: The onboard observer program in longliners in the Mediterranean Sea observed sharks, seabirds and marine turtles.as incidental bycatch in 2024

PS_ATL_AtSea_IEO: The onboard observer program in purse seiners in the Atlantic Ocean observed sharks, marine mammals, mobulids, and marine turtles as incidental bycatch in 2024.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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:

- 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.

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 & 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.

- 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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Results

LLSWO_IND_AtSea: In 2024, marine turtles were observed as incidental catches in the on-board observer programme on longliners in the Indian Ocean.

PS_IND_AtSea_IEO: In 2024, sharks, mobulids and marine turtles were observed as incidental by-catches in the on-board observer programme on purse seiners in the Indian Ocean

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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:

- 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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Results

PS_ WPAC_AtSea_IEO: In 2024, sharks, whale shark and mobulids were observed as incidental by-catches in the on-board observer programme on purse seiners in the Pacific Ocean.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

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:

- 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)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Results

LLSWO_EPAC_AtSea: In 2024, marine turtles were observed as incidental catches in the longline observer programme in the Eastern Pacific.

PS_EPAC_AtSea_IEO: In 2024, sharks, whale shark, mobulids and marine turtles were observed as incidental by-catches in the on-board observer programme on purse seiners in the Pacific Ocean.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

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

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.

Sampling scheme identifier: ESP_IEO_P5_AtSea- CCAMLR

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:

- 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 LLLS 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 stablished threshold. The protocol is available in the CCAMLR web page:

https://www.ccamlr.org/en/compliance/vulnerable-marine-ecosystems-vmes

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)

Sampling scheme identifier: ESP_IEO_P5_AtSea- CCAMLR

Results

No incidental catches of sensitive species in the observed trips.

Deviations from the work plan

No deviations.

Actions to avoid deviations

Not applicable.

(One text box of 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 plannified. 2. Duration of the study 3. Methodology and expected outcomes of the study (max 900 words per study)
Brief description of the results (including deviations from the plan and justifications as to why if this was the case). Not aplicable. Achievement of the original expected outcomes and justification if this was not the case. Not aplicable. Follow-up to the activities (what are the next steps, how the results will be used). Not aplicable. *(max. 900 words per study)*

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.

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 desviation

(max. 900 words)

Deviations from the work plan

DEVIATIONS IN SEGMENTS AND CLUSTERS:

There are some deviations from the Work Plan. These deviations depend on the activity of the fishing fleet.

The clusters for 2023 and the segments they consist of are listed below.

CLUSTER	SEGMENT	Nº VESSELS
MBSDRBVL0612		**62**
	MBSDRBVL0006	3
	MBSDRBVL0612	48
	MBSDRBVL1218	11
MBSFPOVL1218		**22**
	MBSFPOVL1218	19
	MBSFPOVL2440	3
MBSHOKVL1218		**18**
	MBSHOKVL1218	17
	MBSHOKVL1824	1
MBSHOKVL1218LLD		**24**

	MBSHOKVL0612LLD	2
	MBSHOKVL1218LLD	22
MBSHOKVL1824LLD		**15**
	MBSHOKVL1824LLD	14
	MBSHOKVL2440LLD	1
MBSINACTIVEVL1824		**32**
	MBSINACTIVEVL1824	21
	MBSINACTIVEVL2440	11
MBSPSVL2440		**22**
	MBSPSVL2440	20
	MBSPSVL40XX	2
NAODFNVL1824		**23**
	NAODFNVL1824	21
	NAODFNVL2440	2
NAODTSVL1218		**64**
	NAODTSVL1012	7
	NAODTSVL1218	57
NAOFPOVL1012IC		**13**
	NAOFPOVL1012IC	8
	NAOFPOVL1218IC	5
NAOHOKVL1012		**63**
	NAOHOKVL0010	4
	NAOHOKVL1012	59
NAOHOKVL1012IC		**46**
	NAOHOKVL0010IC	8
	NAOHOKVL1012IC	38
NAOHOKVL2440IC		**22**
	NAOHOKVL1824IC	7
	NAOHOKVL2440IC	15
NAOHOKVL2440LLD		**37**
	NAOHOKVL1218LLD	2
	NAOHOKVL1824LLD	8
	NAOHOKVL2440LLD	27
NAOINACTIVEVL1012IC		**19**
	NAOINACTIVEVL1012IC	10
	NAOINACTIVEVL1218IC	6
	NAOINACTIVEVL1824IC	1
	NAOINACTIVEVL2440IC	2

NAOINACTIVEVL2440		**25**
	NAOINACTIVEVL1824	13
	NAOINACTIVEVL2440	11
	NAOINACTIVEVL40XX	1
NAOPGPVL2440		**56**
	NAOPGPVL1824	3
	NAOPGPVL2440	53
NAOPMPVL0010IC		**444**
	NAOPMPVL0010IC	440
	NAOPMPVL1012IC	4
NAOPSVL1012		**19**
	NAOPSVL0010	1
	NAOPSVL1012	18
NAOPSVL1218IC		**10**
	NAOPSVL1012IC	1
	NAOPSVL1218IC	9
OFRHOKVL2440		**9**
	OFRHOKVL1824	2
	OFRHOKVL2440	5
	OFRHOKVL40XX	2
OFRINACTIVEVL2440		**19**
	OFRINACTIVEVL1218	1
	OFRINACTIVEVL1824	3
	OFRINACTIVEVL2440	11
	OFRINACTIVEVL40XX	4

The following segments are not included in any cluster

SEGMENT	Nº VESSELS
MBSDFNVL0612	91
MBSDFNVL1218	59
MBSDTSVL0612	15
MBSDTSVL1218	136
MBSDTSVL1824	280
MBSDTSVL2440	122
MBSFPOVL0612	28
MBSHOKVL0612	54
MBSINACTIVEVL0006	67

MBSINACTIVEVL0612	242
MBSINACTIVEVL1218	57
MBSPMPVL0006	90
MBSPMPVL0612	720
MBSPMPVL1218	11
MBSPSVL0612	8
MBSPSVL1218	54
MBSPSVL1824	69
NAODFNVL1012	117
NAODFNVL1218	126
NAODRBVL0010	1071
NAODRBVL1012	23
NAODRBVL1218	85
NAODTSVL1824	74
NAODTSVL2440	89
NAODTSVL40XX	12
NAOFPOVL1012	79
NAOFPOVL1218	56
NAOHOKVL1218	74
NAOHOKVL1218IC	35
NAOHOKVL1824	30
NAOHOKVL2440	49
NAOINACTIVEVL0010	616
NAOINACTIVEVL0010IC	124
NAOINACTIVEVL1012	32
NAOINACTIVEVL1218	52
NAOPGVL0010	25
NAOPMPVL0010	2333
NAOPMPVL1012	16
NAOPMPVL1218	13
NAOPSVL1218	85
NAOPSVL1824	88
NAOPSVL2440	58
OFRDTSVL2440	40
OFRDTSVL40XX	28
OFRHOKVL2440LLD	61
OFRHOKVL40XXLLD	28
OFRPSVL40XX	25
	7647

NAME CHANGES FOR SEGMENTS:

According to the requested changes of the STECF experts in the name of the segment “the Vessels using passive gear with loa<12m" by "Vessels using Polyvalent “passive” gears only" is needed to clarify that this segment that Spain wanted to refer as PG “Vessels using passive gears only for vessels < 12m” is different from the segment PGP “Vessels using polyvalent passive gears only”.

MasterCodeList" of the Annual Report Excel template should be updated to include all fishing techniques allowed that appear on the website:

https://dcf.ec.europa.eu/data-calls/definitions-and-terminology/f/fleet-segment-dcf-eu-map_en

SOCIOECONOMIC VARIABLES

For the "Consumption of fixed capital" variable, the information collection method has been changed from a Sample method to a Census method implemented through the PIM method by indications of the PNDB experts.

In the rest of the variables, the variations of increase in the "planned sample rate %" are due to the planned oversampling to avoid the loss of quality of the results due to non-response, as indicated in the Annex.

And the variations of decrease of the "planned sample rate %" are due to the fact that the size of the strata is related to the variability within them, therefore it varies each year depending on the vessels that are part of that stratum, and depends on the activity carried out by the vessels in the year of study.

Actions to avoid deviations

The actions taken to reduce the variations is the increase of the samples, oversampling them to increase the reliability and representativeness of the data and to ensure that they continue to be robust.

(max. 900 words)

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 desviation

(max. 900 words)

No thresholds apply

Data extracted on 14/05/2025 09:32:53 from [ESTAT]			
Dataset:	**Aquaculture production in tonnes**		
Last updated:	05/05/2025 11:00		
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	2023		
GEO (Labels)- European Union - 27 countries	Tonnes		% Production
Belgium	261		0,02%
Bulgaria	9.928,249		0,90%
Czechia	18.613,3		1,69%
Denmark	30.488,99		2,77%
Germany	35.079,5		3,19%
Estonia	918,461		0,08%
Ireland	32.762,3453	e	2,98%
Greece	140.907,7		12,81%
Spain	242.753,5244		22,06%
France	186.561,4917	b	16,96%
Croatia	26.859,557		2,44%
Italy	129.746,3		11,79%
Cyprus	5.700,2		0,52%
Latvia	785,8		0,07%
Lithuania	3.727,797		0,34%
Hungary	17.848,555		1,62%
Malta	20.803,718		1,89%
Netherlands	41.135,7	e	3,74%
Austria	5.170,229		0,47%
Poland	40.666,5214		3,70%
Portugal	18.287,75		1,66%
Romania	11.262	e	1,02%
Slovenia	1.131,51		0,10%
Slovakia	2.768,21		0,25%
Finland	15.168,5		1,38%
Sweden	11.300		1,03%
Iceland	49.602		4,51%
Observation flags:			
b		break in time series	
e		estimated	

Deviations from the work plan

In these strata, the data collection scheme was C (Census) but the entire stratum was not collected, due to the classification of the statistical units in the different strata it is highly variable because it depends on the annual activity of the companies and this activity can vary depending on the species they cultivate and produce each year.

Aquaculture Technique	Aquaculture species group	Data collection scheme	Planned sample rate (%)	Updated planned sample rate (%)
Hatcheries & nurseries	Trout	C	100,00%	17%
Ponds	Carp	C	100,00%	94%
Cages	Tuna	C	100,00%	75%
Tanks and race-ways	Other freshwater fish	C	100,00%	60%
Other	Oyster	C	100,00%	83%
Enclosures and pens	Multispecies	C	100,00%	96%
Polyculture	Macroalgae	C	100,00%	94%
Polyculture	Carp	C	100,00%	75%
Polyculture	Other aquatic organisms	C	100,00%	80%

CLUSTERS

Salmon.Polyculture.All methods	3	Salmon.Fish farming techniques.Tanks and raceways	2
		Salmon.Hatcheries and nurseries.All methods	1
Trout.Fish farming techniques.Tanks and raceways	68	Trout.Fish farming techniques.Ponds	2
		Trout.Fish farming techniques.Tanks and raceways	66
Trout.Hatcheries and nurseries.All methods	6	Trout.Hatcheries and nurseries.All methods	6
Sea bass & Sea bream.Fish farming techniques.Cages	20	Sea bass & Sea bream.Fish farming techniques.Cages	20
Sea bass & Sea bream.Polyculture.All methods	4	Sea bass & Sea bream.Fish farming techniques.Tanks and raceways	1
		Sea bass & Sea bream.Hatcheries and nurseries.All methods	3
Carp.Fish farming techniques.Ponds	16	Carp.Fish farming techniques.Ponds	16
Carp.Polyculture.All methods	4	Carp.Fish farming techniques.Tanks and raceways	3
		Carp.Hatcheries and nurseries.All methods	1
Tuna.Fish farming techniques.Cages	4	Tuna.Fish farming techniques.Cages	4

Sturgeon (Eggs for human consumption).Fish farming techniques.Tanks and raceways	3	Sturgeon (Eggs for human consumption).Fish farming techniques.Tanks and raceways	3
Other fresh water fish.Fish farming techniques.Tanks and raceways	5	Eel.Fish farming techniques.Recirculation systems	1
		Eel.Hatcheries and nurseries.All methods	1
		Other fresh water fish.Fish farming techniques.Tanks and raceways	1
		Other fresh water fish.Fish farming techniques.Recirculation systems	2
Other marine fish.Fish farming techniques.Tanks and raceways	6	Other marine fish.Fish farming techniques.Tanks and raceways	6
Other marine fish.Polyculture.All methods	5	Other marine fish.Fish farming techniques.Recirculation systems	4
		Other marine fish.Fish farming techniques.Cages	1
Mussel.Shellfish farming techniques.Off bottom.Rafts	1920	Mussel.Shellfish farming techniques.Off bottom.Rafts	1918
		Mussel.Shellfish farming techniques.On bottom	1
		Mussel.Shellfish farming techniques.Other.	1
Mussel.Shellfish farming techniques.Off bottom.Long-line	7	Mussel.Shellfish farming techniques.Off bottom.Long-line	7
Oyster.Shellfish farming techniques.Off bottom.Rafts	45	Oyster.Shellfish farming techniques.Off bottom.Long-line	1
		Oyster.Shellfish farming techniques.Off bottom.Rafts	44
Oyster.Shellfish farming techniques.Other	6	Oyster.Shellfish farming techniques.Other	6
Clam.Shellfish farming techniques.Off bottom.Rafts	5	Clam.Shellfish farming techniques.Off bottom.Rafts	5
Clam.Shellfish farming techniques.On bottom	601	Clam.Shellfish farming techniques.On bottom	600
		Clam.Shellfish farming techniques.Other	1
Other molluscs.Shellfish farming techniques.Other	6	Other molluscs.Shellfish farming techniques.On bottom	4
		Other molluscs.Shellfish farming techniques.Other	2
Multispecies.Fish farming techniques.Enclosures and pens	27	Multispecies.Fish farming techniques.Enclosures and pens	27

Other aquatic organisms.Polyculture.All methods	5	Other aquatic organisms.Shellfish farming techniques.On bottom	1
		Other aquatic organisms.Fish farming techniques.Tanks and raceways	1
		Other aquatic organisms.Fish farming techniques.Recirculation systems	1
		Crustaceans.Fish farming techniques.Ponds	1
		Crustaceans.Fish farming techniques.Recirculation systems	1
Seaweeds (Macroalgae).Polyculture.All methods.	17	Seaweeds (Microalgae).Fish farming techniques.Tanks and raceways.	1
		Seaweeds (Microalgae).Fish farming techniques.Enclosures and pens.	1
		Seaweeds (Microalgae).Shellfish farming techniques.Off bottom.Long-line	1
		Seaweeds (Macroalgae).Fish farming techniques.Tanks and raceways.	2
		Seaweeds (Macroalgae).Fish farming techniques.Recirculation systems.	10
		Seaweeds (Macroalgae).Fish farming techniques.Other methods.	2

Actions to avoid deviations

As the deviations depend on the activity of the company, no action can be taken to reduce them.

(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)
Deviations from the work plan For the segments under 10 and 11-49, data from companies that were not collected in the field were obtained using administrative data. The reference year is 2022, as more up-to-date data is not available from the source. Actions to avoid deviations An effort will be made to obtain data for 2023 as soon as possible. *(max. 900 words)*

The quality report fulfils Article 6(3)(d) of Regulation (EU) 2017/1004. This document is intended to specify data to be collected under Chapter II, point 2 of the EU MAP Delegated Decision annex: Biological data on exploited biological resources caught by Union commercial and recreational fisheries

Sampling scheme identifier: ESP_IEO_P1_AtSea

MS :ESP
Region: North-East Atlantic
Sampling scheme identifier: ESP_IEO_P1_AtSea
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting discard volume and length samples from commercial catches at sea for all species listed in Table 1 of the EU MAP Delegated Decision annex. Secondarily, information on incidental catches of sensitive species is also collected, as well as marine litter data. The sampling scheme covers métiers that use less selective fishing gear and are more likely to produce discards (selected in old pilot programs) within the Spanish (non-Basque) fleet operating in the Atlantic European waters (i.e. EEZ of UK, Ireland, France, Portugal and Spain in Subareas ICES 6, 7, 8 and 9).
Description of the population
Population targeted: The population targeted is the fishing trips of the Spanish (non-Basque) trawlers and gillnetters operating in the Atlantic Spanish fishing grounds, as well as the purse seiners of the Gulf of Cadiz and the Spanish bottom otter trawlers targeting megrims in European non-Iberian Atlantic waters (mainly, ICES Subarea 7). The Spanish purse seiners of the Gulf of Cadiz have been included in this at-sea sampling program because of its difficulty to be sampled in port, rather than by presenting high levels of discards. **Population sampled:** The entire target population is susceptible to sampling, excluding the small-scale vessels without habitability for observers on board. Therefore, the sampling of gillnet métiers is focused on larger vessels, which target hake (using the fishing gear locally known as "volanta") and white anglerfish ("rasco"). However, all vessels of the trawl and purse seine métiers are susceptible to be sampled. **Stratification:** The sampled population is stratified in five technical strata (fleet/*métier*): • IEO_P1_S_CN_GNS: set gillnetters targeting hake and white anglerfish in the Cantabrian-Northwest fishing ground. • IEO_P1_S_CN_TB: bottom trawlers in the Cantabrian-Northwest fishing ground. • IEO_P1_S_GC_OTB: bottom otter trawlers of the Gulf of Cadiz fishing ground. • IEO_P1_S_GC_PS: purse seiners of the Gulf of Cadiz fishing ground. • IEO_P1_S_S7_OTB: bottom otter trawlers targeting megrims in ICES Subarea 7.
Sampling design and protocols
Sampling design description: The vessel represents the Primary Sampling Unit (PSU), which are randomly selected from official lists of boats with fishing license, taking for sampling the fishing trip immediately following the phone call. For strata 1 to 4, the PSU selection is done by Simple Random Sampling With Replacement (SRSWR). For métier 5, the PSU selection is carried out directly by the

fishery association for operational reasons, so it must be considered a Non-Probabilistic Quasi Simple Random Sampling Without Replacement (NPQSRSWOR).

In relation to the selection of fishing operations (hauls), all of them are sampled in the métiers of the national fishing grounds (Cantabrian-Northwest and Gulf of Cadiz) with daily trips (strata 1 to 4). However, métier 5, whose trips last 12 days on average, require alternating hauls for sampling.

All catch fractions available on board are considered in the sampling scheme.

Is the sampling design compliant with the 4S principle?:

Y

Regional coordination:

N

Link to sampling design documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y . http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Monitoring of sampling progress within the sampling year:

Monthly monitoring of the coverage, adapting the sampling intensity when there are variations in fishing activity, so as to guarantee the quarterly robustness of the data.

Data capture

Means of data capture:

Lengths are collected with measuring board/tape for fish and cephalopods, and calliper for crustaceans. Weights are collected with dynamometers for crustaceans and cephalopods. Sampling data are registered by voice recording or written directly on the sampling sheets designed specifically for it. Subsequently, this information is computerized.

Data capture documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Quality checks documentation:

Y

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*"(1) is the IEO fisheries and oceanographic Database. In relation to the former, this institutional Database serves as storage of primary and detailed fisheries sampling data, as well as a calculation tool to estimate aggregated scientific data.

International database:

RDB (Regional DataBase)

Quality checks and data validation documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

(1): Translation: Integrated Monitoring of Oceanic Natural Resources

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Data processing

Evaluation of data accuracy (bias and precision):

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Editing and imputation methods:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Quality document associated to a dataset:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Validation of the final dataset:

The internal quality control process consist of four steps: 1) Supervision (monthly monitoring of the sampling coverage), 2) Verification (checking of the integrity of computerized data), 3) Matching (crossing the sampled trips with the official logbooks to assign the same trip ID), and 4) Validation (statistical analysis of a number of variables of the set of sampled trips by weighting domain). The validation of the final dataset is made by applying the Cook's distance to the sampled discard volume and length distributions by species and *métier* for detection of possible outliers.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P1_OnShore

MS :ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_IEO_P1_OnShore

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at length samples from commercial landings on-shore for all species listed in Table 1 of the EU MAP Delegated Decision annex. The scheme covers the Spanish (non-Basque) fishing fleet operating in the Atlantic European waters (i.e. EEZ of UK, Ireland, France, Portugal and Spain in Subareas 6, 7, 8 and 9).

Description of the population

Population targeted:

The Primary Sampling Unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

The Spanish fleet of Atlantic European waters lands its catch in Atlantic national ports, as well as ports of other coastal countries.

Population sampled:

The main national ports, excluding the foreign ports, the minor national ports, as well as those ports whose logistics prevent a correct implementation of the sampling protocol. No sampling during the week-ends, when fishing activity is prohibited in Spain.

Stratification:

Population is stratified in 3 geographical fishing grounds with different fleets landing at their respective ports:

- IEO_P1_M_CN: Spanish (non-Basque) fleet operating in the national fishing ground of Cantabrian-Northwest (17 major ports: A Coruña, Avilés, Burela, Cedeira, Celeiro, Fisterra, Gijón, Llanes, Luarca, Marín, Muros, Ribeira, San Vicente de la Barquera, Santander, Santoña, Suances and Vigo).
- IEO_P1_M_GC: Spanish fleet operating in the national fishing ground of Gulf of Cadiz (5 major ports: Barbate, Isla Cristina, Rota, Sanlúcar de Barrameda and Tarifa).
- IEO_P1_M_NEAFC: Spanish (non-Basque) fleet operating in the NEAFC European non-Spanish waters (6 major national ports: A Coruña, Avilés, Burela, Celeiro, Gijón and Vigo).

Sampling design and protocols

Sampling design description:

The PSU selection is based on historical knowledge of the target fisheries, covering the main national ports (22 from 165 total ports, which host around 48% of the trips and 66% of the landings), trying to maintain a temporary periodicity throughout the year (generally weekly). Thus, the design of this sampling scheme has been defined as Non-Probabilistic Judgement Sampling (NPJS).

Then, the Secondary Sampling Unit (SSU), i.e. the landing event, is systematically selected prioritizing the main métiers requested by the ICES stock assessment WGs, whose landed species are sampled by commercial category under concurrent coverage.

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM)

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y.

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM

Monitoring of sampling progress within the sampling year:

Monthly monitoring of the coverage, adapting the sampling intensity when variations in fishing activity occur, so as to guarantee the quarterly robustness of the scientific data.

Data capture

Means of data capture:

Lengths are collected with measuring board/tape for fish and cephalopods, and calliper for crustaceans. Sampling data are registered by voice recording or written directly on the sampling sheets designed specifically for it. Subsequently, this information is computerized.

Data capture documentation:

http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM

Quality checks documentation:

Y
Data storage
National database: SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database. In relation to the former, this institutional Database serves as storage of primary and detailed fisheries sampling data, as well as a calculation tool to estimate aggregated scientific data. **International database:** RDB (Regional DataBase) **Quality checks and data validation documentation:** http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM
Sample storage
Storage description: This sampling scheme doesn't produce samples to store.
Data processing
Evaluation of data accuracy (bias and precision): http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM **Editing and imputation methods:** http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM **Quality document associated to a dataset:** http://www.ieo.es/es_ES/web/ieo/pndb (section P1: Evaluación de recursos pesqueros en el área del ICES – CIEM **Validation of the final dataset:** The internal quality control process consist of four steps: 1) Supervision (monthly monitoring of the sampling coverage), 2) Verification (checking of the integrity of computerized data), 3) Matching (crossing the sampled trips with the official logbooks to assign the same trip ID), and 4) Validation (statistical analysis of a number of variables of the set of sampled trips by weighting domain). The validation of the final dataset is made by applying the Cook's distance to the sampled length distributions by species and métier for detection of possible outliers.
AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P1_Biological_Specific

MS: ESP
Region: North-East Atlantic
Sampling scheme identifier: ESP_IEO_P1_Biological_Specific
Sampling scheme type: Biological parameters specific
Observation type: SciObsOnShore
Time period of validity: from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity variables) from commercial landings on-shore for next pelagic and demersal species included in Table 2.2 of the WP: *Engraulis encrasicolus, Micromesistius poutassou, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Conger conger, Helicolenus dactylopterus, Lepidorhombus whiffiagonis, Lepidorhombus boscii, Loligo vulgaris, Lophius budegassa, Lophius piscatorius, Merluccius merluccius, Molva molva, Nephrops norvegicus, Octopus vulgaris, Pagellus bogaraveo, Parapenaeus longirostris, Phycis blennoides, Sepia officinalis and Trisopterus luscus.*

Description of the population

Population targeted.

The primary sampling unit (PSU) for each targeted species is the stock/Área/Frequency (see table in the Stratification section)

Population sampled:

The landed fraction of the target populations will be sampled periodically at the IEO laboratories, in order to cover the largest possible distribution area of each population. The samples will be obtained from the most important markets.

Stratification:

Population Targeted (Distribution Area)		Geographical strata for sampling	Frequency	N. PSUs
Engraulis encrasicolus	8	8.c.E / 8.c.W	Quarter	8
Engraulis encrasicolus	9, 10	9.a.N / 9.a.S	Quarter	8
Micromesistius poutassou	1-9, 12, 14	8.c + 9.a	Quarter	4
Sardina pilchardus	8c, 9a	8.c.E / 8.c.W / 9.a.N / 9.a.S	Quarter	16
Scomber scombrus	5, 6, 7, 8, 9	8.c.E / 8.c.W / 9.a.N	Quarter	12
Scomber colias	8, 9, 10	8.c.E / 8.c.W / 9.a.N / 9.a.S	Quarter	16
Trachurus trachurus	4a, 5b, 6a, 7a-c, 7e-k, 8	8.c.E / 8.c.W	Quarter	8
Trachurus trachurus	9a	9.a.N	Quarter	4
Conger conger	All areas	All areas	Year	1
Helicolenus dactylopterus	All areas	All areas	Year	1
Lepidorhombus boscii	8c, 9a	8.c (8.c.E+8.c.W) + 9.a	Quarter	4
Lepidorhombus whiffiagonis	7, 8abd	7	Quarter	4
Lepidorhombus whiffiagonis	8c, 9a	8.c (8.c.E+8.c.W) + 9.a	Quarter	4
Loligo vulgaris	All areas	9.a.S	Triennial	1
Lophius budegassa	7b-k, 8abd	7b-k	Quarter	4
Lophius budegassa	8c, 9a	8.c+9.a	Quarter	4
Lophius piscatorius	7, 8abd	7b-k	Quarter	4
Lophius piscatorius	8c, 9a	8.c + 9.a	Quarter	4
Merluccius merluccius	5b, 6, 7, 12, 14	7	Quarter	4
Merluccius merluccius	8c, 9, 10	8.c+9.a	Quarter	4
Molva molva	jun-14	7	Year	1
Nephrops norvegicus	*8c*	*FU 25 and FU 31*	*Year*	*1*
Nephrops norvegicus	9	9.a.S	Year	1
Octopus vulgaris	All areas	9.a.S	Triennial	1
Pagellus bogaraveo	9	9.a.S	Triennial	1
Parapenaeus longirostris		9.a.S	Triennial	1
Phycis blennoides	All areas	All areas	Year	1
Sepia officinalis	All areas	9.a.S	Triennial	1
Trisopterus luscus	All areas	9.a.N	Year	1

Table 1.- Distribution areas of the population targeted, geographical strata sampled in each one and the sampling frequency for each of these strata. The Number of PSUs is obtained by multiplying the number of strata by the Frequency.

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic, in such a way that the samples of the stocks are obtained from the sellers, who in turn buy them in the most important fishing ports, which receive the landings of the selected geographic strata.

The sample/subsample is selected by 2 different methods depending on the species:

For the "pelagic" species group (*Engraulis encrasicolus, Micromesistius poutassou, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Loligo vulgaris, Nephrops norvegicus, Octopus vulgaris, Parapenaeus longirostris* & *Sepia officinalis*), a Simple Random Sampling (SRS) is carried out from the landing boxes. The selected sample is entirely biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached).

For the "demersal" species group (*Conger conger, Helicolenus dactylopterus, Lepidorhombus whiffiagonis, Lepidorhombus boscii, Lophius budegassa, Lophius piscatorius, Merluccius merluccius, Molva molva, Phycis blennoides, Pagellus bogaraveo* and *Trisopterus luscus*), a Simple Random Sampling (SRS) is applied for the selection of the samples in each length stratum. An attempt is made to select a fixed number of specimens of each length class for biological sampling, in such a way that various biological variables are collected from each individual. The sample attempts to represent the full length range of the landings, so the least abundant length classes are preferably selected for sampling.

Is the sampling design compliant with the 4S principle?:

N.

Regional coordination:

N.

Link to sampling design documentation:

There is currently no documentation available describing the design of this sampling scheme. However, it can be said that the sampling design in this case is defined by the target populations, the geographic strata and the temporal frequency, as shown in the table of the previous section: "stratification". Besides, the samplings of each geographic stratum and/or species are allocated to the IEO laboratories closest to the corresponding landing ports.

Sampled Geographical strata	IEO Sampling laboratories
ICES SubDivision 8.c.East	C.O. Santander
ICES SubDivision 8.c.West	C.O. Coruña
ICES SubDivision 9.a.North	C.O. Vigo
ICES SubDivision 9.a.South	C.O. Cádiz
ICES SubArea 7	C.O. Coruña & C.O. Vigo

Table 2.- Correspondence between the geographic fishing strata and the sampling laboratories

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are carried out. The sampling schemes are common into each of these two large "pelagic" and "demersal" groups.

Link to sampling protocol documentation:

There are sampling protocols for many of the demersal species in which the methodologies used in sampling, the storage and processing of data, and the processing and observation of skeletal parts (PE) for the allocation of age are described (Guía práctica para el estudio del crecimiento de species demersales en el Área ICES: http://hdl.handle.net/10261/321753

Age determination procedures from pelagic and benthic species from ICES Área in Spanish Institute of Oceanography (IEO) are also available at http://hdl.handle.net/10261/326961.

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts and follow the international workshops recommendations.

Sampling implementation

Recording of refusal rate:

NA. The fraction of the landing to be sampled is purchased from a vendor.

Monitoring of sampling progress within the sampling year:

It is intended that all the sampling strata are well represented, intensifying the samplings in the worst represented strata, although this is not always possible.

Data capture

Means of data capture:

For most of the stocks, data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized to the IEO SIRENO database as soon as possible.

E. encrasicolus, *S. pilchardus* and *S. colias* data from the Gulf of Cádiz (9.a.S) are captured electronically with a tailored software/hardware system (icrOS) and data are subsequently uploaded to the IEO SIRENO database. The icrOS system simplest hardware setup comprises one or more sampling kiosks and a server connected in a local network. Each of those sampling kiosks is formed by a computer screen, a Raspberry Pi board, a waterproof keyboard and a mouse (**Figure 1**).

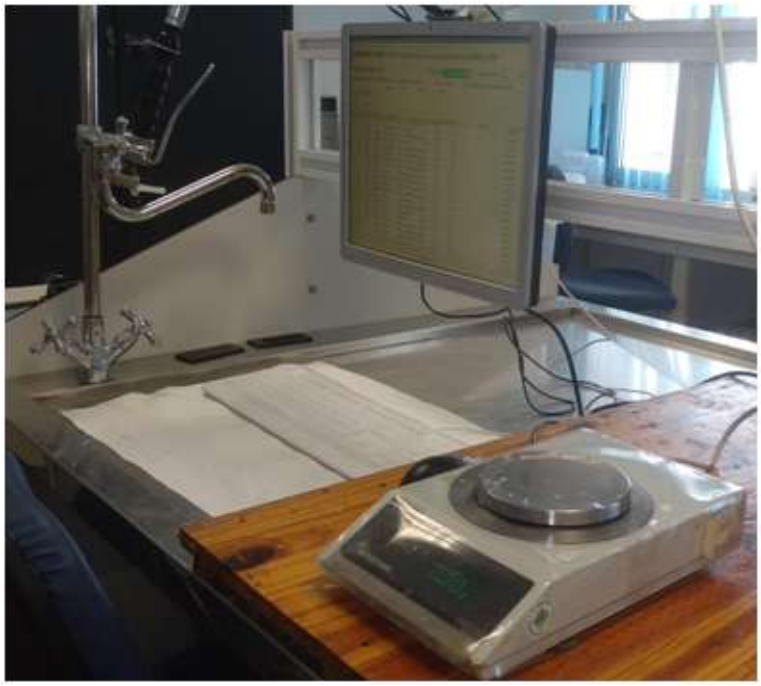


Figure 1. Typical icrOS sampling kiosk setup at IEO's Cádiz laboratory.

The server runs a PostgreSQL+PostGIS database where data from sampling is stored, a R-Shiny server for data quality checks and reports and a LTSP (Linux Terminal Server Project) which delivers the sampling software and applications to the sampling kiosks at boot time, easing the maintenance of the sampling software across the system.

Additional hardware such scales, GPS, echosounders, icrOS electronic measuring board, etc., can be connected to the system for data capture. In the case of scales, what is particularly recommended to reduce data errors due to bad weighing data recording, the system currently supports data capture from METTLER-TOLEDO, Marel and POLS scales. The icrOS electronic measuring board, however, is designed for sampling of length frequency distributions (LFD) and not for the biological sampling of the individual length measurement, despite it can be used as a conventional measuring board.

Label printers ZEBRA-ZPL2 language compatible can be connected to the system for printing specimen identification labels for labelling vials, etc. with a simple specimen code.

The sampling software consists in several applications for haul events data (position, time, depth...), catch sampling, LFD samplings and biological sampling. Biological sampling is performed using sampling protocols, defined before the sampling (**Figure 2**). For protocol definition, the user chooses the variables to be sampled (numerical for weight or length, categorical for keys, Boolean...) between a set of user defined variables and their sampling order, whether the variable value has a default value or not, if it can be locked (keep the value between specimens, useful when a given value, i.e., the same maturity appears across all the specimens). When the sampling starts, the sampling application reads the selected protocol (**Figure 3**), stored in the system database, and creates the user interface form for that protocol. This makes possible for the application to virtually sample any species (fishes, crustaceans...) if the proper protocol and variables have been defined for it.

The stages of the categorical variables (keys) are set at variable definition time. At sampling time, the user interface provides the user with drop-down lists for the categorical variables with that predefined stages, so the input of values not present in the keys is not possible, providing some extent of quality assurance to the system (**Figure 4**).

The sampling application can also be used for editing the values and samples previously input in case of error correction, and marking any individual variable of the sample as outlier/bad/invalid data is possible (i.e., after checking it is possible to mark as bad data only eviscerated weight for a particular sample, but the rest of the data remains valid).

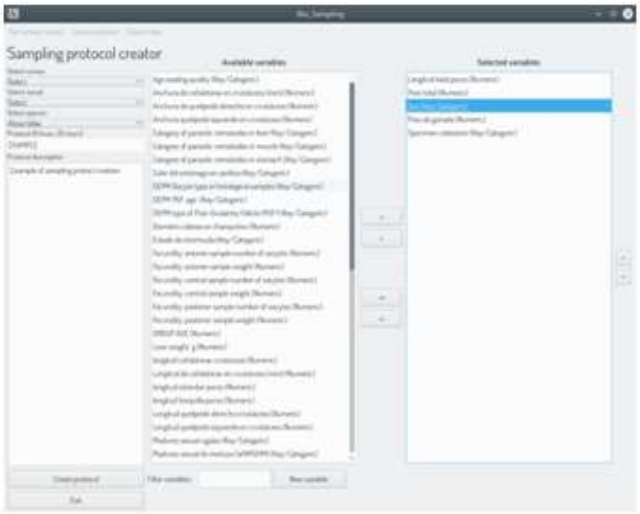


Figure 2. Sampling protocol creator.

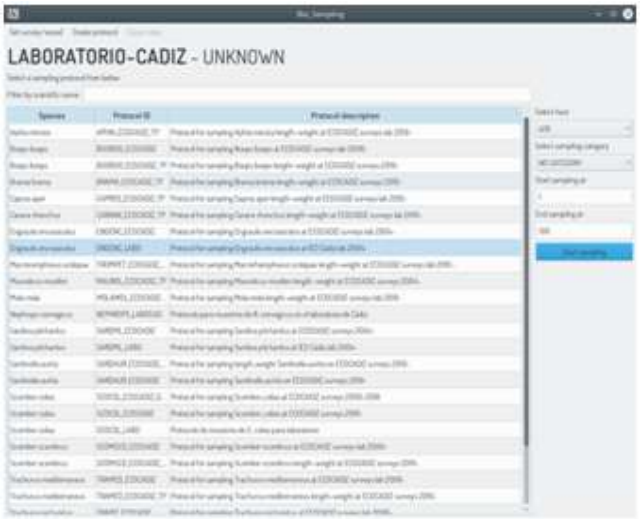


Figure 3. Selection of the sampling protocol.

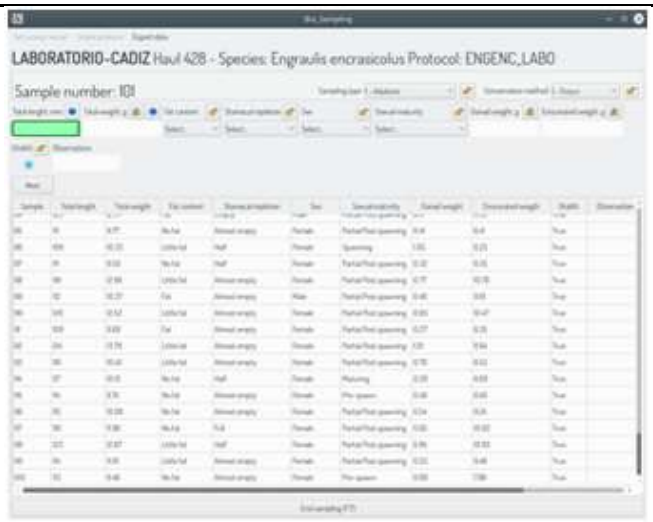


Figure 4. Biological sampling.

The system provides also applications for quality check, which are currently under development and also for data extraction and reporting. These applications are run in a R-Shiny server and can be accessed from any computer connected to the system network.

Data capture documentation:

Documentation on sampling templates, sampling equipment, maturity scales and ageing criteria in force is available within the sampling protocols (see the "Sampling design and protocols" section.

For the icrOS software/hardware system a first description of the system can be found at ICES WKSEATEC (Workshop on Technical Development to Support Fisheries Data Collection) 2017 Report, pages 16-34 available at (https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WKSEATEC/WKSEATEC%20report%202017.pdf). However, most recent description of the system can be found in the RCG NANSEA RCG Baltic 2021. Part I Report. 'New data sources and technology'. icrOS. Pgs 38-39. (https://datacollection.jrc.ec.europa.eu/docs/rcg).

Quality checks documentation:

No documentation targeting quality checks is available.

Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

For small pelagic fish species sampled at IEO's lab at Cádiz, a R-Shiny application is used after sampling is complete for data checking. The application shows graphically the relationships between length, total, eviscerated and gonad weights, so outliers can be detected and corrected if necessary (**Figure 5**).

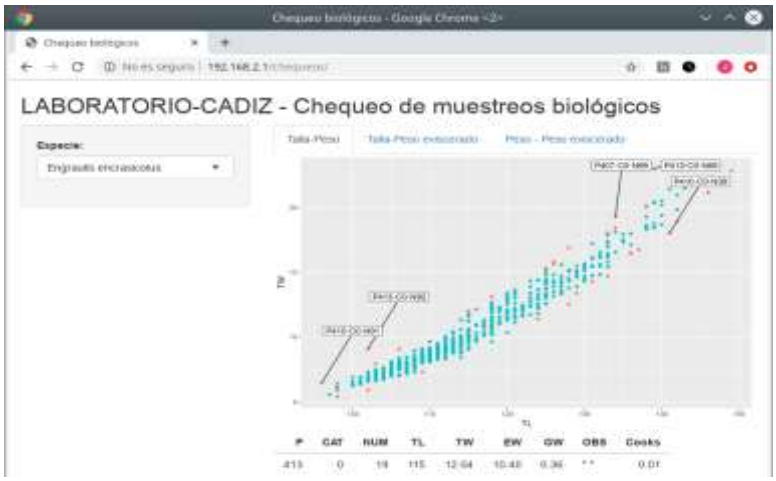


Figure 5. Application for data checking from biological sampling.

Data storage

National database:

SIRENO, the IEO database, is currently taking over the functions of the Spanish database, which has not yet finished development.

International database:

NA. Biological sampling data capture carried by the IEO populates the RDB and RDBES hosted by ICES. Age data is also sent to Intercatch for those species requested in the data call.

Quality checks and data validation documentation:

Our data recording system (SIRENO) has input masks that limit the entry of missing or anomalous values in specific fields.

Specialized staff at the IEO carry out strict quality controls and data validations. All data stored in SIRENO, electronically or manually, must be validated. Although the information contained in the database remains visible through the application, each data set must be properly validated by a specific specialist, before being downloaded and sent to the end user.

In the case of using icrOS system (small pelagic species from 9a-S Gulf of Cadiz), the icrOS system doesn't allow the occurrence of missing values/zeros in those variables defined as mandatory , i.e., total length or total weight

Sample storage

Storage description:

The otoliths of almost all these species, after having been photographed for ageing, They are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Coruña, Vigo, Santander and Cádiz. These pieces are stored systematically, without expiration date.

When the histological processing of the gonads is necessary to determine the sex or the state of sexual maturity of the specimens, as is the case of the conger eel, both the gonadal tissue samples included in paraffin blocks, as the slides with their respective histological sections, are also carefully kept and systematically stored in their respective places, where they remain indefinitely.

Sample analysis:

Sampling protocol for many of the demersal species in which the methodologies used in sampling, the storage and processing of data, and the processing and observation of skeletal parts (PE) for the allocation of age are described in sampling protocols (see the "Sampling design and protocols" section.

Data processing

Evaluation of data accuracy (bias and precision):

The ageing data are obtained based on the agreement of two readers (pelagic and benthic species) and of three, in the case of demersal species. The quality assurance procedure is described in the sampling protocols (see the "Sampling design and protocols" section).

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of anchovy from the Gulf of Cádiz, for maturity ogives, missing maturity percentages are imputed from historical data.

Quality document associated to a dataset:

N.

Validation of the final dataset:

A tool developed by the IEO in R INBIO 2.0[1] (Estimation of biological parameters and their uncertainties by simulation techniques) is used to check the quality of the biological datasets. [*Sampedro, P., Sainza, M. and Trujillo, V.*, 2005. A simple

tool to calculate biological parameters'uncertainty. Working Document, In: *Workshop on Sampling Desing for Fisheries Data* (WKSDFD), Pasajes, Spain.]. The methodologies used are:

Growth in age: von Bertalanffy, non-linear estimation by least squares (Gauss-Newton algorithm).

Size-weight ratio: non-linear estimation by least squares (Gauss-Newton algorithm).

Sex ratio: estimation of the global sex-ratio, it calculates the weighted coefficient of overall variation (weighted average of the coefficients of variation by size, being the number of individuals the weighting factor of each group) and the number of individuals used in the calculation.

Maturity (size and age): generalized linear model (GLM) with binomial errors and connection function: logistics function. Adjusting log-maximum likelihood.

AR comment:

Population targeted:

Nephrops from Division 8c was added

Pagellus bogaraveo in division 9a south should be considered jointly with Mediterranean area as the species is moving around the Gibraltar Strait from Atlantic to Mediterranean and viceversa.

Link to sampling protocol documentation

Links have been updated.

Sampling scheme identifier: ESP-AZTI_AtSea_ICES

MS : ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP-AZTI_AtSea_ICES

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length-weight information of discarded species at sea. All species that come onboard are sampled. AZTI oversees vessels based in the Basque Country (whereas the landing performed in other Spanish areas and by Spanish fleet are sampled by the IEO).

The aim of this sampling is to estimate discards at sea, including weight and length distribution of every captured species. The observed fleet includes trawlers, purse seine and small scale fisheries, according to predefined strata (see detailed description below).

Description of the population

Population targeted:

All fish species captured onboard are analysed for the estimation of total discard, as well as retained weight and length distribution. The primary sampling units (PSU) is vessel*week, and the secondary sampling unit (SSU) is the trip. The sampling frame is stratified based on strata (see Stratification below).

Population sampled:

Sampling is carried out in the Basque fleet including bottom otter trawlers, pair bottom trawlers, purse seiners, small scale fisheries (see Stratification section). Other fleet as trollers and hand lines for large pelagic fishes are excluded. As they are considered gears with very low discard.

Stratification:

At sea sampling is based on four different strata, predefined according to boat census and/or main fishing gear: (I) bottom otter trawlers; (II) pair bottom trawlers; (III) boats within the 'purse seine' census (including fishing activities by purse seine,

hand lines during the mackerel season and trolling lines or live bait during the tuna season); and (IV) small scale fishery (i.e. artisanal fleet);

The temporal strata is the quarter, although equal monthly coverage is aimed.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined by a quasi-simple random sampling matrix with replacement, considering the vessel*week as the primary sampling unit. This sampling is considered for each quarter and with a random selection, a week is defined for a given vessel.

In the case of purse seiners, a similar method is used, but the sampling is carried out when the fleet is fishing in with this gear, and it varies from one year to another. The same vessel can be fishing with different gears along the gear and the period as purse seiner is limited in time. When they start with this modality the sampling starts, and the vessel*week selection is made in the same random method as others

Is the sampling design compliant with the 4S principle?:

The sampling has been designed to comply with the 4S principle as closer as possible.

Regional coordination:

A defined Regional Coordination procedure is expected in a near future. In this sense, many samplings follow common protocols in coordination within the RCG in the North Atlantic area, to coordinate all the samplings and avoid overlapping. Accordingly, sampling procedures follow the recommendations from the RCG-NANSEA, ICES WGCATCH and ICES-WKPICS. AZTI also participates in the subgroup of the Case Study of the trawl fishery in Iberian Waters.

Link to sampling design documentation:

No sampling design documentation.

Compliance with international recommendations:

Yes, the sampling design is in line with international recommendations (already commented above).

Link to sampling protocol documentation:

A preliminary draft containing a detailed sampling protocol is included in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

The final document will be uploaded as soon as the remaining sections are completed.

Compliance with international recommendations:

Yes, the sampling protocol is in line with international recommendations (already commented above).

Sampling implementation

Recording of refusal rate:

Yes, refusals are recorded. When a survey cannot be carried out or the sampling is not possible, the reason is written down and the sampling is moved to the next vessel in the list.

Monitoring of sampling progress within the sampling year:

Sampling coverage is continuously monitored and controlled, comparing the planned or expected sampling (based on the PSU sampling matrix) and the sampled units quarterly (i.e. every three months) throughout the year.

Data capture

Means of data capture:

Fish length measurements are obtained with ichtyometers and weights with a hand scale. Lengths, as well as sampled weight, species, and total capture data are first recorded with a voice-recorder, and then introduced in an Excel sheet. From the Excel sheet it will be automatically uploaded to the AZTI database.

Data capture documentation:

Please see the sampling protocol in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

Quality checks documentation:

Yes, automatic quality checks are applied when entering the data in the database.

Expert knowledge is used to detect errors, outliers, etc. and to compare different data sources with historical data.

Data storage

National database:

AZTI Fisheries Data Base

International database:

Data are sent to the RDB and the RDBES, as well as to INTERCATCH.

Quality checks and data validation documentation:

NA

Sample storage

Storage description:

NA.

Sample analysis:

NA.

Data processing

Evaluation of data accuracy (bias and precision):

There is not any evaluation documentation yet. Such documentation will be available as soon as Regional protocols are developed to calculate bias and precision on fish length distributions.

Editing and imputation methods:

Yes, imputation methods are used when required by the stock coordinator. In such cases, the nearest neighbour criteria is applied.

Quality document associated to a dataset:

NA.

Validation of the final dataset:

The final dataset is revised and compared with previous years, considering different data sources in order to check the quality of data, reduce bias, detect outliers, etc.

AR comment:

Sampling design, Data capture

A new site gathering all sampling documentation has been developed:

https://www.azti.es/en/servicios/fisheries-sampling-programme/

Sampling scheme identifier: ESP-AZTI_AtSea_PET_ICES

MS : ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP-AZTI_AtSea_PET_ICES

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length-weight information of discarded species at sea. All species that come onboard are sampled. AZTI oversees vessels based in the Basque Country (whereas the landing performed in other Spanish areas and by Spanish fleet are sampled by the IEO).

The aim of this sampling is to estimate discards at sea, including weight and length distribution of every captured species. The observed fleet includes trawlers, purse seine and small scale fisheries, according to predefined strata (see detailed description below).

Description of the population

Population targeted:

Data on cetaceans and other megafauna bycatch is collected. The metier sampled is the PTB_8abd and the primary sampling units (PSU) is vessel*week.

Population sampled:

Sampling is carried out in the pair trawlers operating on ICES 8abd based on the Basque Country.

Stratification:

The sampling is carried out in the period that most cetacean bycatch occurs in the Bay of Biscay, from October to April. From October to December, one vessel*week is sampled monthly, whereas from January to April two vessel*weeks are sampled. The PSU is randomly selected for each month.

Sampling design and protocols

Sampling design description:

Allocation is defined by a quasi-simple random sampling matrix with replacement, considering the vessel*week as the primary sampling unit. This sampling is considered for each month and with a random selection, a week is defined for a given vessel.

Is the sampling design compliant with the 4S principle?:

The sampling has been designed to comply with the 4S principle as closer as possible.

Regional coordination:

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

Link to sampling design documentation:

No sampling design documentation.

Compliance with international recommendations:

Yes, the sampling design is in line with international recommendations.

Link to sampling protocol documentation:

A detailed sampling protocol is included in the following link https://www.azti.es/en/servicios/fisheries-sampling-programme/

Compliance with international recommendations:

Yes, the sampling protocol is in line with international recommendations.

Sampling implementation

Recording of refusal rate:

Yes, refusals are recorded. When a survey cannot be carried out or the sampling is not possible, the reason is written down and the sampling is moved to the next vessel*week in the list.

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

Sampling coverage is continuously monitored and controlled, comparing the planned or expected sampling (based on the PSU sampling matrix) and the sampled units monthly throughout the year.

Data capture

Means of data capture:

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.

Data capture documentation:

Please see the sampling protocol named 'Protocolo PETs parejas.doc' in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

Quality checks documentation:

Yes, automatic quality checks are applied when entering the data in the database.

Expert knowledge is used to detect errors, outliers, etc. and to compare different data sources with historical data.

Data storage

National database:

AZTI Fisheries Data Base

International database:

Data are sent to the ICES WGBYC and WGMOMA..

Quality checks and data validation documentation:

NA

Sample storage

Storage description:

NA.

Sample analysis:

NA.

Data processing

Evaluation of data accuracy (bias and precision):

There is not any evaluation documentation yet..

Editing and imputation methods:

NA.

Quality document associated to a dataset:

NA.

Validation of the final dataset:

NA.

AR comment:

Sampling design, Data capture

A new site gathering all sampling documentation has been developed:

https://www.azti.es/en/servicios/fisheries-sampling-programme/

Sampling scheme identifier: ESP-AZTI_OnShore_ICES

MS : ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP-AZTI_OnShore_ICES

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for species listed in Table 1 of the EU MAP Delegated Decision annex. AZTI oversees sampling fish landed in the Basque Country by the Basque fleet (whereas the landing performed in other Spanish areas and by Spanish fleet are sampled by the IEO).

The aim of this sampling is to estimate landings at length (i.e. length abundance distribution) of all the fish stocks targeted by the different types of commercial fishing fleet (i.e. trawlers, purse seine and small scale fisheries), according to predefined strata (see detailed description below).

Description of the population

Population targeted:

All fish species landed by the Basque fleet are considered for length sampling. The primary sampling units (PSU) are all port*days with landings. The secondary sampling unit (SSU) is the trip (i.e. the boat unloading fish that is sampled each day*port). The sampling frame is stratified based on strata (see Stratification below).

Population sampled:

Sampling is carried out in the main fishing ports of the Basque Country (mostly in Hondarribia, Pasaia, Getaria, Ondarroa, Lekeitio, Bermeo; and also in Lekeitio, Santurtzi and Armintza when small scale fisheries are sampled).

Basque fleet including bottom otter trawlers, pair bottom trawlers, purse seiners, small scale fisheries and polyvalent coastal fisheries are sampled (see Stratification section).

Sampling of paired bottom trawlers operating in areas VIIIa-b-d is limited to at-sea sampling observations. >24m longliners are out of our sampling frame. In the same way, ports with less activity that can get some landings throughout the year are not covered, since the sampling effort is focused on those ports with the highest fishing activity.

No sampling is carried out during the week-ends or holiday.

Stratification:

On-shore sampling is based on five different strata, predefined according to boat census and/or main fishing gear: (I) bottom otter trawlers; (II) pair bottom trawlers; (III) boats within the 'purse seine' census (including fishing activities by purse seine, hand lines during the mackerel season and trolling lines or live bait during the tuna season); (IV) small scale fishery (i.e. artisanal fleet); and (V) polyvalent coastal fishery, including vessels in census not included in previous strata.

The temporal strata is the quarter, although equal monthly coverage is aimed.

The predefined strata are mutually exclusive, since one boat cannot be included in more than one stratum at the same time.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined by a quasi-simple random sampling matrix with replacement, considering the port*day as the primary sampling unit. In order to avoid bias on the sampling effort, samplers avoid repeating the sampling on the same boats (SSU) many times within each week, following a week*month-based scheme in which sampled boats are registered (see Sampling Design documentation). This way a special effort is made to get the sampling as random as possible.

Is the sampling design compliant with the 4S principle?:

The sampling has been designed to comply with the 4S principle as closer as possible.

Regional coordination:

A defined Regional Coordination procedure is expected in a near future. In this sense, many samplings follow common protocols in coordination within the RCG in the North Atlantic area, to coordinate all the samplings and avoid overlapping.

Accordingly, sampling procedures follow the recommendations from the RCG-NANSEA, ICES WGCATCH and ICES-WKPICS. AZTI also participates in the subgroup of the Case Study of the trawl fishery in Iberian Waters.

Link to sampling design documentation:

A quasi random sampling matrix is used to chose the port*day (PSU) by each sampler (see Figure 1 in 'OnShoreSamplingDesignAZTI_PSU_SSU.pdf' document attached). The sampling effort allocation is based on the number of port*days with landings.

The secondary sampling unit (SSU) is the boat(s) or trip(s) sampled in each day*port. Repeating SSU within each sampling week is avoided with a sampling control scheme (Figure 2 in 'OnShoreSamplingDesignAZTI_PSU_SSU.pdf' document attached).

https://azti.sharepoint.com/:f:/s/Proyectos/DatosPesqueriasAZTI/Ep9FepREGoNFne6KrKyE994Bpfi_ZT0y9VhIrRoeZUB5YQ?e=T33h9K

Compliance with international recommendations:

Yes, the sampling design is in line with international recommendations (already commented above).

Link to sampling protocol documentation:

A preliminary draft containing a detailed sampling protocol is included in the following link:
https://www.azti.es/en/servicios/fisheries-sampling-programme/

The final document will be uploaded as soon as the remaining sections are completed.

Compliance with international recommendations:

Yes, the sampling protocol is in line with international recommendations (already commented above).

Sampling implementation

Recording of refusal rate:

Yes, refusals are recorded.

Expected difficulties: each strata has its own particularities. In general: refusals, incomplete trips (due to landings sent to a processing industry, where the sampling is not possible), getting in advance information about whether landings will take place in the selected port (for small vessels), randomization of the vessel selection, etc.

Monitoring of sampling progress within the sampling year:

Sampling coverage is continuously monitored and controlled, comparing the planned or expected sampling (based on the PSU sampling matrix) and the sampled units quarterly (i.e. every three months) throughout the year.

Data capture

Means of data capture:

Fish length measurements are obtained with ichtyometers. Lengths, as well as sampled weight, species, and total capture data are first recorded with a voice-recorder, and then tranposed to the sample-sheets. All the collected sample-sheet data are transferred to the database every month.

Data capture documentation:

Please see the sampling protocol in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

See also the data introduction protocol, named 'ProtocoloIntroduccionDatos_AZTI_draft1.pdf', where the procedure of data transfer from sample sheets to the database is explained.

Quality checks documentation:

Yes, automatic quality checks are applied when entering the data in the database.

Expert knowledge is used to detect errors, outliers, etc. and to compare different data sources with historical data.

Data storage

National database:

AZTI Fisheries Data Base

International database: Data are sent to the RDB and the RDBES, as well as to INTERCATCH. **Quality checks and data validation documentation:** NA
Sample storage
Storage description: NA **Sample analysis**: NA
Data processing
Evaluation of data accuracy (bias and precision): There is not any evaluation documentation yet. Such documentation will be available as soon as Regional protocols are developed to calculate bias and precision on fish length distributions. **Editing and imputation methods:** Yes, imputation methods are used when required by the stock coordinator. In such cases, the nearest neighbour criteria is applied. **Quality document associated to a dataset:** NA. **Validation of the final dataset:** The final dataset is revised and compared with previous years, considering different data sources in order to check the quality of data, reduce bias, detect outliers, etc.
AR comment: **Sampling design, Data capture** A new site gathering all sampling documentation has been developed: https://www.azti.es/en/servicios/fisheries-sampling-programme/

Sampling scheme identifier: ESP_AZTI_Biological_Specific

MS: ESP
Region: North-East Atlantic
Sampling scheme identifier: ESP_AZTI_Biological_Specific
Sampling scheme type: Biological parameters specific
Observation type: SciObsOnShore
Time period of validity: from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity) from commercial landings onshore for the next pelagic and demersal species included in Table 2.2 of the WP: *Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Trachurus trachurus, Lepidorhombus whiffiagonis, Merluccius merluccius, Lophius budegassa, Lophius piscatorius.*
Description of the population
Population targeted:

The population targeted is the following stocks into which the sampled species above are divided: ane.27.8, pil.27.8.abd, pil.27.8c9a, mac.27.nea, hom.27.2a4a5b6a7a-ce-k8, meg.27.7b-k8abd, hke.27.3a46-8abd, hke.27.8c9a, ank.27.78abd, ank.27.8c9a, mon.27.78abd, mon.27.8c9a.

Population sampled:

The available fraction of the target populations is the commercial landings at the main markets on the Basque Country; minor ports are not sampled.

Stratification:

Each target population is stratified by geographical lots, namely, 8.c.E, 8abd and 7, being this lots where Basque fleets mostly operate. Then each lot is stratified by time frame, i.e., month, quarter, semester, and year, and by the length class (link).

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic, in such a way that the samples of the stocks are obtained in those market which receive the most important landings of the selected strata (https://www.azti.es/en/servicios/fisheries-sampling-programme/). Mandatory biological parameters are obtained from a determinate number of individuals in the selected sample as required in the sampling scheme.

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

There is currently a matrix describing the design of this sampling scheme. It defines the number of individuals to be sampled per target population, geographic strata, and length class (https://www.azti.es/en/servicios/fisheries-sampling-programme/).

Compliance with international recommendations:

Y. Sampled species are evaluated by international groups of experts i.e., ICES WGBIOP and EGs referenced in the protocols (link).

Link to sampling protocol documentation:

Biological sampling protocols for all the species are available at the following link (https://www.azti.es/en/servicios/fisheries-sampling-programme/)

Compliance with international recommendations:

Y. Biological sampling protocols are updated according to the international workshops' recommendations i.e., ICES WGBIOP and EGs referenced in the protocols (https://www.azti.es/en/servicios/fisheries-sampling-programme/).

Sampling implementation

Recording of refusal rate:

NA. The fraction of the landing to be sampled is purchased from a vendor.

Monitoring of sampling progress within the sampling year:

Sampling for biological parameters is monitored quarterly, thus the degree of achievement of the sampling coverage objectives is always known and any deviation can be mitigated by intensifying the sampling in the required strata.

Data capture

Means of data capture:

Sampling data is firstly noted in the sampling sheet and thereafter imported into the internal database in about 1 month time (link). Date, fishing area and gear, total weight of the corresponding capture, and weight of the sample are registered along with the biological measurements in the sampling. Data capture is assisted by a variety of material, the same in all species:

ichthyometer (length), analytical balance with 2 decimal places of accuracy (weight), international agreed maturity scales and ageing criteria and sex discrimination descriptions (https://www.azti.es/en/servicios/fisheries-sampling-programme/).

Data capture documentation:

Documentation on sampling templates, measurement equipment, maturity scales and ageing criteria in force is available within the sampling protocols (https://www.azti.es/en/servicios/fisheries-sampling-programme/).

Quality checks documentation:

N. There is an internal protocol detailing all the data check, but it is not ready to be shared.

Measuring equipment is calibrated (internal monitoring system for lab equipment) and the most updated maturity scales and ageing criteria are used (https://www.azti.es/en/servicios/fisheries-sampling-programme/). Technicians are trained accordingly both in internal and international exchanges.

Data storage

National database:

Biological sampling data capture carried by AZTI stored in AZTI Fisheries database and sent to IEO to populate SIRENO national database.

International database:

Biological sampling data capture carried by AZTI populates the RDB and RBDES hosted by ICES. Age data is also sent to Intercatch for those species requested in the data call

Quality checks and data validation documentation:

Automatic quality checks and validations are applied when entering the data in the database. The errors and gaps in data capture are checked with what it is registered in paper first, and then corrected in the database. If there is no possibility to correct it, the data is usually removed or replaced with average values/expert judgement. Data duplication is also checked. During the data quality process data captured is checked for outliers/non-realistic values in biological parameters along with spatial position and dates. For length data the graphs developed in FishPi are used. For the rest of biological parameters, the outlier is considered the observation out of the interquartile range. Data is then represented graphically with boxplots using R ggplot2 package and using expert judgement.

Sample storage

Storage description:

The otoliths of all these species mentioned above and illicii of monkfishes are stored dry according to all standards at our laboratory. Depending on the species they may be firstly processed (e.g., cutting, burning) before being conserved in Eukitte medium or envelopes in the corresponding place in the storeroom. They are stored without expiration date. The access to the stored samples is done using an internal application of samples reception and management (https://www.azti.es/en/servicios/fisheries-sampling-programme/). Information on quantities of sampled stored by species/stock, geographic sub-area and by year is available at https://www.azti.es/en/servicios/fisheries-sampling-programme/.

Sample analysis:

The sampling analysis is done according to the manuals(https://www.azti.es/en/servicios/fisheries-sampling-programme/) which are based on internationally agreed protocols that are the outputs from EGs.

Data processing

Evaluation of data accuracy (bias and precision):

Y, the maturity assignment is evaluated by the percentage of agreement amount all readers on samples of 50 individuals. An internal calibration exercise is set up by species and year. The information we use are the EGs reports and workshops of international exchanges in which we also participate. The reference to them are in the protocols at https://www.azti.es/en/servicios/fisheries-sampling-programme/.

Ageing data is obtained based on the agreement of two readers. The information we use are the EGs reports and workshops of international exchanges in which we also participate. The references to them are in the protocols at https://www.azti.es/en/servicios/fisheries-sampling-programme/.

Additionally, we plan to compile all instructions in quality assurance protocols for the rest of biological parameters that will be developed during the present EU MAP exercise.

Editing and imputation methods:

Y. Missing information is filled using the nearest neighbour in case there is a small gap between unsampled sizes with respect to the observed size range. However, if the number of samples is very small, the ALK is complemented with other sources: sometimes from the surveys, other times from adjacent regions or adjacent periods.

Quality document associated to a dataset:

N.

Validation of the final dataset: How

Mentioned through the sections above all the quality checked steps to get a validated dataset to provide to the end user.

AR comment:

Sampling design, Data capture

A new site gathering all sampling documentation has been developed:

https://www.azti.es/en/servicios/fisheries-sampling-programme/

Sampling scheme identifier: ESP_IEO_P2_AtSea

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_AtSea

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting volume of discards and length samples from the catches (All fractions) at sea for all commercial species caught in the trip. When the observer has not the possibility of sample all species, he/she should priorize the species listed in Table 2.1 of the Spanish work plan covered by a commercial sampling scheme for length.

Description of the population

Population targeted:

The primary sampling unit (PSU) is all Spanish Mediterranean fishing trips of trawlers.

Population sampled:

List of vessels (trawlers) based in the most important ports in terms of landing and effort, which operate in the main areas of each sampling frame.

Stratification:

Four different strata are considered: GSA, metier, selected ports and time frame. For each GSA, metiers are non-probabilistic selected, based on the rules of the regional RFMO (GFCM). For each combination of GSA-metier-base port, the selection is according to previous knowledge which include their importance for each métiers (both in terms of biomass landed and effort as number of vessels) as well as their availability to carry out the sampling (predisposition and adequate facilities). Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.

Population targeted		subGeographical strata	N strata	Temporary strata
OTB_DEF_>=40_0_0	1, 5, 6, 7	E1, W1, Mall5, Meno5, S6, N6, 7	7	Quarter
OTB_DWS_>=40_0_0	1, 2, 5, 6, 7	1, 2, Mall5, Meno5, S6, N6, 7	7	Quarter

(the sampling frame OTB_DWS_>40_0_0 includes the OTB_DWS and OTB_MDD metier due to the imposibility to identify a priori the metier of the trip)

Sampling design and protocols

Sampling design description:

The sampling frame is the list of vessel for each GSA or subGeographical strata and métier, with fishing trip as PSU. The trip to sample is selected by Simple Random Sampling as follows:

The list of vessel which operated in each GSA and métier and in the previous year would be available.

The list of vessels will be randomly ordered and vessels will be contacted in order as they appear in the list. Every unit is equally likely to be in the sample.

Results of the contact (no answer, refusal and reasons for refusals) will be tracked.

All catches will be concurrently sampled.

Is the sampling design compliant with the 4S principle?:

Y

Regional coordination:

N

Link to sampling design documentation:

Sampling design: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Sampling design: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.

Y

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

When data records comes to laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with observers to explain the methodology and resolve possible doubts.

Data capture

Means of data capture:

All data of the trip (general data, position of hauls, faunistic list, length distributions of species in the catch) are captured and registered written directly on the sampling sheets designed specifically for it. The observer uses a recorder to collect the data on faunistic composition of catches and length distributions, and after the trip he/she transcribes the information to sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible.

Weight of length samples are taken with an electronic dynamometer. Length measurements of fish and cephalopods are taken with ichtyometers, while calipers are used for crustaceans.

Data capture documentation:

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

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

Measuring on board: http://www.fao.org/gfcm/data/dcrf

Quality checks documentation:

Y, not documented.

Documentation will be available at the end of 2022

Data exploration to investigate the errors committed during the sampling process such as:

Length distribution of a sample: checked with the comparison of SOP value and the sample weight value

Length distribution of the population: checked with the comparison of SOP value of the length distribution and the landing weight.

Detection of values out of range through graphs

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Handbook of IEO database: **MED3. Handbook SIRENO**

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples.

Data processing

Evaluation of data accuracy (bias and precision):

Y

Data accuracy: **MED4. Spanish National Programme Quality Frame**

Landing data processing and evaluation of data accuracy: **MED5: Raising of length of the landings**

Discard data processing and evaluation of data accuracy: **MED6. Handbook_SIRENO_discards**

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

Editing and imputation methods:

N

We hope to have available the Editing and Imputation documentation at the end of 2022.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Format is cheked with external tools (for example, DV Tool in the JRC webpage, platform to upload the Tasks in the GFCM-DCRF webpage)

AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P2_OnShore

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_OnShore

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for all commercial species caught in the trip. When the observer has not the posibility of sample all species, he/she should priorize the species listed in Table 2.1 of the Spanish work plan covered by a commercial sampling scheme for length.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Major ports for each sampling frame in terms of landings and effort for the selected métiers. Excluding all minor ports.

Stratification:

Four different strata are considered: GSA, metier, selected ports and time frame. For each GSA, metiers are non-probabilistic selected, based on the rules of the regional RFMO (GFCM). For each combination of GSA-metier, the ports to sample have previously been selected according to previous knowledge which include their importance for each métiers (both in terms of biomass landed and effort as number of vessels) as well as their availability to carry out the sampling (predisposition and adequate facilities). Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.

Population targeted		N Strata	Temporary strata
PS_SPF_>=14_0_0	GSAs 1, 5 and 6	3	Quarter
GTR_DEF_>=16_0_0	GSAs 1, 5 and 6	3	Quarter
LLS_DEF_0_0_0	GSAs 6 and 7	2	Quarter
FPO_DEF_0_0_0	GSAs 1 and 6	2	Quarter
LA_SLP_>=14_0_0	GSA 5	1	Quarter

Sampling design and protocols

Sampling design description:

The PSU (port*day) selection is done by Non Probabilistic Judgement Sampling from a selection of 13 major national ports. The Secondary Sampling Units (SSU = landed trips) are systematically selected from the target métiers in each GSA as follows:

- For those métiers selected in each GSA to sample, in each selected ports, a vessel would be randomly selected (for example, the first vessel in the auction, or the first vessel at right or at left…). Then, in the same day or in the next day, the observer will select n'th subject from the list,
- Results of the contact (vessel sampled, refusal and reasons for refusals) will be tracked.
- All catches landed will be concurrently sampled.

Is the sampling design compliant with the 4S principle?:

Y

Regional coordination:

N

Link to sampling design documentation:

Sampling desing: MED1. Sampling plan description for biological data in the Spanish Mediterranean

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Sampling design: MED1. Sampling plan description for biological data in the Spanish Mediterranean

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

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

When data records comes to laboratories, technical staf checks the data collected and, if there are some problems or mistakes, speaks with samplers to explain the methodology and resolve possible doubts.

Data capture

Means of data capture:

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the sampler uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible.

Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

Data capture documentation:

Onshore sampling protocol (hadbook): **MED7. Manual de instrucciones para muestreadores en lonja**.

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

Measuring protocols: http://www.fao.org/gfcm/data/dcrf

Quality checks documentation:

Y, not documented.

Documentation will be available at the end of 2022

Data exploration to investigate the errors committed during the sampling process such as:

Length distribution of a sample: checked with the comparison of SOP value and the sample weight value

Length distribution of the population: checked with the comparison of SOP value of the length distribution and the landing weight.

Detection of values out of range through graphs.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Handbook of IEO database: **MED3. Handbook SIRENO**

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples.

Data processing

Evaluation of data accuracy (bias and precision):

Y

Data accuracy: **MED4. Spanish National Programme Quality Frame**

Landing data processing and evaluation of data accuracy: **MED5: Raising of length of the landings**

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

Editing and imputation methods:

N

We hope to have available the Editing and Imputation documentation at the end of 2022.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Format is cheked with external tools (for example, DV Tool in the JRC webpage, platform to upload the Tasks in the GFCM-DCRF webpage)

AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P2_StockSpecific

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_StockSpecific

Sampling scheme type: Commercial by category

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for selected commercial species landed in a port.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Major ports for each sampling frame in terms of landings and effort for the selected species/métier. Excluding all minor ports.

Stratification:

Four different strata are considered: GSA, metier, selected ports and time frame. For each GSA, metiers are non-probabilistic selected, based on the rules of the regional RFMO (GFCM). For each combination of GSA-metier, the ports to sample have previously been selected according to previous knowledge which include their importance for each métiers (both in terms of biomass landed and effort as number of vessels) as well as their availability to carry out the sampling (predisposition and adequate facilities). Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.

Population targeted		**N Strata**	**Temporary strata**
PS_SPF_>=14_0_0	GSAs 1, 5 and 6	3	Quarter
GTR_DEF_>=16_0_0	GSAs 1, 5 and 6	3	Quarter
LLS_DEF_0_0_0	GSAs 6 and 7	2	Quarter
FPO_DEF_0_0_0	GSAs 1 and 6	2	Quarter
LA_SLP_>=14_0_0	GSA 5	1	Quarter

Sampling design and protocols

Sampling design description:

The PSU (port*day) selection is done by Non Probabilistic Judgement Sampling from a selection of 10 major national ports. The Secondary Sampling Units (SSU = boxes of the target species) are systematically selected from the target métiers in each GSA as follows:

For those species/métiers selected in each GSA to sample, in each selected ports, a box (or more) would be randomly selected (for example, the first box in the auction, or the first box at right or at left…).

Results of the contact (vessel sampled, refusal and reasons for refusals) will be tracked.

Samples should be large enough to allow to obtain a well defined mean.

Is the sampling design compliant with the 4S principle?:

Y

Regional coordination:

N

Link to sampling design documentation:

Sampling desing: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Sampling design: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

When data records comes to laboratories, technical staf checks the data collected and, if there are some problems or mistakes, speaks with observers to explain the methodology and resolve possible doubts.

Data capture

Means of data capture:

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the observer uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible.

Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

Data capture documentation:

Onshore sampling protocol (hadbook): **MED7. Manual de instrucciones para muestreadores en lonja**.

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

Measuring protocols: http://www.fao.org/gfcm/data/dcrf

Quality checks documentation:

Y, not documented.

Documentation will be available at the end of 2022

Data exploration to investigate the errors committed during the sampling process such as:

Length distribution of a sample: checked with the comparison of SOP value and the sample weight value

Length distribution of the population: checked with the comparison of SOP value of the length distribution and the landing weight.

Detection of values out of range throught graphs

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Handbook of IEO database: **MED3. Handbook SIRENO**

http://www.ieo.es/es_ES/web/ieo/pndb (section P2: Evaluación de recursos pesqueros en el Mediterráneo)
Sample storage
Storage description: This sampling scheme doesn't produce samples to store. Sample analysis: This sampling scheme doesn't produce samples.
Data processing
Evaluation of data accuracy (bias and precision): Y Data accuracy: **MED4. Spanish National Programme Quality Frame** Landing data processing and evaluation of data accuracy: **MED5: Raising of length of the landings** http://www.ieo.es/es_ES/web/ieo/pndb (section P2: Evaluación de recursos pesqueros en el Mediterráneo) **Editing and imputation methods:** N We hope to have available the Editing and Imputation documentation at the end of 2022 **Quality document associated to a dataset:** N **Validation of the final dataset:** How are datasets validated (quality checked) before providing to end-user? The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames. Format is cheked with external tools (for example, DV Tool in the JRC webpage, platform to upload the Tasks in the GFCM-DCRF webpage)
AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P2_Biological_Specific

MS:ESP
Region: Mediterranean and Black Sea
Sampling scheme identifier: ESP_IEO_P2_Biological_Specific
Sampling scheme type: Biological parameters specific
Observation type: SciObsOnShore
Time period of validity: from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity variables) from commercial landings on-shore for next pelagic and demersal species included in Table 2.2 of the WP, and requiered by the GFCM: species Group 1: *Engraulis encrasicolus*, *Sardina pilchardus*, *Merluccius merluccius*, *Parapenaeus longirostris,* species Group 2: *Lophius budegassa*, *Micromesistius poutassou*, *Mullus surmuletus*, *Octopus vulgaris, Raja clavata, Scomber colias*, *Trachurus trachurus,* and other main species in the Spanish fisheries: *Aristeus antennatus, Mullus barbatus, Nephrops norvegicus* and *Trachurus mediterraneus.*
Description of the population
Population targeted:

The primary sampling unit (PSU) is the stock. The selection of stocks to sample has been made following the requeriments of the GFCM: individual information on sex and length at maturity would be mandatory for species belonging to Group 1 (Appendix A.1 of the GFCM-DCRF manual). The collection of this information is not compulsory for species G2 and G3, but countries are invited to provide them to.

Population sampled:

The landed fraction of the target populations will be sampled periodically at the IEO laboratories, in order to cover the largest possible distribution area of each population. The samples will be obtained from the most important markets.

The design has been done taking into account the representativeness of the data to collect with relation to the population (catches from the commercial fleet), considering that these data should be obtained cost-effectively and the information obtained can be used to estimate the population characteristics of interest precisely (low variability) and accurately (unbiased).

In general, species G1 will be sampled annually in all Spanish GSAs, while species G2 and the other main species in the Spanish fisheries will be sampled each three years in the more relevant GSA or GSAs.

Stratification:

Population targeted	Geographical stratas	N strata	Temporary strata
Engraulis encrasicolus	GSA1 and GSA6	2	Quaterly
Sardina pilchardus	GSA1 and GSA6	2	Quaterly
Scomber colias*	GSA1 and GSA6	2	Quaterly
Trachurus mediterraneus*	GSA1	1	Quaterly
Trachurus trachurus*	GSA1	1	Quaterly
Aristeus antennatus*	GSA5 and GSA6	2	Quaterly
Lophius budegassa*	GSA6	1	Quaterly
Merluccius merluccius	GSA1, GSA5 and GSA6	3	Quaterly
Micromesistius poutassou*	GSA6	1	Quaterly
Mullus barbatus	GSA1 and GSA6	2	Quaterly
Mullus surmuletus	GSA1, GSA5 and GSA6	3	Quaterly
Nephrops norvegicus	GSA1, GSA5 and GSA6	3	Quaterly
Octopus vulgaris*	GSA1	1	Quaterly
Parapenaeus longirostris	GSA1, GSA5 and GSA6	3	Quaterly
*Species wich sampling will be carried out once every three years			

Sampling design and protocols

Sampling design description:

The sample/subsample is selected by a Simple Random Sampling (SRS) from landing boxes. In the laboratory, a fixed number of individuals by length class is selected in order to obtain the following information: individual length, weight, eviscerated weight, sex, maturity, gonad weight and, if applicable, the otolith or the structure to estimate the age of the individual every period (month, quarter or year).

In some crustacean species (*Nephrops norvegicus* and *Aristeus antennatus*), in which sex and maturity can be determinated without dissecting the individuals, part of the biological sampling will be done on board.

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

Working group on biological parameters (WGBIOP): https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EOSG/2019/WGBIOP%202019.pdf

Compliance with international recommendations:

Yes. Almost all these species are evaluated by international groups of experts, and their recommendations are carried out. The sampling scheme is common to all of them.

Link to sampling protocol documentation:

Selection of species, and how to take the information of individual length, individual weight, sex, maturity, and collection of structures to determinate the age:

http://www.fao.org/gfcm/data/dcrf

Sampling implementation

Recording of refusal rate:

NA. The fraction of the landing to be sampled is purchased from a vendor.

Monitoring of sampling progress within the sampling year:

It is intended that all the sampling strata are well represented, intensifying the samplings in the worst represented strata, although this is not always possible.

Data capture

Means of data capture:

For most of the stocks, data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized to the I

EO SIRENO database as soon as possible.

Individual weight and gonad weight are taken with precision weight scales. Length measurements of fish and cephalopods are taken with ichthyometers, while calipers are used for crustaceans.

Maturity scales follow the agreements and recomendations of related workshops.

MATURITY DOCUMENTATION AND PROTOCOLS:

*Workshop on Sexual Maturity Sampling WKMAT; 2007. Including general rules and protocols for all groups of species:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acfm/PGCCDBS/WKMAT07.pdf

*Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF): Include all the WKs and maturity scale by species so far:

https://www.ices.dk/community/Documents/WKASMSF%20Report%202018.pdf

*Report of the workshop on sexual maturity staging of mackerel and *horse mackerel* (WKMSMAC), 2007:

https://www.ices.dk/community/Documents/PGCCDBS/WKMSMAC_2007.pdf

*Report of the Workshop on Sexual Maturity Staging of Elasmobranchs (WKMSEL), 2010:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2010/WKMSEL/WKMSEL%202010.pdf

* Report of the Workshop on Sexual Maturity Staging of Cephalopods (WKMSCEPH), 2010:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2010/WKMSCEPH/WKMSCEPH%20Report.pdf

* Report of the Workshop on crustaceans (*Aristeus antennatus*, *Aristaeomorpha foliacea*, *Parapenaeus longirostris*, *Nephrops norvegicus*) maturity stages (WKMSC), 2009:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2009/WKMSC/WKMSC%202009.pdf

* Report of the Workshop on Small Pelagics (*Sardina pilchardus*, *Engraulis encrasicolus*) maturity stages (WKSPMAT), 2008:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2008/WKSPMAT/wkspmat_2008.pdf

* Report of the workshop on sexual maturity staging of hake and monk

(WKMSHM), 2007:

https://www.ices.dk/community/Documents/PGCCDBS/WKMSHM_2007.pdf

Data capture documentation:

Measuring protocols: GFCM Data Collection Reference Framework:

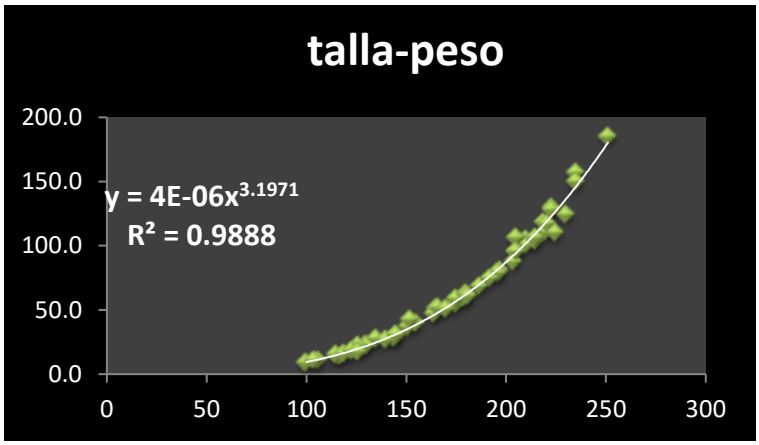
http://www.fao.org/gfcm/data/dcrf

ICES WorkShops and WorkingGroups documents related to biological parameters and data quality assurance are storage in a repository:

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Quality checks documentation:

Analysis and detection of outliers for biological parameters, weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.



Checks are usually carried out during and at the end of the sampling and also by analysing certain relationships between parameters.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (port, species, name od vessel, gear, commercial category) must be selected from a dropdown.

Handbook of IEO database: **MED3. Handbook_SIRENO**

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

Sample storage

Storage description:

The otoliths of all these species, after having been photographed for aging, are stored in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Malaga, Murcia and Baleares. These pieces are stored systematically, without expiration date.

Sample analysis:

Otolith reading and age estimation follow the agreements and recomendations of related workshops

AGE ESTIMATION DOCUMENTATION AND PROTOCOLS:

*Workshop on Ageing Validation methodology of Mullus species (WKVALMU), 2017

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WKVALMU/01%20WKVALMU%20Report%202017.pdf

*Workshop on Age estimation of Blue Whiting (*Micromesistius poutassou*) WKARBLUE2, 2017:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WKARBLUE2/01%20WKARBLUE2%20Report%20of%20the%20Workshop%20on%20Age%20estimation%20of%20Blue%20Whiting%20(Micromesistius%20poutassou)%20(WKARBLUE).pdf

*Report of the Workshop on Age estimation of European anchovy (*Engraulis encrasicolus*), 2016:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2016/WKARA2/WKARA2%202016%20Report.pdf

*Report of the Workshop on Age reading of *Horse Mackerel*, Mediterranean Horse Mackerel and Blue Jack Mackerel (*Trachurus trachurus*, *T. Mediterraneus* and *T. picturatus*) (WKARHOM2), 2015:

*Report of the Workshop on Age Reading of Chub mackerel (*Scomber Colias*) (WKARCM), 2015:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2015/WKARCM%20Report%2001.pdf

*Report of the Workshop on Age Validation Studies of Gadoids (WKAVSG), 2013:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKAVSG/WKAVSG%202013.pdf

*Workshop on age reading of european sardine (*Sardina pilchardus*) (NE Atlantic and Mediterranean) (WKARAS2), 2019:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EOSG/2019/WKARAS2%20Report%202019.pdf

*Anglerfish Illicia/Otoliths Ageing Workshop, 2011

https://www.ices.dk/community/Documents/PGCCDBS/Anglerfish%20(Lophius%20piscaorius)%20illicia%20and%20otoliths%20exchange%202011_.pdf

For more information ICES WorkShops and WorkingGroups documents related to biological parameters and data quality assurance are storage in a repository:

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Data processing

Evaluation of data accuracy (bias and precision):

Y

The estimation of the biological parameters and their uncertainties is to be carried out using the tool INBIO 2.0 ("Estimation of biological parameters and their uncertainties through simulation techniques"), developed in R environment by the IEO. INBIO makes possible to fit the most usual models and to estimate the coefficient of variation for parameters by using the non-parametric bootstrap methodology.

Sampedro P., Saínza M., Trujillo V. 2005. A simple tool to calculate biological parameter's uncertainty. Working Document in Workshop on Sampling Design for Fisheries Data. ICES CM 2005/ACFM:11, Pasajes (Spain), 82 pp.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N

Validation of the final dataset:

A tool developed by the IEO in R INBIO 2.0[1] (Estimation of biological parameters and their uncertainties by simulation techniques) is used to check the quality of the biological datasets. [*Sampedro, P., Sainza, M. and Trujillo, V.*, 2005. A simple tool to calculate biological parameters'uncertainty. Working Document, In: *Workshop on Sampling Desing for Fisheries Data* (WKSDFD), Pasajes, Spain.]. The methodologies used are:

Growth in age: von Bertalanffy, non-linear estimation by least squares (Gauss-Newton algorithm).

Size-weight ratio: non-linear estimation by least squares (Gauss-Newton algorithm).

Sex ratio: estimation of the global sex-ratio, it calculates the weighted coefficient of overall variation (weighted average of the coefficients of variation by size, being the number of individuals the weighting factor of each group) and the number of individuals used in the calculation.

Maturity (size and age): generalized linear model (GLM) with binomial errors and connection function: logistics function. Adjusting log-maximum likelihood.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

MS : ESP

Region: Other regions

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length and biological variables samples for the species listed in Table 1 of the EU MAP Delegated Decision, from at sea observations in NW Africa under Sustainable Fisheries Partnership Agreements (SFPAs).

Description of the population

Population targeted:

The primary sampling unit (PSU) is vessel*trip of bottom trawlers in NW Africa under SFPAs targeting shrimps, black hake and mix cephalopods and finfish.

Population sampled:

The entire target population is susceptible to sampling.

Sampling coverage in these areas highly depends on the signature of the SFPAs between the EU and coastal States. In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (limited space onboard, uncertainty of the fishing activity in response of changing protocol measures, etc.).

Stratification:

The information is broken down by technical criteria (métier):

- OTB_CRU_>=40_0_0 (freezer bottom shrimper trawlers)
- OTB_DEF_>=70_0_0 (bottom trawlers targeting black hake)
- OTB_MCF_>=70_0_0 (freezer trawlers targeting mix cephalopods and finfish)

Sampling coverage in these areas highly depends on the varying circumstances of the Protocols of the SFPAs between the EU and coastal States. These can involve changes in the fisheries conditions and accessibility or even the closure of certain fisheries or the introduction of new fisheries to be sampled. As a consequence, some of the planned objectives for 2022-2027 would not be adequately achieved or some new métiers could be added to sampling scheme in the future.

Sampling design and protocols

Sampling design description:

PSUs (vessel*trip) are selected either by the ship-owners association, trying to follow a rotation system (one vessel per fishing trip), allowing 100% coverage of the target population, nor opportunistically. In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (limited space onboard, uncertainty of the fishing activity in response of changing protocol measures, etc.).

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in NW Africa (internal reports). All this documentation can be reviewed at: http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in NW Africa (internal reports). All this documentation can be reviewed at: http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Along the year a monitoring of the coverage is carried out, adapting the sampling intensity when there are variations in fishing activity.

Sampling schemes are designed to collect the best data and information need for the assessment purposes required by CECAF. Any deviation are due to SFPAs, which are reasons that cannot be attributed to sampling intensity or methods used for collecting data and for estimating the parameters, therefore it is not feasible to adopt any mitigation measures.

Data capture

Means of data capture:

Lengths are collected with measuring board/tape for fish and cephalopods, and calliper for crustaceans Weights are collected with marine scales.

The data are recording or written directly on the sampling sheets designed specifically for it and the information is computerized as soon as possible.

Data capture documentation:

Specific sampling requirements are given in several scientific observation manuals which comprise observation guidelines and reference materials. All this documentation can be reviewed at: http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.
Data storage
National database: All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users. **International database:** Data are uploaded at The Regional Data Base (RDB) hosted and maintained by ICES. **Quality checks and data validation documentation:** Documents on quality checks are currently at the preparation stage. Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, name of vessel, gear, name of species,...) must be selected from a dropdown. Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.
Sample storage
Storage description: This sampling scheme doesn't produce samples to store. Sample analysis: This sampling scheme doesn't produce samples. No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments.
Data processing
Evaluation of data accuracy (bias and precision): N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized). **Editing and imputation methods:** N. Documentation is still ongoing (not yet finalized). **Quality document associated to a dataset:** N. Documentation on processes to evaluate quality is still ongoing (not yet finalized). **Validation of the final dataset:** Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.
AR comment: No deviations or developments.

Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias

MS : ESP
Region: Outermost regions
Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples for the species listed in Table 1 of the EU MAP Delegated Decision, from at sea observations in Canary fishing grounds.

Description of the population

Population targeted:

The primary sampling unit (PSU) is vessel*trip of artisanal fleet targeting both, small pelagics and demersal species in Tenerife and Gran Canaria.

Population sampled

The entire target population is susceptible to sampling.

In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (e.g. limited space onboard, legal capacity to admit non-crew personnel).

Stratification:

The information is broken down by technical criteria (métier):

- PS_SPF_10_0_0 (artisanal purse seiners targeting small pelagics).
- MIS_DES_0_0_0 (artisanal polyvalent and multi-specific fleet targeting demersal species with small gears (traps, hooks, nets).

Sampling design and protocols

Sampling design description:

PSUs (vessel*trip) are selected *ad-hoc* covering representative "type vessels" operating in the islands (Tenerife and Gran Canaria). In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (e.g. limited space onboard, legal capacity to admit non-crew personnel).

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Monthly monitoring of the coverage, adapting the sampling intensity when there are variations in fishing activity, so as to guarantee the robustness of the data

Sampling schemes are designed to collect the best data and information need for the assessment purposes required by CECAF. Any deviations are due to collaboration of the sector, which are reasons that cannot be attributed to sampling intensity or methods used for collecting data.

Data capture

Means of data capture:

Lengths are collected with measuring board/tape for fish and cephalopods, and calliper for crustaceans Weights are collected with precision marine scales.

The data are recording or written directly on the sampling sheets designed specifically for it and the information is computerized as soon as possible.

Data capture documentation:

Specific sampling requirements are given in several scientific observation manuals which comprise observation guidelines and reference materials. All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at The Regional Data Base (RDB) hosted and maintained by ICES.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, name of vessel, gear, name of species,...) must be selected from a dropdown.

Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments.

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP-IEO_P3_OnShore

MS : ESP

Region: Other regions & Outermost regions

Sampling scheme identifier: ESP-IEO_P3_OnShore

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for the species listed in Table 1 of the EU MAP Delegated Decision. The scheme covers the Spanish fleet operating under Sustainable Fisheries Partnership Agreements (SFPAs) and the fleet operating in the EU waters of Canary Island (outermost regions).

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Population sampled is the main ports where the mentioned fleets land.

Stratification:

Population is stratified in several lots. Then the landed trips are selected by technical criteria (métier):

- Port of Barbate: hosting a 100% of landings in Spain from SFPAs (PS_SPF_0_0_0).
- Port of Cádiz: hosting a 98% of fresh fish trawlers from SFPAs (OTB_DEF_>=70_0_0).
- Port of Vigo: hosting a 100% of landings in Spain from SFPAs (LLS_DEF_0_0_0).
- Ports from Canary Islands, covering 70% and 100% of the landing from PS_SPF_10_0_0 and MIS_DES_0_0_0, respectively.

Circumstances related to the Protocol regulations, management measures in the Spanish fishing ground (closed seasons, TACs) or the abundance of the stocks in one fishing ground or another may affect the activity of the fleet.

Sampling design and protocols

Sampling design description:

The PSU selection is based on historical knowledge of the target fisheries, covering the main landing ports of the fleets considered.

The selection of the sampling day is not random, but depends on the availability of trips landed in port according to the seasonality of the fisheries and the fishing strategy of the metiers. Therefore, the method of selecting on-shore events for sampling is defined as Non-Probabilistic Judgement Sampling ("NPJS").

All fractions of landings are considered. The secondary sampling unit (SSU) is the trip landed from the métiers considered and it is selected randomly.

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Y. Monthly monitoring of data collected from the samplers. In the IEO laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with samplers to solve possible doubts.

Data capture

Means of data capture:

Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the sampler uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerized to the IEO SIRENO database as soon as posible.

Data capture documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc.*

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at The Regional Data Base (RDB) hosted and maintained by ICES.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage. Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown. The system compares the weight of the length sampling and the calculated weight with the length-weight relationship. Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.
Sample storage
Storage description: This sampling scheme doesn't produce samples to store. Sample analysis: This sampling scheme doesn't produce samples. No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments
Data processing
Evaluation of data accuracy (bias and precision): N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized). **Editing and imputation methods:** N. Documentation is still ongoing (not yet finalized). **Quality document associated to a dataset:** N. Documentation on processes to evaluate quality is still ongoing (not yet finalized). **Validation of the final dataset:** Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.
AR comment: No deviations or developments.

Sampling scheme identifier: ESP-IEO_P3_OnShore_stock specific

MS : ESP
Region: Other regions & Outermost regions
Sampling scheme identifier: ESP-IEO_P3_OnShore_stock specific
Sampling scheme type: Commercial fishing trip
Observation type: SciObsOnShore
Time period of validity: from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting length samples from commercial landings on-shore for selected commercial species landed in a port. The scheme covers the Spanish fleet operating under Sustainable Fisheries Partnership Agreements (SFPAs) and the fleet operating in the EU waters of Canary Island (outermost regions).
Description of the population
Population targeted: The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day). **Population sampled:**

Population sampled is the main ports where the mentioned fleets land.

Stratification:

Population is stratified in several lots. Then the landed trips are selected by technical criteria (métier):

- Port of Barbate: hosting a 100% of landings in Spain from SFPAs (PS_SPF_0_0_0).
- Port of Cádiz: hosting a 98% of fresh fish trawlers from SFPAs (OTB_DEF_>=70_0_0).
- Ports of Tenerife: covering 70% of the landing (PS_SPF_10_0_0).
- Ports of The Canary Islands: covering 100% of demersal fish (MIS_DES_0_0_0).

Circumstances related to the Protocol regulations, management measures in the Spanish fishing ground (closed seasons, TACs) or the abundance of the stocks in one fishing ground or another may affect the activity of the fleet.

Sampling design and protocols

Sampling design description:

The PSU selection is based on historical knowledge of the target fisheries, covering the main landing ports of the fleets considered.

The selection of the sampling day is not random, but depends on the availability of trips landed in port according to the seasonality of the fisheries and the fishing strategy of the metiers. Therefore, the method of selecting on-shore events for sampling is defined as Non-Probabilistic Judgement Sampling ("NPJS").

The Secondary Sampling Units (SSU = boxes of the selected species) are randomly selected from the target métiers. All fractions are considered for each stock as follows.

- Anchovy, (*Engraulis encrasicolus)* from PS_SPF_0_0_0
- Small pelagic: Atlantic chub mackerel, (*Scomber colias)*; Blue jack mackerel, (*Trachurus picturatus)*; Sardine, (*Sardina pilchardus)*; Round sardinella, (*Sardinella aurita*) from PS_SPF_10_0_0
- Benguela hake, (*Merluccius polli*) from OTB_DEF_>=70_0_0
- Parrotfish,(*Sparisoma cretense*) from MIS_DES_0_0_0

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Y. Monthly monitoring of data collected from the samplers. In the IEO laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with samplers to solve possible doubts.

Data capture

Means of data capture:

Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the sampler uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible

Data capture documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at The Regional Data Base (RDB) hosted and maintained by ICES.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples. No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP-IEO_P3_BioSpec

MS: ESP

Region: Other regions & Outermost regions

Sampling scheme identifier: ESP-IEO_P3_BioSpec

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity variables) from commercial landings on-shore for the species included in table 2.2 of the WP. The scheme covers landings from the artisanal Spanish fleet operating under Sustainable Fisheries Partnership Agreements (SFPAs) and the fleet operating in the EU waters of Canary Island (outermost regions).

Description of the population

Population targeted:

The primary sampling unit (PSU) is the stock, from the national ports where the mentioned fleets land.

Circumstances related to the Protocol regulations, management measures in the Spanish fishing ground (closed seasons, TACs) or the abundance of the stocks in one fishing ground or another may affect the activity of the fleet

Population sampled:

The landed fraction of the target populations will be sampled periodically at the IEO laboratories, in order to cover the largest possible distribution area of each population. The samples will be obtained from the most important markets.

Stratification:

Population targeted		Geographical Stratas	# Strata	Temporary Strata
Engraulis encrasicolus	34	34.1.11	1	Monthly
Scomber colias	34	34.1.2	1	Monthly
Sardina pilchardus	34	34.1.11/34.1.2	2	Monthly
Sardinella aurita	34	34.1.2	1	Monthly
Trachurus picturatus	34	34.1.2	1	Monthly
Sparisoma cretense	34	34.1.2	1	Monthly

Sampling design and protocols

Sampling design description:

The sample/subsample is selected randomly (SRS) from landing boxes. The selected sample is entirely biologically analyzed (several biological variables are collected on each sampled fish until the expected number of samples is reached).

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

N/A. The fraction of the landing to be sampled is purchased from a vendor

Monitoring of sampling progress within the sampling year:

Y. It is intended that all the sampling strata are well represented, intensifying the samplings in the worst represented strata.

Data capture

Means of data capture:

For most of the stocks, data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized to the IEO SIRENO database as soon as possible.

Individual weight and gonad weight are taken with precision weight scales. Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

Maturity scales follow the agreements and recommendations of related workshops.

Data capture documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

N/A

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage. Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.
Sample storage
Storage description: The otoliths of selected species are stored in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out. These pieces are stored systematically, without expiration date. Sample analysis: No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments.
Data processing
Evaluation of data accuracy (bias and precision): N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized). **Editing and imputation methods:** N. Documentation is still ongoing (not yet finalized). **Quality document associated to a dataset:** N. Documentation on processes to evaluate quality is still ongoing (not yet finalized). **Validation of the final dataset:** Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.
AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

MS: ESP
Region: Other Regions
Sampling scheme identifier: ESP_IEO_P4_AtSea_all
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting length samples from commercial and non-commercial catches at sea for all species listed in Table 1 of the Commission Delegated Decision (EU) 2021/1167. The scheme covers observations at sea in the Atlantic Ocean and adjacent Seas, Indian Ocean, Western Central Pacific and Eastern Central Pacific.
Description of the population
Population targeted: The primary sampling units (PSU) are the fishing trips. The population targeted is the list of vessels with license to fish for each fishery under the MS flag. **Population sampled:** The entire target population is susceptible to sampling, excluding vessels without habitability for observers on board. **Stratification:**

Stratification has been done according to species/metier/area of each fishery. The population was stratified in 15 strata (métier):

- LLALB_MED_AtSea: drifting longlines targeting albacore in Mediterranean Sea.
- LLBFT_MED_AtSea: drifting longlines targeting bluefin tuna in Mediterranean Sea.
- LLSWO_MED_AtSea drifting longlines targeting swordfish in Mediterranean Sea.
- LLLTA_MED_AtSea: drifting longlines targeting little tuna in Mediterranean Sea.
- PS_MED_BFT_AtSea: purse seine in Mediterranean Sea.
- LLSWO_ATL_AtSea: drifting longlines targeting swordfish in the Atlantic Ocean.
- LLSWO_IND_AtSea: drifting longlines targeting swordfish in the Indian Ocean.
- LLSWO_EPAC_AtSea: drifting longlines targeting swordfish in Eastern Pacific Ocean.
- LLSWO_WPAC_AtSea: drifting longlines targeting swordfish in Western Pacific Ocean.
- PS_ATL_AtSea_IEO: purse seine in the Atlantic Ocean.
- PS_IND_AtSea_IEO: purse seine in the Indian Ocean.
- PS_EPAC_AtSea_IEO: purse seine in the Eastern Pacific Ocean.
- PS_WPAC_AtSea_IEO: purse seine in the Western Pacific Ocean.
- TRAP_MED_SmallTunas: stationary uncovered pound nets in the Mediterranean Sea.
- TRAP_ATL_BFT: stationary uncovered pound nets in the Atlantic Ocean.

Sampling design and protocols

Sampling design description:

The PSU selected for sampling will be randomly selected from the list of vessels with a fishing license according to spatial and temporal strata.

The target coverage for tropical purse seine fisheries in Atlantic and Indian Oceans is 10% of the total trips and will be uniformly distributed along the year. For the IATTC area the intended coverage of purse seine fisheries is 100% of the annual primary sampling units (50% by IATTC observers and 50% by national observers).

There are three catch fractions depending on the fisheries involved in the sampling design: commercial target species (stored on board), bycatch (incidental catches) and discarded commercial species.

In the Mediterranean longline fishery, a number of trips are planned to assure the Spatio-temporal strata coverage (month, 5º x 5º grid, métier). The PSUs are selected randomly among those that target the month, area, and metier to be covered.

The observers on board collect data on catches (target and bycatch species) and also biological data from commercial fisheries, as well as information about the condition of the bycatch when discarded (death or alive). In the case of tropical purse seines, the observers on board collect information on the bycatch discards for all fishing sets. The activity related to floating objects is also recorded on board. The catch of purse seiners in the Mediterranean Sea is sent to a flattering cage.

Is the sampling design compliant with the 4S principle?: Y

N

Regional coordination:

Yes. The sampling design and protocols for the purse seiner fisheries landing in the Atlantic and Indian oceans are coordinated between the Spanish (IEO & AZTI) and French institutes. They were developed originally in an informal basis and later under agreements with IRD (Institut de Recherche pour le développement, France) and other no-MS as SFA (Seychelles Fishing Authority) and CRODT (Centre de Recherche Océanographique de Dakar Thiaroye). Currently, these agreements are not in place but all these institutions continue working together and following the same protocols.

In the case of the IATTC convention area, observers follow the protocols developed by the IATTC Secretariat in the framework of the Agreement on the International Dolphin Conservation Program (a legally-binding multilateral agreement which entered into force in February 1999, with 13 contracting parties, including the EU).

Link to sampling design documentation:

The sampling design follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

https://www.iattc.org/Downloads.htm/ (into the link goes to 'Red de cerco - Programa observadores/Manual completo2017')

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

The sampling protocols follow RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html;

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

https://www.iattc.org/Downloads.htm/ (into the link goes to 'Red de cerco - Programa observadores/Manual completo2017')

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

In the Atlantic and Indian Oceans purse seine sampling by scientific observers follows a specific and common methodology edited in a manual used by IRD, AZTI and IEO.

Compliance with international recommendations:

Y.

Sampling implementation

Recording of refusal rate:

Y.

Monitoring of sampling progress within the sampling year:

The coverage of the sampling progress is monitored monthly.

In the Mediterranean longline fishery, once the onboard observer sends the trip data to the laboratory, data are reviewed and validated by cross-checking it with data from sales notes and logbooks. If errors are detected in data collection, the observer is contacted to correct them. If there is a problem with the boat that compromises the coverage of a stratum, there is a list of boats that allows solving the problem. If the problem occurs with the observer, a list of specialized and trained observers is available that permits us to replace it.

In the purse seine fleet in the Atlantic and Indian Oceans the sampling is evenly distributed across vessels. The aim is covering one trip per vessel, and trying to distribute observer trips randomly throughout the year. In the case of the IATTC convention area, there is a mandatory observer coverage of 100% carried out in collaboration with the IATTC Secretariat. IATTC and Member State observers are generally deployed alternating each two trips.

Data capture

Means of data capture:

The size of the fish is measured using a measuring board, tape or calliper and weights are collected with scales or dynamometers, depending on the fish size. The sampling information is recorded on sheet forms and later is computerized.

In the case of purse seines fisheries, observers transfer the information collected on dedicated forms to databases using specific software. This software has been developed and supported by the IATTC technical staff (Observer, IATTC Secretariat, pers.com) and in the Atlantic and Indian Oceans, the development and support is carried out by IRD (ObServe, Cauquil *et al 2015*).

Data capture documentation:

The observers on board have protocols for collecting data that follow the recommendations of tuna-RFMOs sampling manuals. The links:

ICCAT. 2006-2016. Manual de ICCAT. Comisión internacional para la conservación del atún Atlántico. En: Publicaciones ICCAT [on line]. Actualizado 2016. ISBN (Edición electrónica): 978-92-990055-0-7, https://www.iccat.int/es/iccatmanual.html.

https://www.iotc.org/data-and-statistics.

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. (SCRS/2009/43).

https://gitlab.com/ultreiaio/ird-observe

http://ultreiaio.gitlab.io/ird-observe/

Cauquil P., Rabearisoa N., Sabarros P., Chavance P. and Bach P. (2015) ObServe: Database and operational software for longline and purse seine fishery data. 13th Working Party on Billfish. Indian Ocean Tuna Commission. Available online at: https://www.iotc.org/documents/observe-database-and-operational-software-longline-and-purse-seine-fishery-data

Quality checks documentation:

N. The observer data is carefully reviewed by the IEO staff in the laboratory in order to detect errors and inconsistencies in the recorded data before consolidating them. General quality indicators are also used for purse seiner observer's data coming from the three oceans, included in the software (https://gitlab.com/ultreiaio/ird-observe).

Data storage

National database:

The data collected by observers on board are stored into specific databases designed according to specificities of the fisheries and into the SIRENO database which is managed by the IEO.

In addition the observer's data obtained from the purse seiners in the Atlantic and Indian oceans are stored in a database called ObServe which has been developed by IRD and is used by IRD, AZTI and IEO.

In the Eastern Pacific Ocean the data from the observation on board EU purse seiners are stored in an IATTC_IEO shared database. The sampling by scientific observers follows a specific methodology that can be consulted in http://www.iattc.org/Downloads.htm

International database:

Aggregated data are stored on tuna-RFMOs databases:

ICCAT (International Commission for the Conservation of Atlantic Tunas): https://iccat.int/en/accesingdb.html

IOTC (Indian Ocean Tuna Commission): https://www.iotc.org/data/datasets

IATTC (Inter-American Tropical Tuna Commission): https://www.iattc.org/PublicDomainData/IATTC-Catch-by-species1.htm

WCPFC (Western and Central Pacific Fisheries Commission): https://www.wcpfc.int/data-catalogue

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Once the data on observed trips arrive at MS laboratory, these data are revised by experts to detect errors and cross-checked with both sales notes and logbooks records.

For purse seiners, at the end of each deployment, observers are debriefed for data validation following ad-hoc software tools developed for ObServe (Atlantic and Indian oceans) and Observer (Pacific ocean).

Sample storage

Storage description:

Samples for genetic (muscle tissue), reproduction (gonadal tissue), and age and growth (hard parts: otoliths and/or first ray of the first dorsal fin) are collected for the main tuna and tuna-like species. The samples are stored in adequate fixative solutions, frozen or stored in boxes in the IEO laboratory store. Samples are stored till they are analyzed or sent to the laboratories in charge to analyze them. A subsample of each genetic or reproductive sample is stored in our laboratory indefinitely. Each sample has a code that includes the year, the species, the gear, the tissue type, and a specific number.

Sample analysis:

Due to logistics constraints in distant water fisheries, tissue samples are not systematically collected in the purse seine fishery. Eventually, some biological samples are taken in the framework of national or international projects. In these cases, the samples are stored in the research centre requested.

ICCAT SMT Research program: review 2018-21 SMTYP: SCRS/P/2021/036 (Lucena F., and Hazin F.), in 2022 for small tunas (LTA, BON & WAH).

Processing of samples for maturity and fecundity:

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2016). Contrasting batch fecundity estimates of albacore (*Thunnus alalunga*), an indeterminate spawner, by different laboratory techniques. FISHERIES RESEARCH. 176, 76-85.

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2015) Stereological comparison of oocyte recruitment and batch fecundity estimates from paraffin and resin sections using spawning albacore (*Thunnus alalunga*) ovaries as a case study. Journal of Sea Research JOURNAL OF SEA RESEARCH. Volumen: 95: 226-238.

Saber, S., Ortiz de Urbina, J., Gillespie K., Poisson F., Coelho R., Rosa D., Puerto, M.A., Macías, D. 2020. A preliminary analysis of the maturity of ICCAT swordfish stocks Collect. Vol. Sci. Pap. ICCAT, 77(3): 537-551.

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Data sets are explored and checked by experts IEO scientific staff. Quality checking for data processing includes automatic analysis of databases producing tables with detected mistakes and a report containing the percentages of mistakes to be corrected.

Once the data arrive at the laboratory, the data are revised by experts to detect errors and cross-checked with both sales notes and logbooks registers. In the case of purse seiners an annual comparison between declared logbooks and estimated catches is made in order to correct species composition and catch based on T3 treatment, taking into account data from sampling at port. This methodology is common to IRD and IEO.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P4_OnShore_all

MS : ESP

Region: Other Regions

Sampling scheme identifier: ESP_IEO_P4_OnShore_all

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings at fishing ports for all species listed in Table 1 of the Commission Delegated Decision (EU) 2021/1167. The scheme covers landings from the Atlantic Ocean and adjacent Seas.

Description of the population

Population targeted:

The primary sampling units (PSU) are the fishing trips. The population targeted is the list of vessels with license to fish for each fishery.

Population sampled:

The entire target population is susceptible to sampling. It will be sampled a representative number of trips of each of the fisheries.

Stratification:

Stratification has been done according to species/metier/area of each fishery. The population was stratified in 9 strata (métier):

- LL_MED_Port: drifting longlines in the Mediterranean Sea.
- BB_BFT_CantabrianSea_IEO_Port: baitboat targeting bluefin tuna in the Cantabrian Sea.
- BB_BFT_Strait_Port: baitboat targeting bluefin tuna in the Strait of Gibraltar..
- HAND_BFT_Strait_Port: handline targeting bluefin tuna in the Strait of Gibraltar.
- BB_ALB_CantabrianSea_IEO_Port: baitboat targeting albacore in Cantabrian Sea
- TROL_ALB_CantabrianSea_IEO_Port: trolling lines in Cantabrian Sea
- LLSWO_ATL_Port: drifting longlines targeting swordfish in the Atlantic Ocean.
- BB_MSP_Canary_Port: baitboat in Canary Islands
- BB_TROP_Dakar_Port: baitboat landing in Dakar.

Sampling design and protocols

Sampling design description:

The PSU will be randomly selected for sampling by spatial and temporal strata. The sampling fraction is considered to be proportional to the total population. The catch fractions depending on the fisheries involved in the sampling design are the commercial landings.

For the baitboat fisheries, sampling will be tentatively covering all landings in the port of Dakar (Senegal). For every trip sampled, the freezing wells where tropical tunas are stored are considered as one.

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

Yes. The sampling design and protocols for the baitboat fishery landing in Dakar have been developed regionally under agreements with IRD (Institut de Recherche pour le développement, France) and other non-EU MS as SFA (Seychelles Fishing Authority), CRO (Centre de Recherches Océanologiques in Abidjan) and CRODT (Centre de Recherche Océanographique de Dakar Thiaroye). Currently, these agreements are not in force but all these states go on working together and following the same protocols for sampling. The sampling activities are standardized for the MS of the EU purse seiner fishery in the central-east Atlantic and in the Indian ocean.

No, in the case of other metiers.

Link to sampling design documentation:

The sampling design follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html;

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines)

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

The sampling protocol follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html;

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

Compliance with international recommendations:

Y.

Sampling implementation

Recording of refusal rate:

N.

Monitoring of sampling progress within the sampling year:

Monitoring of sampling is based on the annual activity of the commercial fleet by spatial and monthly time strata.

In the case of baitboat landing in Dakar (Senegal) the target sampling includes all landings in the main ports. Due to this coverage, no need for allocation of the PSU is needed. Sampling teams are required to provide data on a monthly basis and instructed to report any contingency as it occurs. The sampling of the secondary units (well) is aimed at optimizing the coverage of the different strata (geographical area, set type and month). Therefore, in exceptional circumstances, sampling will try to improve the coverage of undersampled strata.

Data capture

Means of data capture:

Fish are measured at market while landings. The size of the fish is measured using a measuring board, tape or calliper and weights are collected with scales or dynamometers, depending on the fish size. The sampling information is recorded on sheet

forms and later is computerized in a specific DB application developed by the national authority in collaboration with the research centres.

For the baitboat fisheries landing in Dakar (Senegal), information will be collected by using the dedicated software AVDTH: "Acquisition et validation des données de pêche au thon tropical" (see Lechauve, 1999 for further detail: AVDTH98: acquisition et validation des données de pêche au thon tropical (ird.fr)".

Data capture documentation:

The protocol and means for collecting data are described in the port sampling manual of ICCAT. The links: https://www.iccat.int/es/iccatmanual.html.

Quality checks documentation:

N. The data is carefully reviewed by the IEO staff in the laboratory in order to detect errors and inconsistencies in the recorded data before consolidating them. Logbook data are cross-checked against the information provided by the Spanish Fisheries Secretariat and recorded through the ERS.

Our team carries out biannual surveys to the skippers of the longline fishery vessels to test the correct allocation of the trips to metier in the Mediterranean.

Length sampling hard copies are made available together with the keypunched data. In case of detection of anomalies, information is cross-checked between both sources.

Data storage

National database:

The data collected are stored into specific databases designed according to the specificities of the fisheries and into the SIRENO database which is managed by the IEO.

International database:

Agregated data are stored on ICCAT (International Commission for the Conservation of Atlantic Tunas): https://iccat.int/en/accesingdb.html.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Sample storage

Storage description:

Samples for genetic (muscle tissue), reproduction (gonadal tissue), and age and growth (hard parts: otoliths and/or first fin ray of the first dorsal fin) are collected for the main tuna and tuna-like species. The samples are stored in adequate fixative solutions, frozen or stored in boxes in the IEO laboratory store. Samples are stored till they are analyzed or sent to the laboratories in charge to analyze them. A subsample of each genetic or reproductive sample is stored in our laboratory indefinitely. Each sample has a code that includes the year, the species, the gear, the tissue type, and a specific number.

Sample analysis:

Processing of samples for maturity and fecundity:

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2016). Contrasting batch fecundity estimates of albacore (*Thunnus alalunga*), an indeterminate spawner, by different laboratory techniques. FISHERIES RESEARCH. 176, 76-85.

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2015) Stereological comparison of oocyte recruitment and batch fecundity estimates from paraffin and resin sections using spawning albacore (*Thunnus alalunga*) ovaries as a case study. Journal of Sea Research JOURNAL OF SEA RESEARCH. Volumen: 95: 226-238.

Saber, S., Ortiz de Urbina, J., Gillespie K., Poisson F., Coelho R., Rosa D., Puerto, M.A., Macías, D. 2020. A preliminary analysis of the maturity of ICCAT swordfish stocks Collect. Vol. Sci. Pap. ICCAT, 77(3): 537-551.

Farley JH, Williams AJ, Hoyle SD, Davies CR, Nicol SJ (2013) Reproductive Dynamics and Potential Annual Fecundity of South Pacific Albacore Tuna (*Thunnus alalunga*). PLOS ONE 8(4): e60577. https://doi.org/10.1371/journal.pone.0060577

Processing of samples (otoliths/ fin ray) for aging:

Brown-Peterson N.J., Wyanski D.M., Saborido-Rey F., Macewicz B.J. and Lowerre-Barbieri S.K. 2011. A standardized terminology for describing reproductive development in fishes. Marine and Coastal Fisheries: Dynamics Management and Ecosystem Science 3, 52-70.

Campana, S. E. 2001. Accuracy, precision and quality control in age determination, including a review of the use and abuse of age validation methods. Journal of Fish Biology, 59, 197–242 doi:10.1006/jfbi.2001.1668.

Ortiz de Zárate, V, Valeiras, X., and Ruiz, M. 2007. Sampling protocol for skeletal structures of North Atlantic albacore tuna (Thunnus alalunga) and ageing interpretation. Col. Vol. Sci. Pap. ICCAT, 60(2): 492-506.

Ortiz de Zárate, V., E.A. Babcock. 2016. Estimating individual growth variability in albacore (*Thunnus alalunga*) from the North Atlantic stock: Aging for assessment purposes. Fisheries Research 180, 54–66.

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Data sets are examined and checked by IEO experts scientific staff. Quality checking for data processing includes automatic analysis of databases producing tables with detected mistakes and a report containing the percentages of records to be corrected.

Once the data arrive at the laboratory, the data are revised by experts to detect errors and cross-checked with both sales notes and logbooks registers and contacting network sampling staff for improvement in collection of data.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P4_OnShore_sp

MS : ESP

Region: Other Regions

Sampling scheme identifier: ESP_IEO_P4_OnShore_sp

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings at Abidjan (Ivory Coast) and Victoria (Seychelles) ports for bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*) and skipjack tuna (*Katsuwonus pelamis*) as main objetives. The scheme covers landings from the Atlantic and Indian Ocean.

Description of the population

Population targeted:

The primary sampling units (PSU) are the fishing trips. The population targeted corresponds to the list of national purse seine vessels with license to fish in the central-east Atlantic and Indian oceans and landing in the main harbours for both oceans.

Population sampled:

Sampling will tentatively be covering all landings in the ports of Dakar (Senegal) and Abidjan (Ivory Coast), in the Atlantic and in the port of Victoria (Seychelles) in the Indian Ocean.

Stratification:

Stratification has been done according to species/metier/area of fishery. Stratification for purse-seiners has been defined using detailed analyses from the European ET Research Programme (No. 95/37 "Analysis of the Tropical Tuna Multi-species Sampling Scheme"). It is carried out according to three criteria: zone, time and association. The population was stratified in 2 strata (métier):

- PS_ATL_Port: purse seiners in the Atlantic Ocean.
- PS_IND_Port: purse seiners in the Indian Ocean.

Sampling design and protocols

Sampling design description:

The PSU selected for sampling will be randomly selected within each stratum. The sampling teams collect all the PSU information landing in the ports of Dakar (Senegal) and Abidjan (Ivory Coast) in the Atlantic and in the port of Victoria (Seychelles) in the Indian.

For every trip sampled, the freezing wells where tropical tunas are stored are considered secondary sampling units (18-26 by trip, considering the whole catch) of the population. They are selected according to the characteristics of the sets for each one, following spatio-temporal criteria and considering the fishing mode (on tuna schools associated with floating objects (FOB) or on free schools). An average of 3-10 wells per trip are sampled according to the protocols. The number depends on the homogeneity of the strata in the wella and on their availability.

Sampling is carried out concurrently in port, so all the target species involved are selected for the sampling.

Is the sampling design compliant with the 4S principle?:

N

Regional coordination:

Yes. The sampling design and protocols have been developed regionally under agreements with IRD (Institut de Recherche pour le développement, France) and other non-EU MS as SFA (Seychelles Fishing Authority), CRO (Centre de Recherches Océanologiques in Abidjan) and CRODT (Centre de Recherche Océanographique de Dakar Thiaroye). Currently, these agreements are not in force but all these states go on working together and following the same protocols for sampling. The sampling activities are standardized for the MS of the EU purse seiner fishery in the central-east Atlantic ocean and in the Indian ocean.

More information from Pallarés & Petit, (1998 "Tropical tunas: new sampling and data processing strategy for estimating the composition of catches by species and sizes "Collect. Vol. Sci. Pap. ICCAT, 48: 230–246) and Duparc et al. (2019 "Assessment of the species composition of major tropical tunas in purse seine catches: a new modelling approach for the Tropical Tuna Treatment processing. "Pages 1–35 Report of the 21th session of the IOTC Working Party on Tropical Tunas. IOTC, San Sebastián, Spain).

Link to sampling design documentation:

The sampling design follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

The sampling protocols follow RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

Sarralde et al 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

Compliance with international recommendations:

Y.

Sampling implementation

Recording of refusal rate:

N.

Monitoring of sampling progress within the sampling year:

Monitoring of sampling is done on the bases of activity of the commercial fleet by spatial and time strata annually.

Data capture

Means of data capture:

Fish are measured at market while landings. The size of the fish is measured using a calliper depending on the fish size.

Information will be collected by using the dedicated software AVDTH: "Acquisition et validation des données de pêche au thon tropical" (see Lechauve, 1999 for further detail: AVDTH98: acquisition et validation des données de pêche au thon tropical (ird.fr)".

Currently the National Fisheries Authority is developing a new software to streamline the information recorded by the skippers through the ERS (set time, well plan, etc). The data collected during the biological sampling in port will be recorded by the sampling teams in a specific application developed by the National Authority in collaboration with the research centres.

Data capture documentation:

The port observers have protocols for collecting data that follow the recommendations of tuna-RFMOs sampling manuals. The links:

https://www.iccat.int/es/iccatmanual.html

https://www.iotc.org/data-and-statistics

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. (SCRS/2009/43).(https://www.iccat.int/es/pubs_CVSP.html).

Lechauve, J.J. 1999. Acquisition et validation des données de pêche au thon tropical. Document Scientifique et Technique du Centre IRD de Bretagne Doc. Sci. Tech. Cent. de Bretagne IRD (ex ORSTOM) N° 84, mai 1999

https://www.mapa.gob.es/es/pesca/temas/vigilancia-pesquera/manual-cumplimentacion-deav4_tcm30-502219.pdf

Quality checks documentation:

N. The data is carefully reviewed by the EO staff in the laboratory in order to detect errors and inconsistencies in the recorded data before storing them.

Data storage

National database:

The data are stored into specific databases designed according to different strata of the fleet and into the SIRENO database which is managed by the IEO.

International database:

These data are stored on tuna-RFMOs database:

ICCAT (International Commission for the Conservation of Atlantic Tunas): https://iccat.int/en/accesingdb.html

IOTC (Indian Ocean Tuna Commission): https://www.iotc.org/data/datasets

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Sample storage

Storage description:

Sample analysis:

Eventually, some biological samples are taken (spines, gonads, muscle tissue) in the framework of national or international projects. In these cases, the samples are stored in the research centre requested.

ICCAT SMT Research program: review 2018-21 SMTYP: SCRS/P/2021/036 (Lucena F., and Hazin F.), in 2022 for small tunas (LTA, BON & WAH).

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Data sets are explored and checked by experts IEO scientific staff. Quality checking for data processing includes automatic analysis of databases producing tables with detected mistakes and a report containing the percentages of mistakes to be corrected.

Once the data arrive at the laboratory, the data are revised by experts to detect errors and cross-checked with both sales notes and logbooks registers. In the case of purse seiners an annual comparison between declared logbooks and estimated catches is made in order to correct species composition and catch based on T3 treatment, taking into account data from sampling at port. This methodology is common to IRD and IEO.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP_IEO_P5_AtSea

MS: ESP

Region: Other Regions (NAFO) & North-East Atlantic & North Sea and Eastern Arctic

Sampling scheme identifier: ESP_IEO_P5_AtSea

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting fishing data, catches composition (all fractions), length samples and biological parameters from commercial trips at sea operating in international waters of NEAFC & NAFO Regulatory Areas for all species listed in Table 1 of the EU MAP Delegated Decision annex.

Sampling is concurrent but observers priorize sampling of species listed in Table 2.1 of the Spanish Work Plan covered by a commercial sampling scheme for length and the sampling planned in Table 2.2 for biological variables.

Also, VME indicators data, incidental catches of sensitive species and marine litter data are collected.

Description of the population

Population targeted:

The primary sampling units (PSU) are all vessel trips of Spanish trawlers (OTB & OTM) operating in international waters of NEAFC & NAFO Regulatory Areas.

Population sampled:

The target population: is the total number of trips in a year carried out by the Spanish fleet targeting the stocks selected for sampling.

All fishing trips are susceptible to be sampled and sampling is tried to be distributed throughout the year and in all fisheries planned.

Stratification:

The target population includes commercial fleet with similar technical characteristics (freezer trawlers over 40 m length) operating in international waters of NEAFC & NAFO Regulatory Areas. In addition, these vessels operate with fishing licenses that allow them to fish in most of the target fisheries. Often, during the same trip (PSU), a vessel can operate in several areas and with several fishing gears.

For these reasons, the following sampled population have been stratified jointly with a similar sampling plan to be sampled annually:

Region	RFMO	Sampling frame identifier	Area
Other Regions	NAFO	OTB_MDD_40-60-130-280	NAFO Div. 3LMNO
North-East Atlantic	ICES	OTB_DWS_100-129	ICES 12, 6b1
North-East Atlantic	ICES	OTM_DEF_100-119	ICES 12, 14
North Sea and Eastern Arctic	ICES	OTM_DEF_100-119	ICES 1-2
North Sea and Eastern Arctic	ICES	OTB_DEF_>=120	ICES 1-2

In addition, IEO staff that monitor these fisheries are the same for all population sampled which means that same sampling methodologies, implementation and data processing are performed.

Sampling design and protocols

Sampling design description:

The sampling frame is the list of vessels with license to fish in each target fishery.

The selection of the sampling frame is according to to the scientific experience gained from the study of fisheries in the area

Method of PSU selection: Each PSU is selected by a systematic non-random sampling from a list of vessels ranked by the effort of observation on board in previous years by fishery and updated every year. The selection is made by the fisheries authority which granted the fishing license.

The number of fishing trips to be sampled has been calculated based on data from previous years in order to keep the coverage enough to comply the requirements of end users.

The SSU is the fishing haul and is randomly selected.

The method to collect data from commercial fisheries is the concurrent sampling on board carried out by observers at-sea who remain on board throughout the period of the whole fishing trip (1-3 months).

Observers at sea collect data on unsorted catches and discards.

The Sex-ratio index is achieved at the same time of sampling of length which are randomly collected and not stratified. The biological parameters (Weight, Age, Maturity) come from a sampling design stratified by length class.

The data for the estimation of discards and catches structure consist on length data by sex and length-weight relationship collected by trip sampled. Raisings are done for each species by month and division. Finally, a raising is made to the total catch of the fishery.

The calculation to achieve other biological parameters will be estimated based on bootstrap procedures and fitting models with the tool INBIO 2.0* ("Estimation of biological parameters and their uncertainties through simulation techniques") developed in R environment by the IEO.

**Update of "Sampedro, P., Sainza, M. and Trujillo, V., 2005. A simple tool to calculate biological parameters'uncertainty. Working Document, In: Workshop on Sampling Desing for Fisheries Data (WKSDFD), Pasajes, Spain.*

Is the sampling design compliant with the 4S principle?:

Y

Regional coordination:

N

Link to sampling design documentation:

See above: Sampling design description

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

MANUAL DEL OBSERVADOR (http://hdl.handle.net/10261/327457)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

The refusal rate in the last years has been zero because each fishing license is linked to the acceptance of scientific observer on board.

Monitoring of sampling progress within the sampling year:

For each trip sampled an observer on board is appointed preferably with experience in sampling on board in these fisheries.

The training of the observer on board is carried out by technicians from the scientific institute who instruct the observer to carry out the tasks on board.

The observer collects data on paper forms and records them daily on a laptop.

During each sampled trip, the data collected is monitored through periodic email communications between the observer and hers/his coordinator.

The data collected is checked weekly and doubts or sampling problems on board are received and resolved at any time.

Once the observer returns to port, there is an interview with the coordinator and the forms and recorded data are thoroughly reviewed.

All fishing trips are susceptible of being sampled and the goal is share the sampling throughout the year and in all planned fisheries. Sampling needs are reviewed monthly

Usually vessels operating in this area have permissions for fishing with several trawls on the same trip (PSU) for operating in several fisheries. Observers are allocated to vessels but prior there is no accurate information on the planning of vessel activity (gear, areas,). Thus, it is difficult to predict in advance which métiers going to be sampled during the same voyage. Therefore different sampling targets are considered when the vessel operates with different métier.

The main cause of the deviation of the sampling planned is the lasting of the trips in these fisheries and the unpredictability of the permanence of observers in fishing areas due to the decisions taken by vessels' owners in the way of moving vessels among areas. Although the behaviour of the fleet is impossible to change, it is important to improve coordination with the sectors involved: owners and administration authorities.

Data capture

Means of data capture:

Data are captured by the observers at sea using specific recording paper forms for each haul or sampling:

- Fishing Forms.
- Catches Forms.
- Length Sampling Forms.
- Biological Sampling Forms.

- Others Forms (VME Indicators, Incidental Catches)

Length data is collected using a measuring board for fish and cephalopods species and using a digital caliper for crustaceans.

Weight data is collected using marine scales (up to 6 kg and 20 kg) mainly. If the scale does not run properly then observers use dynamometers.

Variables as sex, maturity data is collected "de visu" in according to the protocols.

Data are recorded daily by the observers at sea on a laptop using the software LEJANAS and Excel.

Pictures of VME indicators and incidental by catch are taken by observers using a camera for data validation at the Lab.

Data capture documentation:

Manual ESP_IEO_P5_AtSea_Sampling (Spanish) MANUAL DEL OBSERVADOR (http://hdl.handle.net/10261/327457)

Manual ESP_IEO_P5_AtSea_Recording (Spanish)

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

Manual ESP_IEO_P5_AtSea_VME Indicators (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas).

Quality checks documentation:

N

Documentation will be available at the end of 2022.

Data of each trip, collected and recorded on board, are checked during and after the trip (in the laboratory) in order to detect errors and inconsistencies (detection of outliers, SOP of the length distributions, ranges of variables, etc.)

After the trip, the observer debugs all data, haul by haul and sampling by sampling. Finally, a random check of about 15% of the data is carried out to validate the quality of the results. Annually all sets of data for each fishery are checked previously to be used for assessment and other scientific tasks.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

RDB (Regional Data Base)

InterCatch (ICES areas)

Quality checks and data validation documentation:

Manual SIRENO

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Sample storage

Storage description:

Otoliths collected on board are kept duly labelled waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each sampled trip before reading.

Gonads collected on board are kept in micro-perforated duly labelled plastic bags that are fixed in formaldehyde solution using a special mask during sample handling.

At the lab, ovary samples are stored in 70º alcohol, in outdoor storage rooms located at CO of Vigo. Due to lack of space, only a sample of the gonads that may be of interest for further studies are kept. On the other hand, all of the histological sections and slides are stored. The collection is in the CO of Vigo.

Sample analysis:

Age

Otoliths reading and age estimation follow the agreements and recomendations of related workshops.

Maturity

To improve the quality of the maturity data, a workshop is held annually to review the different maturity stages of the main bony fish species, and of sharks and rays both oviparous and ovoviviparous. Maturity manuals for each of the species are available onboard to scientific observer. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes sampled. The gonad is shown inside the fish as seen in biological sampling, and also outside the fish and in detail.

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

ICES WK and WG documents related to biological parameters

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Data processing

Evaluation of data accuracy (bias and precision):

N

Documentation will be available at the end of 2022.

The refusal rate in the last years has been zero because each fishing license is linked to the acceptance of scientific observer on board.

The observer programs on board have manuals and protocols that define the objectives and tasks.

The methodology used to improve the data quality include the next tools:

- Exploratory data analysis to detect outliers and errors from hauls, catches, length and biological sampling.
- Plotting hauls positions: checking the allocation of geographic strata.
- Checks of CPUEs.
- Scatter plots of length and biological samplings.
- SOP factor of length / weight for biological samplings.
- SOP factor of sample weights to identify errors and quantify the quality of the sampling.
- Tools of the ESP_IEO_P5_AtSea software and script in R for the calculation of uncertainty for raising.
- Estimation of the biological parameters and their uncertainties carried out using the tool INBIO 2.0 (“Estimation of biological parameters and their uncertainties through simulation techniques”), developed in R environment by the IEO.

In addition, quality controls are also performed:

Implementation of sampling protocols for each species where the methodologies of sampling, processing and storage of samples are described.

Processing, debugging and periodic checking of data.

Standardization of the common criteria in assigning maturity and age of each species, in order to improve the accuracy

Attendance to workshops and/or exchanges between different scientific teams

Editing and imputation methods:

N

Documentation will be available at the end of 2022

Typing errors of sample data are corrected or excluded.

Outliers and poor quality sampling data are excluded.

Extrapolations to others temporal and geographical strata (months, areas,..) when data is lacking.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Biological parameters are checked in R INBIO 2.0.

In general, for each fishery, final datasets are validated taking into account the guidelines and formats of the data calls for the end users, mainly assessment Working Groups and NAFO, ICES and RCGs:

RFMO	Sampling frame identifier	Area	End User
NAFO	OTB_MDD_40-60-130-280	NAFO Div. 3LMNO	NAFO SC, RCG LDF?
ICES	OTB_DWS_100-129	ICES 12, 6b1	WGDEEP, RCG NANSEA
ICES	OTM_DEF_100-119	ICES 12, 14	NWWG, RCG NANSEA
ICES	OTM_DEF_100-119	ICES 1-2	AFWG, RCG NANSEA
ICES	OTB_DEF_>=120	ICES 1-2	AFWG, RCG NANSEA

AR comment:

Links to Observer's Manual (MANUAL DEL OBSERVADOR) has been updated.

Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR

MS: ESP

Region: Other Regions (CCAMLR)

Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR

Sampling scheme type: Commercial and exploratory fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

The sampling scheme aims to collect at sea fishing data, catch composition (all fractions) and biological parameters from exploratory and commercial trips operating in CCAMLR waters

Sampling is concurrent but observer's priority is to sample target species (*Dissostichus mawsoni* and *Dissostichus eleginoides*) and bycatch (Macrourids and others).

Observers record information on the gear configuration (including measures to reduce incidental mortality of seabirds and marine mammals), fishing operations (including catch composition), biological measurements of target and by-catch species, details of fish tagging and tag-recaptures, vessel sightings and data on indicators of vulnerable marine ecosystems. All of these data are submitted by observers to the CCAMLR Secretariat on standardised logbook forms designed for longline, trawl (finfish and krill) and pot (crabs and finfish) fisheries.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the vessel trip, that is sampled onboard the Spanish logline fleet (LLS) operating in CCAMLR Regulatory Area.

Population sampled

The target population: Toothfish (Dissostichus spp) stocks in subareas 88.1 and 48.6.

Fishing trips occur in the austral summer (Nov-March) due to the ice condition, unsuitable in other periods.

Stratification:

For management purposes there are differentiate stocks in both subareas. Subarea 88.1 is an exploratory fishery while subarea 48.6 is a poor-data area therefore a research plan is needed. During the same trip (PSU), the vessel operates in several subareas.

For these reasons, the following sampled population have been described with a similar sampling plan:

Region	RFMO	Sampling frame identifier	Area
Other Regions	CCAMLR	ESP_IEO_P5_AtSea_CCAMLR	CCAMLR subarea 88.1
Other Regions	CCAMLR	ESP_IEO_P5_AtSea_CCAMLR	CCAMLR subarea 48.6

Sampling design and protocols

Sampling design description:

All fishing vessels have two observers onboard, one International and the other National. The International observer is selected following the SISO (Scheme of International Scientific Observation) protocol:

https://www.ccamlr.org/en/document/publications/text-ccamlr-scheme-international-scientific-observation.

Method of PSU selection: According to CCAMLR Conservation Measures, it is compulsory to sample all fishing vessels.

The SSU is the fishing haul and is randomly selected.

The method to collect data from commercial fisheries is the concurrent sampling on board carried out by two observers at-sea who remain on board throughout for the entire fishing trip (4-5 months).

Observers at sea collect data on unsorted catch, bycatch and discards following the SISO manual :

https://www.ccamlr.org/en/document/science/scientific-observers-manual-%E2%80%93-finfish-fisheries-%E2%80%93-version-2020

An Observer sampling requirements for *Dissostichu*s spp. can be found on the CCAMLR website:

https://www.ccamlr.org/en/science/observer-sampling-requirements-dissostichus-spp

The biological parameters (Weight, sex, Maturity) come from a randomly collected sampling design.

The data for the estimation of discards and catch structure consist on length data and weight sampled. Raisings are done for each species to the total catch of the fishery.

Tag/recapture data is essential for stock assessment using CASAL package developed in the R environment. A tagging rate is set, which is different depending on the area:

https://www.ccamlr.org/en/document/science/toothfish-and-skate-tagging-methods

Other biological parameters are estimated in the laboratories, such as the age estimation that is based on otolith readings from samples collected on board.

Is the sampling design compliant with the 4S principle?:

Y

Regional coordination:

N

Link to sampling design documentation:

https://www.ccamlr.org/en/document/science/scientific-observers-manual-%E2%80%93-finfish-fisheries-%E2%80%93-version-2020

Compliance with international recommendations:

Y

Link to sampling protocol documentation.

https://www.ccamlr.org/en/science/information-technical-coordinators-and-scientific-observers

https://www.ccamlr.org/en/document/publications/text-ccamlr-scheme-international-scientific-observation

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

There are two observers on board, following the SISO requirements, one of which is international while the other is national. Usually they work onboard in 12-hour shifts.

The training of the National observer is carried out by technicians from the IEO (Spanish Institute of Oceanography). The International observer is trained following the SISO programme.

A national coordinator is appointed by CCAMLKR from each Party.

Observers collect the data manually and process it on a laptop on a daily basis.

The data collected is monitored through periodic emails between observers and coordinators.

Once the observer returns to port, 5 working days are devoted to review the data and samples collected, codification of photographs and to finish the observer report.

Sampling needs are reviewed monthly.

The vessel operating in this area has permissions for fishing only with set bottom long line (PSU) for commercial and exploratory fishing. The sampling is planned in advance. Usually the number of samples from the research proposals in subarea 48.6 is higher as the aim is to obtain the maximum data to be able to carry out the stock assessment as soon as possible.

They could be different causes of deviation of the sampling planned, being the main the “ice condition”. When the concentration of the ice is high the vessel cannot work. An additional cause of deviation could be that the vessel runs out of oil, having to shorten the campaign.

It is important to improve coordination with the sectors involved: owners and administration authorities.

Data capture

Means of data capture:

Data are recorded daily by the observers at sea on a laptop using the CCAMLR forms

- Fishing Forms.
- Catches Forms.
- Biological Sampling Forms.
- Tag and recovery forms
- Others Forms (VME Indicators, Incidental Catches)

Length data is collected using a measuring board for fish.

Weight data is collected using marine scales (20 kg) mainly.

Other parameters as sex and maturity data are collected “de visu” according with the SISO manual.

https://www.ccamlr.org/en/node/74773.

Pics of VME taxa indicators and incidental by catch are taken by observers using a camera.

A tagging protocol is in place.

Data capture documentation:

Longline fisheries data and cruise report forms

https://www.ccamlr.org/en/node/74773

Instructions for sampling protocols and methods

https://www.ccamlr.org/en/science/information-technical-coordinators-and-scientific-observers

CCAMLR data forms

https://www.ccamlr.org/en/data/forms

By-catch identification and educational material for use by observers on vessels

https://www.ccamlr.org/en/document/science/common-catch-species-ccamlr-longline-and-trawl-fisheries

https://www.ccamlr.org/en/document/publications/fishes-ross-sea-region-%E2%80%93-field-guide-common-species-caught-longline-fishery

https://www.ccamlr.org/en/document/science/dissostichus-eleginoides-gonade-maturity-guide

VME-taxa-classification-guide

https://www.ccamlr.org/en/document/publications/vme-taxa-classification-guide

Other training materials for observers

https://www.ccamlr.org/en/document/science/seabird-identification-%E2%80%93-photographic-guide-observers-sea-southern-indian-ocean

https://www.ccamlr.org/en/document/science/whale-depredation-%E2%80%93-data-collection-guidelines

https://www.ccamlr.org/en/science/observer-self-training-guide

Quality checks documentation:

Y

Data collected and recorded on board of each trip are checked during and after the trip (in the laboratory) in order to detect errors and inconsistencies (detection of outliers, SOP of the length distributions, ranges of variables, etc.)

After the trip, the observer debugs all data, haul by haul and samples. Finally, a random check of about 15% of the data is carried out to validate the quality of the results. Annually all sets of data for each fishery are checked to be used for assessment and other scientific tasks by members and CCAMLR Secretariat.

Data storage

National database:

NA

International database:

CCAMLR Secretariat hosts the Database:

https://www.ccamlr.org/en/data/data

Quality checks and data validation documentation:

CCAMLR Secretariat validates the data together with the National coordinators that are the owners of the data.

Sample storage

Storage description:

Otoliths collected on board are kept duly labelled in waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each sampled trip.

Sample analysis:

Age

There is a link to a otolith library with a repository of images in order to validate other readings:

https://www.ccamlr.org/en/science/otolith-library

Maturity

Maturity indexes are in the SISO manual. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes. The gonad is shown both inside the fish as seen in biological sampling and outside the fish.

Data processing

Evaluation of data accuracy (bias and precision):

N

Documentation will be available at the end of 2022.

The refusal rate in the past years is zero because each fishing license is linked to the acceptance of the two scientific observers on board.

The observer programs on board have manuals and protocols that define the objectives and working tasks.

The methodology used to improve the data quality include the next tools:

- Exploratory data analysis to detect outliers and errors from hauls, catches, length and biological sampling.
- Plotting hauls positions: checking the allocation of geographic strata.
- Checks of CPUEs.
- Checks of Species taxa.
- Scatter plots of length and biological samplings.
- SOP factor of length / weight for biological samplings.
- SOP factor of sample weights to identify errors and quantify the quality of the sampling.

Editing and imputation methods:

N

Documentation will be available at the end of 2022

Typing errors of sample data are corrected or excluded.

Outliers and poor quality sampling data are excluded.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final validation is made between the CCAMLR Secretariat and the National coordinator. Every outlier/potential error is getting back to the coordinator who checks the data together with the observer.

AR comment: No deviations or developments.

Sampling scheme identifier: FCGS

MS:ESP
Region: Other Regions
Sampling scheme identifier:FCGS
Sampling scheme type: Research Survey at Sea
Observation type: SciObsAtSea
Time period of validity: from 2022 until 2027
Short description (max 100 words):

The objective of the survey is to know the stock status of target species: their abundance, biomass and demographic structure and the hydrographical and environmental conditions on the Flemish Cap Bank (NAFO Division 3M).

Description of the population

Population targeted:

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*)

Area: Flemish Cap Bank (NAFO Regulatory Area Division 3M). Flemish Cap is entirely outside any 200-mile EEZ, and the exploitation of its resources is regulated by the NAFO.

Dates: The survey starts in the second half of June, and needs 35 days at sea.

Population sampled:

All fish, cephalopods, shrimp and non-commercial invertebrates.

Flemish Cap is an isolated bank on the American continental shelf, with an approximated surface of 17 000 squared nautical miles within the 1460 m (800 fathoms) isobath and 10 555 within the 730 m (400 fathoms). Flemish Pass, an area deeper than 1000 m, separates it from the Newfoundland Grand Bank and gives it its isolated character by limiting the migration of many species, particularly those occurring in the shallowest zones.

The trawling gear used is the Lofoten and the cod-end mesh size is 35 mm. An auxiliary net bag of 10 mm mesh size is used to retain the youngest individuals of shrimp escaping throw an small square of the cod-end

Stratification:

Random stratified survey of the Flemish Cap area until 1460 m (800 fathoms) depth, making 181 bottom trawl hauls with a Lofoten fishing gear, at daytime: between 6:00 and 22:00, and 30 minutes effective fishing time.

The adopted stratification of Flemish Cap (Table 1) considers 19 strata up to 730 m (400 fathoms) depth. Stratification was later extended to cover up to 1460 m (800 fathoms) depth, considering 39 strata. Two strata of this bank (numbers 26 and 27) have fishing grounds unsuitable for trawling due to the huge abundance of sponges, and the same goes for the five strata belonging to the Beothuk Knoll (numbers 35–39) due, presumably, to the massive presence of corals.

All these strata have been removed from the survey, resulting in the current 32 strata surveyed. Each stratum is divided in rectangles of equal area. i.e. the number of rectangles is proportional to the stratum area. A total of 478 rectangles are therefore considered in the current survey design. Each rectangle is in turn divided in 10 fishing units of equal area, leading to 4780 possible bottom trawl fishing hauls.

Table 1. Specification and characteristics of the survey area, and number of selected hauls.

	Area sq. miles	Strata	Rectangles	Fishing units	Selected hauls
depth < 730 m	10 555	19	309	3 090	120
depth: 730–1 460 m	5 515	13	169	1 690	61
Total	16 070	32	478	4 780	181

Sampling design and protocols

Sampling design description:

Type of survey

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. 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.

Trawl station methodology

181 hauls will be selected at random, 120 of them in less than 730 m depth.

The selection of the hauls is set with the following conditions:

- The number of hauls in each stratum is fixed, distributed proportionately to the number of units, and ensuring at least two hauls by stratum.

- Hauls (fishing units) are randomly chosen within each stratum with the following constrains: only one haul can be selected within a given rectangle, and two hauls cannot coincide in adjacent fishing units.
- Information from previous surveys and commercial fishing is used to eliminate hauls in unsuitable fishing grounds.
- The allocation of the hauls into each fishing unit could be made more accurate using the bathymetry of the area obtained by the NEREIDA project, reducing the risks of snagging in the bottom.

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

No. There is not signed agreement about task sharing.

The survey is carried out by Spain and Portugal and annually there is a joint coordination meeting ad hoc for this survey. (FCCM)

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

Link to sampling design documentation:

https://archive.nafo.int/open/studies/s46/S46.pdf

Compliance with international recommendations:

Y

Link to sampling protocol documentation

https://archive.nafo.int/open/studies/s46/S46.pdf

Compliance with international recommendations:

Y

The results of the survey are used by the NAFO Scientific Council to make an assessment on the state of the resources, which is the key tool for the NAFO Commission to take the appropriate management measures.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The criterion used to change the position of a previously selected random haul has always been the information from the commercial fishing and from previous surveys about the suitability of the bottom trawling. This information is contrasted with the more detailed bathymetric charts of the bottom that have been developed in the project NEREIDA.

Criteria for rejecting a haul:

- Snag of the trawling gear in the bottom.
- Damages in the cod-end or severe damages in large sections of the wings or belly.
- Less than 20 minutes of effective trawling time.
- Gear malfunction, i.e., when it is considered that gear contact with bottom was not correct, or the geometry of the gear was not maintained properly through the whole trawl.

Rejected fishing hauls means that, because standard conditions were not achieved, such station cannot be used to quantify the biomass and abundance neither to determine the structure of the population. However, the specimens caught in any non-valid hauls can be used to make all kind of biological sampling.

The order of execution of selected stations is determined during the survey, setting each day the hauls to be held the next day, trying to minimize the routes between stations.

A detailed plan of the order of the stations is impractical because it is necessary to make changes due to unforeseen malfunction of the gear (e.g. obstruction, breakages…).

The distance travelled in each haul is the geographical distance between the GPS positions of the start of the haul (when the gear comes into contact with the bottom and it acquires its characteristic shape) and the start of the haulin (when cable starts to be recovered).

The development of the survey depends on the weather conditions and other factors (breakdowns, gear damages, etc.), so that the final fishing plan is decided on board day to day in order to optimize the use of the working day.

Every year, issues about logistic, sampling plan and protocols are discussed in the coordination meeting (FCCM) (Mar-Apr) previously to the survey (Jun-Jul)

Data capture

Means of data capture:

Trawl hauls

The trawling gear used is the Lofoten and the cod-end mesh size is 35 mm. An auxiliary net bag of 10 mm mesh size is used to retain the youngest individuals of shrimp escaping throw an small square of the cod-end.

ScanMar and, ITI sensors are used to monitor the gear.

Fishing hauls and Catch Record. A haul's data form is filled in each set. It will contain information gathered in the bridge during and immediately after finishing the haul, as well as catch information by species. This form is available in the sampling area before sorting the catch starts. There are two forms, one for depth < 700 m. and another one for > 700 m. There is a space reserved for sums and calculations. Catch record. All fish species, as well the commercial cephalopods and crustacean are recorded.

Biological data

Length sampling. The length frequency of each species is recorded in separated data forms. Length measurements are made by at least two persons, so that always a person measure and other records. The lengths shall be recorded in the appropriate data form for this purpose After the measurement, it is clearly indicated the beginning and end of the size range and measures are counted and registered the total number of individuals measured by size. For species with sex discrimination, frequencies are recorded in separate columns with indication of the sex on headings.

Biological sampling. In each haul a full biological sampling is done for the most of target species by two observers and always a person measure and other writes down data in the form. Control sheets for each species are available at the beginning of each day based on data collected from previous hauls.

Length data is collected using a measuring board for fish and cephalopods species. For crustaceans, sampling is made using a digital caliper connected to a laptop that records length data automatically to an Excel file.

Weight data is collected using marine scales.

Stomach contents

Stomach sampling. This sampling is done every two years as a minimum, and it is under the exclusive task of two observers that always a person measure and other records data in a specific form. Sampling data is recorded in a specific software of the Trophic Relationships.

Benthos in the trawl

Benthonic invertebrates. Non-commercial invertebrates, sponges and corals among them, are recorded in a specific data form. Catch records are written down in a specific data form where weight and number of each best identified group is noted, as well as any observation. A photographic record is made of the whole invertebrate catch.

Litter items

Marine litter data is registered and written down in the haul´s form for their classification according to the established code. In addition, a photographic record of it is made.

Hydrography-CTD

Temperature and salinity profile using a CTD. The files generated in each station * .hex must be checked and converted to ASCII files by means of the SBD data processing program.

All survey data are captured using specific recording specific paper forms.

All data recorded during the survey are entered in a computer as soon as possible, as data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc software called ARGO. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data capture documentation:

https://archive.nafo.int/open/studies/s46/S46.pdf

https://digital.csic.es/bitstream/10261/95007/1/scr13-021_protocols_EU.pdf

3M Flemish Cap 2024 Survey Plan (in English, pp. 44–57)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

http://www.ieo.es/es_ES/web/ieo/pndb. (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Quality checks documentation:

https://archive.nafo.int/open/studies/s46/S46.pdf

(See: Validation of Survey Results, pg 14)

All data recorded during the survey are entered in a computer as soon as possible, data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc program, ARGO. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data storage

National database:

National Database: SIRENO (IEO)

Survey Database: ARGO (IIM-CSIC)

Stomach contents: DataBase Trophic Relationships (IEO)

International database:

VME Indicators: ICES VME database (http://vme.ices.dk)

Hydrography-CTD: IODE/SeaDataNet

Quality checks and data validation documentation:

https://archive.nafo.int/open/studies/s46/S46.pdf

(See: Validation of Survey Results, pg 14)

All data recorded during the survey are entered in a computer as soon as possible, as data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc program, ARGO. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Sample storage

Storage description:

Age

Otoliths collected on board are kept duly labelled waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each species before reading.

Maturity

Gonads collected on board are kept in micro-perforated duly labelled plastic bags that are fixed in formaldehyde solution using a special mask during sample handling. Gonads on board are kept in containers by species.

At the lab, ovary samples are stored in 70º alcohol, in outdoor storage rooms located at labs. . Due to lack of space, only a sample of the gonads that may be of interest for further studies are kept. On the other hand, all of the histological sections and slides are stored.

The samples of otoliths and gonads are stored in the three Institutes of MS participants: IEO and IIM-CSIC (Vigo, Spain) and IPMA (Lisbon, Portugal) in according of the task sharing by species.

Shrimp (*Pandalus borealis*) samples

Additional samples are taken for study in laboratory to calculate the length-weight relationship. These samples are frozen on board. Samples are taken from all strata. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) until they are sampled.

Benthonic invertebrates

All specimens of less frequent species are retained, particularly those from species not included in the invertebrates' identification cards or those with uncertain or incomplete classification. Samples are stored in plastic bags, labelled with survey, haul and species, and they are preserved in the appropriate conservation media.(alcohol and formalin).

Taxonomy

If some species are not identified on board, individuals are labelled, frozen and stored in boxes for their study in the lab. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) until they are identified by experts.

Sample analysis:

To improve the quality of the maturity data, a workshop is held prior to the surveys in NAFO waters to review the different maturity stages of the main bony fish species, and of sharks and rays both oviparous and ovoviviparous.

Maturity manuals for each of the species are available onboard to scientific staff for each species. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes sampled in the study area. The gonad is shown inside the fish as seen in biological sampling, and also outside the fish and in detail. Those stages for which photographs of individuals captured in the study area are not available are illustrated with photographs of the reports of the ICES maturity workshops that were carried out for the correspondent species.

https://archive.nafo.int/open/studies/s46/S46.pdf

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb. (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Survey Plan FCGS 2021 (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb. (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Data processing

Evaluation of data accuracy (bias and precision):

Y

https://archive.nafo.int/open/studies/s46/S46.pdf

(See: Data analysis, pg 13)

Editing and imputation methods:

Y

https://archive.nafo.int/open/studies/s46/S46.pdf

(See: Data analysis, pg 13)

Quality document associated to a dataset:

N

Validation of the final dataset:

Final datasets are validated taking into account the guidelines and formats of SC- NAFO.

https://archive.nafo.int/open/studies/s46/S46.pdf

(See: Validation of Survey Results, pg 14)

AR comment:

Data capture:

New links to survey manual and to 3M Flemish Cap 2024 Survey Plan.

Sampling scheme identifier: PLATUXA_ESP

MS:ESP

Region: Other Regions

Sampling scheme identifier:PLATUXA_ESP

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

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 Regulatory Area Div. 3NO and 3L).

The survey is divided in two parts:

- 1st part Div 3NO. National Name of the research survey: Platuxa
- 2nd part Div 3L. National Name of the research survey: Fletán Negro 3L

Description of the population

Population targeted:

1st part Div 3NO: Platuxa

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*).

Area: NAFO Regulatory Area Div. 3NO.

Dates: The survey starts in the second half of May, and needs 30 days at sea including sailing days.

2nd part Div 3L: Fletán Negro 3L

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*)

Area: NAFO Regulatory Area Division 3L (Flemish Pass).

Dates: The survey starts in early August, and needs 28 days at sea including sailing days

The area of both surveys is entirely outside any 200-mile EEZ, and the exploitation of its resources is regulated by the NAFO.

Population sampled:

All fishes, cephalopods, shrimp and non-commercial invertebrates.

The 1st part of the survey (Platuxa) is carried out between the lines of the Canadian EEZ and 46º 00´N and 46º 30´W. The depth range of the fishing hauls is from 57 to 1281 m.

The 2nd part of the survey (Fletán Negro 3L) is carried out between the lines of the Canadian EEZ and 46º 00´N and 48º 30´W. The depth range of the fishing hauls is from 93 to 1463 m.

The trawling gear used is a Campelen 1800 type and the cod-end mesh size is 44 mm.

Stratification:

Apart from the geographical and temporal stratification described in the section "Population targeted"

The stratification reflects the bathymetric profile of the Bank, with large strata in the shallow area and very narrow strata in the cliff. The strata are divided into units with an approximate area of 35 nm2, which in turn are divided into 10 cells of about 3 nm2. These cells are the units on which the sampling is based.

Depending on the extent of each stratum, between 2 and 20 cells per stratum are randomly selected for fishing hauls. For the subsequent statistical analysis of the data, it is essential that there be a minimum of two hauls per stratum.

Sampling design and protocols

Sampling design description:

Type of survey

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.

Trawl station methodology

The selection of the hauls is set with the following conditions:

- The number of hauls in each stratum is fixed, distributed proportionately to the number of units, and ensuring at least two hauls by stratum.
- Hauls (fishing units) are randomly chosen within each stratum with the following constrains: only one haul can be selected within a given rectangle, and two hauls cannot coincide in adjacent fishing units.
- Information from previous surveys and commercial fishing is used to eliminate hauls in unsuitable fishing grounds.
- The allocation of the hauls into each fishing unit could be made more accurate using the bathymetry of the area obtained by the NEREIDA project, reducing the risks of snagging in the bottom.

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

No

Link to sampling design documentation:

New links to survey manual (in Spanish):

https://digital.csic.es/handle/10261/328269

3LNO Groundfish (1st part, 3NO Platuxa 2024 Survey Plan (in English, pp. 15–32)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

3LNO Groundfish (2nd part, 3L) 2024 Survey Plan (in English, pp. 68–82)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

Compliance with international recommendations:

Y

The results of the survey are used by the NAFO Scientific Council to make an assessment on the state of the resources, which is the key tool for the NAFO Commission to take the appropriate management measures.

Link to sampling protocol documentation:

See Link to sampling design documentation.

Compliance with international recommendations:

Y

The results of the PLATUXA_ESP are used by the NAFO Scientific Council to make an assessment on the state of the resources, which is the key tool for the NAFO Commission to take the appropriate management measures.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The fishing hauls plan to be carried out during each annual survey is planned prior to it. However, the progress of the survey may require some changes in the planned hauls.

Moving any of the hauls initially planned in the fishing plan is acceptable as long as the number of hauls per stratum is maintained. For statistical reasons, in extreme situations that impede the normal development of the survey and force the elimination of hauls, it is necessary to try to achieve a minimum of two hauls per stratum, being preferable to leave some strata unsampled rather than having only one sample per stratum. If the situation permits, the elimination of strata from the fishing plan should take into account the hauls in previous years in these strata, so that the strata eliminated are those with the least annual variability.

The fishing hauls are standardized, and to be valid they require a speed of 3.0 knots and an effective trawl duration of 30 minutes, controlled by the sensors located on the rig and the doors (SCANMAR and ITI). The start point is defined as the point when the vertical and horizontal openings of the gear stabilize after having made firm. Fishing ends when the gear loses contact with the bottom.

Criteria for rejecting a haul:

- Snag of the trawling gear in the bottom.
- Damages in the cod-end or severe damages in large sections of the wings or belly.
- Less than 20 minutes of effective trawling time.
- Gear malfunction

The development of the survey depends on the weather conditions and other factors (breakdowns, gear damages, etc.), so that the final fishing plan is decided on board day to day in order to optimize the use of the working day.

Data capture

Means of data capture:

Trawl hauls

The trawling gear used is the Campelen 1800 type and the cod-end mesh size is 44 mm ScanMar, Marport and ITI sensors are used to monitor the gear.

Fishing hauls and Catch Record. A haul's data form is filled in each set. It will contain information gathered in the bridge during and immediately after finishing the haul, as well as catch information by species. This form is available in the sampling area before sorting the catch starts. Catch record. All fish species, as well the commercial cephalopods and crustacean are recorded.

Biological data

Length sampling. The length frequency of each species is recorded in separated data forms. Length measurements are made by at least two persons, so that always a person measure and other records. The lengths shall be recorded in the appropriate data form for this purpose After the measurement, it is clearly indicated the beginning and end of the size range and measures are counted and registered the total number of individuals measured by size. For species with sex discrimination, frequencies are recorded in separate columns with indication of the sex on headings.

Biological sampling. In each haul a full biological sampling is done for the most of target species by two observers and always a person measure and other writes down data in the form.

Control sheets for each species are available at the beginning of each day based on data collected from previous hauls.

Length data is collected using a measuring board for fish and cephalopods species. For crustaceans, sampling is made using a digital caliper connected to a laptop that records length data automatically to an Excel file.

Weight data is collected using marine scales.

Stomach contents

Stomach sampling. This sampling is done every two years as a minimum, and it is under the exclusive task of two observers that always a person measure and other records data in a specific form. Sampling data is recorded in specific software of the Trophic Relationships.

Benthos in the trawl

Benthonic invertebrates. Non-commercial invertebrates, sponges and corals among them, are recorded in a specific data form. Catch records are written down in a specific data form where weight and number of each best identified group is noted, as well as any observation. A photographic record is made of the whole invertebrate catch.

Litter items

Marine litter data is registered and written down in the haul´s form for their classification according to the established code. In addition, a photographic record of it is made.

Hydrography-CTD

Temperature and salinity profile using a CTD. The files generated in each station * .hex must be checked and converted to ASCII files by means of the SBD data processing program.

All survey data are captured using specific recording specific paper forms.

All data recorded during the survey are entered in a computer as soon as possible, as data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in ad-hoc software called LEJANAS.CAM. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data capture documentation:

New links to survey manual (in Spanish):

https://digital.csic.es/handle/10261/328269

3LNO Groundfish (1st part, 3NO Platuxa 2024 Survey Plan (in English, pp. 15–32)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

3LNO Groundfish (2nd part, 3L) 2024 Survey Plan (in English, pp. 68–82)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Quality checks documentation:

See Link to data capture documentation

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

All data recorded during the survey are entered in a computer as soon as possible, data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc software LEJANAS.CAM. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data storage

National database:

National Database: SIRENO (IEO)

Survey Database: LEJANAS.CAM

Stomach contents: RT DataBase Trophic Relationships (IEO)

International database:

VME Indicators: ICES VME database (http://vme.ices.dk)

Hydrography-CTD: IODE/SeaDataNet

Quality checks and data validation documentation:

All data collected is recorded on specific paper forms and then it is recorded in the computer system as described previously. The verification of the stored data follows the following steps:

1. The data of each fishing haul, once recorded, are listed to verify that the data indicated is the same as that which appears in the forms. For this, complete lists with formats similar to each of the forms will be available.

2. At the end of the survey: the length-weight ratio of each species is updated and possible discrepancies between length and weight are checked. If the discrepancy is due to a rectifiable error, it will be corrected in the original form in another colour, to recognize the original item and the corrected.

3. For each species, using the best available length-to-weight ratio, the weight of the sample corresponding to each of the length measurements is recalculated. The discrepancies between the indicated sample weight and the recalculated weight cannot be greater than 15%.

The results of the survey are presented annually to the NAFO Scientific Council in several documents.

New links to survey manual (in Spanish):

https://digital.csic.es/handle/10261/328269

3LNO Groundfish (1st part, 3NO Platuxa 2024 Survey Plan (in English, pp. 15–32)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

3LNO Groundfish (2nd part, 3L) 2024 Survey Plan (in English, pp. 68–82)):

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-259.pdf

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Sample storage

Storage description:

Age

Otoliths collected on board are kept duly labelled waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each species before reading.

Maturity

Gonads collected on board are kept in micro-perforated duly labelled plastic bags that are fixed in formaldehyde solution using a special mask during sample handling. Gonads on board are kept in containers by species.

At the lab, ovary samples are stored in 70º alcohol, in outdoor storage rooms located at labs. Due to lack of space, only a sample of the gonads that may be of interest for further studies are kept. On the other hand, all of the histological sections and slides are stored.

The samples of otoliths and gonads are stored in the lab (IEO: C.O. Vigo)

Shrimp (*Pandalus borealis*) samples

Additional samples are taken for study in laboratory to calculate the length-weight relationship. These samples are frozen on board. Samples are taken from all strata. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) until they are sampled.

Benthonic invertebrates

All specimens of less frequent species are retained, particularly those from species not included in the invertebrates' identification cards or those with uncertain or incomplete classification. Samples are stored in plastic bags, labelled with survey, haul and species, and they are preserved in the appropriate conservation media.(alcohol and formalin) and kept in containers. The samples are stored in the lab (IEO: C.O. Vigo) to be sampled by experts.

Taxonomy

If some species are not identified on board, individuals are labelled, frozen and stored in boxes for their study in the lab. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) to be sampled by experts.

Sample analysis:

To improve the quality of the maturity data, a workshop is held prior to the surveys in NAFO waters to review the different maturity stages of the main bony fish species, and of sharks and rays both oviparous and ovoviviparous.

Maturity manuals for each of the species are available onboard to scientific staff for each species. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes sampled in the study area. The gonad is shown inside the fish as seen in biological sampling, and also outside the fish and in detail. Those stages for which photographs of individuals captured in the study area are not available are illustrated with photographs of the reports of the ICES maturity workshops that were carried out for the correspondent species.

See Link to Quality checks and data validation documentation

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Data processing

Evaluation of data accuracy (bias and precision):

Y

See Link to Quality checks and data validation documentation

Editing and imputation methods:

See Link to Quality checks and data validation documentation

Quality document associated to a dataset:

No

Validation of the final dataset:

Final datasets are validated taking into account the guidelines and formats of SC- NAFO.

See Link to Quality checks and data validation documentation

AR comment:

Description of the population, Data Capture, Data storage, Sampling storage, Data procesing

Update the links to survey protocols.

Typographical errors:

- The common name of this species in the section “Population targeted: / 2nd part Div 3L: Fletán Negro 3L / Target species:” – "Bllack dogfish" should be "Black dogfish".
- The dates in the section “Population targeted: / 2nd part Div 3L: Fletán Negro 3L / Dates:” – "The survey starts in the second half of July" should be "The survey starts in early August".
- The name of the survey in the section “Sampling design and protocols / Sampling design description: / Compliance with international recommendations:” – "The results of the FCGS" should be "The results of the PLATUXA_ESP".
- The name of the sensors in the section “Data capture / Means of data capture: / Trawl hauls” – "ScanMar and, ITI sensors" should be "ScanMar, Marport and, ITI sensors".
- The Survey Database in the section “Data storage / National database: / Survey Database:” – "ARGO (IIM-CSIC)" should be "LEJANAS.CAM".
- Stomach contents in the section “Data storage / National database: / Stomach contents:” – "Sstomach" should be "Stomach".
- The name of the database in the section “Data storage / National database: / Stomach contents:” "DataBase Trophic Relationships (IEO)" should be "RT DataBase Trophic Relationships (IEO)."

Sampling scheme identifier: IBTS_Q4 (8c y 9a north)

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBTS_Q4

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

IBTS_Q4 (8c y 9a north)

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from bottom-trawl hauls used to provide information useful for the EU CFP to assess the relative abundance of the following demersal and benthic fish species included in Table 2.2 of the WP. (See Text Box 2.6)

Description of the population

Population targeted:

The survey area corresponds to the **Spanish shelf waters off Galicia and the Cantabrian sea (30-500 m depth), ICES subdivisions 9a North and 8c**, and it is conducted in autumn, September-October. The bottom-trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main demersal and benthic fish inhabiting the Galician and Cantabrian shelf. The main assessed target species are those listed as sampled on Table 2.2 Biol variables.

Population sampled:

This bottom-trawl survey is a multispecies one, surveying the 8c9aN demersal and benthic fish species in autumn. The sampled fractions of the target populations will be those ones inhabiting the grounds of the shelf between 30-500 m depth isobaths with few special deep hauls reaching to 800 m deep, not weighted to the area since is not considered representative for the whole deep area. The timing and spatial coverage of this survey has been defined to assess abundance of the fish commercial species and the strength of the annual recruitment of species as hake, megrims or anglers.

Stratification:

The sampling design is area stratified, with 5 geographical sectors (1: Miño river – Fisterra Cape, 2: Fisterra Cape – Estaca, 3: Estaca – Peñas, 4: Peñas – Ajo and 5: Ajo – Bidasoa river) and 3 bathymetric strata (A: 70-120 m, B: 121- 200 m, C: 201-500) with some special hauls shallower than 70 m and deeper than 500 m

Sampling design and protocols

Sampling design description:

Haul allocation is random avoiding sampling contiguous 5 nm squares, but number of hauls per strata is proportional to the area of the strata, area that is used to obtain abundance weighted to the area of the strata.

The sample/subsample of the catch is selected by a Simple Random Sampling (SRS) though size categories are used in species with large catches and skewed size distribution. Individuals of the selected samples are used to obtain various biological variables are collected until the expected number of samples per size range is reached).

Is the sampling design compliant with the 4S principle?:

NA.

Regional coordination:

Sampling design and protocols are developed in the framework of the IBTSWG (ICES working group on Internation bottom trawl surveys).

PRT, FRA, IRL, GBR, DNK, BEL, DEU, NLD, NOR, SWE

Link to sampling design documentation:

The sampling design is available in the Manual for the International Bottom Trawl Surveys, Section 7.5.1

https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2015%20NeAtl%20IBTS%20Survey.pdf

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within these species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2015%20NeAtl%20IBTS%20Survey.pdf

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Number of hauls is relatively constant though small variability due to weather events may occur.

Data capture

Means of data capture:

A complete report of the methodology and equipment used is available in the Manual of the International Bottom Trawl Surveys in the Western and Southern Areas section 7.8

Data capture documentation:

IBTS Western and Southern Areas Manual sections 3 and 7.8

Quality checks documentation:

IBTS Western and Southern Areas Manual section 7.5.4

Data quality controls through filters are implemented in the software tools used, these include: 1. Haul position vs. geographical sector allocation and depths ranges vs. strata allocation; 2. Differences between speed vs. expected tow distance and positions; 3. Catch weight vs. estimated weight of the sampled length distribution using L-W regressions when available.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

ICES DATRAS.

Quality checks and data validation documentation:

No documentation targeting quality checks. Analysis and detection of outliers for biological parameters, their weight-length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with ggplot2 package, etc.

Sample storage

Storage description:

The otoliths of almost all these species are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Coruña, Vigo and Santander. These pieces are stored systematically, without expiration date.

Sample analysis.

See Annex 1.1 ESP_IEO_P1_Biological_Specific.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Yes. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

No

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

AR comment: No deviations or developments.

Sampling scheme identifier: IBTS_Q4 (9a south)

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBTS_Q4

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

IBTS_Q4 (9a south)

Short description (max 100 words):

The Southern Spanish Groundfish Survey on the Gulf of Cádiz (SP-GCGFS) is conducted in the southern part of ICES Division 9a, the Gulf of Cádiz. The covered area extends from 15 m to 800 m depth, during autumn (November).

Description of the population

Population targeted:

The survey area corresponds to the **Spanish shelf waters of the Gulf of Cadiz (GoC, 20-800 m depth), ICES subdivision 9a South**, and it is conducted in autumn time. The trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main small demersal fish (SPF) inhabiting the GoC neritic waters). The main assessed target species are: hake Merluccius merluccius, shrimp *Parapenaeus longirostris, Octopus Octopus vulgaris, Squid Loligo vulgaris, Cuttlefish Sepia officinalis*.

Population sampled:

This bottom-trawl survey is a multispecies one surveying the 9aS demersal and benthic fish species in autumn. The sampled fractions of the target populations will be those ones inhabiting the grounds of the shelf between 20-800 m depth isobaths, not weighted to the area since is not considered representative for the whole deep area. The timing and spatial coverage of this survey has been defined to assess abundance of the fish commercial species and the strength of the annual recruitment of species as hake, megrims or anglers.

Stratification:

Then, the whole area (7224 km2) 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.

Sampling design and protocols

Sampling design description:

Haul allocation is random avoiding sampling contiguous 5 nm squares, but number of hauls per strata is proportional to the area of the strata, area that is used to obtain abundance weighted to the area of the strata.

The sample/subsample of the catch is selected by a Simple Random Sampling (SRS) though size categories are used in species with large catches and skewed size distribution. Individuals of the selected samples are used to obtain various biological variables are collected until the expected number of samples per size range is reached).

Is the sampling design compliant with the 4S principle?:

NA.

Regional coordination:

Sampling design and protocols are developed in the framework of the IBTSWG (ICES working group on Internation bottom trawl surveys).

PRT, FRA, IRL, GBR, DNK, BEL, DEU, NLD, NOR, SWE

Link to sampling design documentation:

The sampling design is available in the Manual for the International Bottom Trawl Surveys, Section 7.10.1

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

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within these species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

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

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

Trawl hauls providing biological samples and the total of muddy and sandy bottoms. The number of trawls (45) in a relatively high sampling coverage of the GoC SPF community.

Data capture

Means of data capture:

A complete report of the methodology and equipment used is available in the Manual of the International Bottom Trawl Surveys in the Western and Southern Areas sections 3 and 7.10

Data capture documentation:

IBTS Western and Southern Areas Manual sections 3 and 7.10

Quality checks documentation:

IBTS Western and Southern Areas Manual section 7.10

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

ICES DATRAS.

Quality checks and data validation documentation:

No documentation targeting quality checks. Analysis and detection of outliers for biological parameters, their weight-length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with ggplot2 package, etc.

Sample storage

Storage description:

The otoliths are kept in vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres of Cádiz where the samplings are carried out. These pieces are stored systematically, without expiration date.

Sample analysis.

See Annex 1.1 ESP_IEO_P1_Biological_Specific.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Yes. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

No

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

AR comment: No deviations or developments.

Sampling scheme identifier: IBTS_Q4 (7ck)

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBTS_Q4

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

IBTS_Q4 (7ck)

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from bottom-trawl hauls used to provide information useful for the EU CFP to assess the relative abundance of the following demersal and benthic fish species included in Table 2.2 of the WP.

Description of the population

Population targeted:

The survey area corresponds to the **Porcupine Bank, western Ireland (170-800 m depth), ICES subdivisions 7ck and 7b** >200 m, and it is conducted at the end of summer, mainly in September. The bottom-trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main demersal and benthic fish inhabiting the trawlable grounds on the Porcupine Bank. The main assessed target species are those listed as sampled on Table 2.2 Biol variables, hake, megrims, anglers and *Nephrops*.

Population sampled:

This bottom-trawl survey is a multispecies one surveying the 7ck demersal and benthic fish species. The sampled fractions of the target populations will be those ones inhabiting the grounds of the Porcupine Bank between 170-800 m depth isobaths. The timing and spatial coverage of this survey has been defined to assess abundance of the fish commercial species and the strength of the annual recruitment of species as hake, megrims or anglers.

Stratification:

The sampling design is area stratified, with two geographical sectors (designated as Northern and Southern) and 3 bathymetric strata (E: >300 m, F: 301- 450 m, G: 451-800).

Sampling design and protocols

Sampling design description:

Haul allocation is random avoiding sampling contiguous 5 nm squares, but number of hauls per strata is proportional to the area of the strata, area that is used to obtain abundance weighted to the area of the strata.

The sample/subsample of the catch is selected by a Simple Random Sampling (SRS) though size categories are used in species with large catches and skewed size distribution. Individuals of the selected samples are used to obtain various biological variables are collected until the expected number of samples per size range is reached).

Is the sampling design compliant with the 4S principle?:

NA.

Regional coordination:

Sampling design and protocols are developed in the framework of the IBTSWG (ICES working group on Internation bottom trawl surveys).

PRT, FRA, IRL, GBR, DNK, BEL, DEU, NLD, NOR, SWE

Link to sampling design documentation:

The sampling design is available in the Manual for the International Bottom Trawl Surveys, Section 7.5.1

https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2015%20NeAtl%20IBTS%20Survey.pdf

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within these species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2015%20NeAtl%20IBTS%20Survey.pdf

http://doi.org/10.17895/ices.pub.3519

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Number of hauls is relatively constant though small variability due to weather events may occur.

Data capture

Means of data capture:

A complete report of the methodology and equipment used is available in the Manual of the International Bottom Trawl Surveys in the Western and Southern Areas section 7.5

Data capture documentation:

IBTS Western and Southern Areas Manual sections 3 and 7.5

Quality checks documentation:

IBTS Western and Southern Areas Manual section 7.5.4

Data quality controls through filters are implemented in the software tools used, these include: 1. Haul position vs. geographical sector allocation and depths ranges vs. strata allocation; 2. Differences between speed vs. expected tow distance and positions; 3. Catch weight vs. estimated weight of the sampled length distribution using L-W regressions when available.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

ICES DATRAS.

Quality checks and data validation documentation:

No documentation targeting quality checks. Analysis and detection of outliers for biological parameters, their weight-length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with ggplot2 package, etc.

Sample storage

Storage description:

The otoliths of almost all these species are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Coruña, Vigo and Santander. These pieces are stored systematically, without expiration date.

Sample analysis.

See Annex 1.1 ESP_IEO_P1_Biological_Specific.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Yes. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

No

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

AR comment: No deviations or developments.

Sampling scheme identifier: IBWSS

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBWSS-ESP

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from pelagic hauls used for echo-traces identification for the following pelagic fish species included in Table 2.2 of the WP: *Micromesistius poutassou.* Biological sampling is used to verify the species and length/age composition/structure of echo-traces during echo-integration. Length and weight are also recorded for other species susceptible of being acoustically assessed (*Trachurus trachurus, Scomber scombrus, and Merluccius merluccius)*

Description of the population

Population targeted:

The International Blue Whiting Spawning Stock Survey area corresponds to the spawning grounds west of the British Isles, Rockall Bank, Porcupine Bank and Porcupine Seabight. Five research vessels participated in the survey, coordinated by the "ICES International Pelagic Campaigns Working Group (WGIPS). The Spanish part of this survey takes place in ICES subdivisions 7j-k.in the area called Porcupine Seabight, south of the study area and it is conducted in spring time (mid-March). The acoustic-trawl survey is aimed at the acoustic estimation of the abundance and biomass of the spawning fraction of the Blue Whiting northern stock (*Micromesistius poutassou*), and the hydrographic characterization of the area. In addition, an understanding of the companion species is pursued, especially in the mesopelagic fraction.

Population sampled:

This acoustic-trawl survey is aimed primarily at the spawning fraction of North Stock of Blue Whiting in spring. The sampled fractions of the target populations will be those ones inhabiting the waters between 450-600 m depth isobaths. The timing and spatial coverage of this survey has been defined to achieve containment of this specific stock on its northward migration along the northwestern coast of Europe. Containment is consistently achieved at the survey for the target specie which survey index is used in analytical stock assessment at WGWIDE.

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints.

Stratification:

In the total study area of the international Survey, the sampling design is stratified into areas, decided in advance and called strata. This pre-stratification of the study area is required by the software used to obtain the abundance index, 'StoX', which requires that the strata be as permanent as possible to standardize the indices year by year since these indices depend on the area of each stratum. The Spanish part of the survey takes place in one of these areas (Strata 7, Porcupine Seabight)

Sampling design and protocols

Sampling design description:

The sampling assignment is opportunistic since pelagic sets are made whenever changes in the echo-traces are detected and according to the time constraints of the survey. The sample for the size distribution is selected by a simple random sampling (SRS) of 50 to 100 individuals from the classified catch. The number of fish to be sampled is determined when a clear pattern appears in the distribution. For biological sampling, 40 specimens are selected by simple random sampling.

Is the sampling design compliant with the4S principle?:

NA.

Regional coordination:

Yes. Sampling design and protocols were developed in the framework of the WGIPS

Link to sampling design documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. Section 2.3

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=30298

Compliance with international recommendations:

Y. The Blue Whiting stocks are assessed by international group of experts (WGWIDE), and their recommendations are taken into account and implemented. All pelagic surveys in the Northeast Atlantic ICES areas are steered by WGIPS, Working Group of International Pelagic Surveys. The sampling schemes adopted by the IEO are standardised and coordinated by these ICES expert groups.

Link to sampling protocol documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=30298

ICES. 2021. Working Group of International Pelagic Surveys (WGIPS). ICES Scientific Reports. 3:40. 481pp

https://doi.org/10.17895/ices.pub.8055

Compliance with international recommendations:

Y. The Blue Whiting stocks are assesed by international group of experts (WGWADE), and their recommendations are taken into account and implemented. All pelagic surveys in the Northeast Atlantic ICES areas are reviewed by WGIPS. The sampling schemes adopted by the IEO are standardised and coordinated by these ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints.

Data capture

Means of data capture:

Sampling equipment:

All vessels employed a single midwater trawl for biological sampling. Acoustic equipment for data collection is a SIMRAD EK-80 scientific echosounder and post-processing is made with Echoview software. Survey abundance estimates are based on acoustic data collected from calibrated scientific echo sounders using an operating frequency of 38 kHz. All transducers are calibrated using a standardised sphere calibration (Demer et al. 2015) prior, during or directly after the survey. All the acoustic data are subsequently uploaded into Ices Acoustic Database and PGNAPES Database.

Biological sampling:

All components of the trawl haul catch are sorted and weighed; fish and other taxa are identified to species level. Size is measured with Ictiometers, weights using marine scales. All the data of the biological sampling are captured and registered written directly on the sampling sheets designed specifically for it, computerized on board and and subsequently uploaded into ICES Acoustic Database, PGNAPES Database and SIRENO IEO database.

Hydrographic sampling:

Hydrographic sampling (vertical CTD casts) was carried out by each vessel at predetermined locations. The equipment is a CTD SBE25. Depth was capped at a maximum depth of 1000 m in open water. The data is stored in Ices Acoustic Database and PGNAPES Database.

Data capture documentation:

Demer, D. A., Berger, L., Bernasconi, M., Bethke, E., Boswell, K., Chu, D., Domokos, R., et al. 2015. Calibration of acoustic instruments. ICES Cooperative Research Report No. 326.

ICES. 2012. Report of the Workshop on implementing a new TS relationship for blue whiting abundance estimates (WKTSBLUES), 23–26 January 2012, ICES Headquarters, Copenhagen, Denmark. ICES CM 2012/SSGESST:01. 27 pp.

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

ICES. 2021. Working Group of International Pelagic Surveys (WGIPS). ICES Scientific Reports. 3:40. https://doi.org/10.17895/ices.pub.8055

Johnsen, E, Totland, A, Skålevik, Å, et al. StoX: An open source software for marine survey analyses. Methods Ecol Evol. 2019; 10: 1523– 1528.

https://doi.org/10.1111/2041-210X.13250

Jolly, G. M., and I. Hampton. 1990. A stratified random transect design for acoustic surveys of fish stocks. Canadian Journal of Fisheries and Aquatic Sciences 47(7): 1282-1291.

Quality checks documentation:

N. No documentation targeting quality checks.

There is a quality control of the data prior to loading it into the databases.

Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

ICES Acoustic Database and PGNAPES Database

Quality checks and data validation documentation:

ICES Acoustic Database: Data submitters can deliver either text files (CSV) or structured mark-up files (XML) for Acoustic and Biological trawl data. In the case of XML a template is released for the users to validate their data before submitting it to the ICES Acoustic Database. This is done by using an XSD 7(XML Schema). An Acoustic XSD schema and Trawl XSD schema are provided separately to facilitate independent submission of the two data types. All general validation rules, quality control, constraint checking and statistical consistency are implemented by using Schematron 8as an ISO standard. In the case of CSV submitted file are converted into XML. Submitted data are as such be validated against the XSD and the Schematron rules and a report of possible errors and warnings is produced. If no errors result, and the data submitter accepts all warnings, then the submitted data is ready to upload into the Acoustic database.

https://www.ices.dk/data/Documents/Specification%20of%20the%20acoustic%20database.pdf

Sample storage

Storage description:

The otoliths are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Vigo and Santander. These pieces are stored systematically, without expiration date.

Sample analysis:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. Section 6

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=30298

Data processing

Evaluation of data accuracy (bias and precision):

Y. Acoustic data are analysed using the StoX software package (V3.0.5) and R-StoX packages software package (RStoX Framework 3.0.12, RStoX Base 1.3.8 and RStoX Data 1.1.3). A description of StoX software package is provided by Johnsen et. al. (2019). Estimation of abundance from acoustic surveys with StoX is carried out according to the stratified transect design model developed by Jolly and Hampton (1990). Baseline survey strata, established in 2017, were adjusted based on

survey effort and observations in 2021. Length and weight data from trawl samples were equally weighted and applied across all transects within a given stratum

Estimate of relative sampling error

For the baseline run, StoX estimates the number of individuals by length group which are further grouped into population characteristics such as numbers at age and sex.

A total length distribution is calculated, by transect, using all the trawl stations assigned to the individual transects. Conversion from NASC (by transect) to mean density by length group by stratum uses the calculated length distribution and a standard target strength equation with user defined parameters. Thereafter, the mean density by stratum is estimated by using a standard weighted mean function, where each transect density is weighted by transect distance. The number of individuals by stratum is given as the product of stratum area and area density.

The bootstrap procedure to estimate the coefficient of variance randomly replaces transects and trawl stations within a stratum on each successive run. The output of all runs are stored in a RData-file, which is used to calculate the relative sampling error.

Johnsen, E, Totland, A, Skålevik, Å, et al. StoX: An open source software for marine survey analyses. Methods Ecol Evol. 2019; 10: 1523– 1528.

https://doi.org/10.1111/2041-210X.13250

Editing and imputation methods:

N

https://www.ices.dk/community/groups/pages/WGIPS.aspx

Quality document associated to a dataset:

N

Validation of the final dataset:

April-May, prior of WGWADE meeting

AR comment: No deviations or developments.

Sampling scheme identifier: MEGS (IEO)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: MEGS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity : from 2022 until 2027

IEO MEGS

Short description (max 100 words):

CAREVA and JUREVA surveys, carried out triennially, provides an index for the strength of the SSB of Atlantic mackerel (*Scomber scombrus*) and a relative abundance index of horse mackerel (*Trachurus trachurus*) spawning stocks in the Northeast Atlantic.

Description of the population

Population targeted:

The target species are mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*), and the survey core area comprises ICES subdivisions 9a, 8c and 8b.

Population sampled:

Pelagic species (mainly mackerel and horse mackerel, but also sardine and anchovy, given that both surveys coincide with their spawning time).

Stratification:

As part of the International Mackerel and Horse Mackerel Egg Survey (triennial), two surveys are carried out every three years

MEGS-CAREVA: Area 9a North, 8c, 8b and d South. Period March-April carried out by IEO

MEGS-JUREVA: Area 9a North, 8c, 8b and d South. Period April-May carried out by IEO

Sampling design and protocols

Sampling design description:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. Section 3. http://doi.org/10.17895/ices.pub.5140

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

Sampling design and protocols are developed in the framework of the WGMEGS (ICES working group on mackerel and horse mackerel egg surveys). During the last group in 2021, participants were originally from the following countries: Spain, The Netherlands, Scotland, Ireland, Norway, Germany, Portugal, Faroe Islands, Denmark, and UK.

At each working group meeting as well as during the workshops on egg staging and fecundity estimation, the manual is discussed and updated where necessary, and incorporated in the working group and workshop reports as an annex document. Other methods necessary for adequate storage and preservation of the samples, sorting, identification and staging of fish eggs are described in sections of the different workshops and working group meetings.

Link to sampling design documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. Section 3. http://doi.org/10.17895/ices.pub.5140

SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

As mentioned before, sampling design and protocols are developed in the framework of the WGMEGS (ICES working group on mackerel and horse mackerel egg surveys). During the survey year, the researchers responsible for the surveys and sample analysis are in real-time contact with the WGMEGS. In case of problems derived from bad weather, ship/laboratory equipment breakdowns, etc., the participants in the remaining surveys / laboratories try to cover the unsampled area / the analysis of the samples, in such a way as to cause the least possible effect on the index derived from the surveys.

Data capture

Means of data capture:

For the collection of biological data in this survey, a marine 'Marell' scale is used for weight and simple ichthyo meters for length. Otoliths are collected in labelled paper envelopes. Samples for fecundity are collected on board following the WG manual (SIPS 5).

The following material is used for the analysis of the samples in the laboratory:

- For histology: Automatic processor; paraffin dispenser; microtome; termofin bath; cold plate; automatic stainer; oven.
- For reading histological sections and whole mount samples: Microscopes with camera; the open software 'ImageJ' is used for fecundity and atresia analysis, following the protocol agreed by the group and described in SIPS 5.
- For studying simple eggs on board: Stereo microscopes; mobile suction and filtration units.
- For egg analysis in the laboratory: Binocular microscopes.

The results of the egg and fecundity analysis should be submitted to the survey data coordinators, using the updated excel spread sheets, within a month of the end of each cruise. These excel templates for the data entry of the plankton and fecundity data will be distributed by the survey coordinators prior to the surveys commencing.

Data capture documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Quality checks documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140. Section 9.

SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Data storage

National database:

There is no specific national database for egg and larvae data

International database:

ICES egg and larvae database

https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx#:~:text=The%20Eggs%20and%20Larvae%20database,to%20the%20ichthyoplankton%20survey%20data.

Quality checks and data validation documentation:

https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx#:~:text=The%20Eggs%20and%20Larvae%20database,to%20the%20ichthyoplankton%20survey%20data.

Sample storage

Storage description:

The standard **plankton samples** collected for the SSB estimates will be handled carefully and preserved as soon as practicable. The recommended procedure will be as follows:

- Remove the end bag used on the station before washing down the net.
- Attach a clean end bag and gently wash down the net from both ends of the sampler, taking care to wash the lower surface of the net just in front of the end bucket.
- Always wash down from the nosecone.
- Make sure the net is clean, using more than one end bag if necessary.
- Make doubly sure that a clean end bag is left on the sampler ready for the next station.

- Wash the plankton from the end bags into a jar with the 4% formaldehyde solution in a wash bottle.
- Top up the jar with 4% formaldehyde, making sure that the volume of plankton does not exceed 50% of the volume of the jar.
- Any excess sample should be fixed separately in additional jars.
- Label jars with station details and put labels containing same details in pencil into all jars.

The standard fixative for use on these surveys will be a 4% solution of buffered (pH 7 - 8) formaldehyde in either distilled or freshwater. (420g of sodium acetate trihydrate is dissolved in 10 litres of 4% formaldehyde, ICES, 2001). The sample should be directly fixed with the addition of the 4% formaldehyde solution and should not come into contact with formaldehyde strength in excess of 4%. The volume of plankton in the sample jar must never exceed 50% of the volume of the jar. Excess sample should be fixed separately in additional jars.

The store is the ICES warehouse at the IEO Vigo oceanographic centre.

The sampling protocol as well as the egg analysis criteria is defined in the SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp.

http://doi.org/10.17895/ices.pub.5140

Mackerel ovary samples are collected (either in CAREVA survey or in PELACUS, survey that is carried out simultaneously) and immediately preserved in formaldehyde solution in containers properly tagged. In the laboratory, a section of the ovary is cut for histology and the remaining ovarian tissue is retained until the end of the collection year. After the analysis, oocyte whole mount subsamples are stored for 5 years in 3.6% formaldehyde. Later, a portion of ovary from a selection of samples is stored as a permanent collection. These samples are stored in 3.6% formaldehyde in closed and labeled plastic jars placed on shelves in labeled cardboard boxes. Histological sections and cassettes of all individuals analyzed are also kept permanently. The store is the ICES warehouse at the IEO Vigo oceanographic centre.

Sample analysis.

The sampling protocol as well as the analysis criteria is defined in the 'SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Data processing

Evaluation of data accuracy (bias and precision):

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Editing and imputation methods

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Quality document associated to a dataset:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

AR comment: No deviations or developments.

Sampling scheme identifier: MEGS (AZTI)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: MEGS
Sampling scheme type: Research Survey at Sea
Observation type: SciObsAtSea

Time period of validity : from 2022 until 2027

AZTI MEGS

Short description (max 100 words):

AZTI-MEGS survey, carried out triennially, provides biological and hydrographic data to produce an index for the strength of the SSB of Atlantic mackerel (*Scomber scombrus*) and a relative abundance index of horse mackerel (*Trachurus trachurus*) spawning stocks in the Northeast Atlantic.

Description of the population

Population targeted:

The target species are mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*), and the central survey area comprises ICES subdivisions 8abcd and 7hj.

Population sampled:

The target populations are the pelagic species mackerel and horse mackerel, but as the spawning of these species coincides in time with other pelagic or semi-demersal populations in the area, data on spawning areas for species such as sardine, anchovy and hake are also obtained.

Stratification:

NA

Sampling design and protocols

Sampling design description:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

Sampling design and protocols are developed in the framework of the WGMEGS (ICES working group on mackerel and horse mackerel egg surveys). During the last group in 2021, participants were originally from the following countries: Spain, The Netherlands, Scotland, Ireland, Norway, Germany, Portugal, Faroe Islands, Denmark, and UK.

At each working group meeting as well as during the workshops on egg staging and fecundity estimation, the manuals (SISP 5 and SISP 6) are discussed and updated where necessary, and incorporated in the working group and workshop reports as an annex document. Other methods necessary for adequate storage and preservation of the samples, sorting, identification and staging of fish eggs are described in sections of the different workshops and working group meetings.

Link to sampling design documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The sampling design and protocols are developed within the framework of the WGMEGS (ICES Working Group on Mackerel and Horse Mackerel EGg surveyS). During the survey, survey leaders are in real-time contact with the other participants. In case of problems due to bad weather, breakdown of vessel/laboratory equipment, etc. the rest of participants try to take actions such as try to cover the unsampled area or complete unfinished analysis. The common goal is to reduce as much as possible the incertity on the index derived from the surveys.

Data capture

Means of data capture:

For the collection of biological data during the survey, the weight of fish is recorded using a POLS (currently: MAREL) marine scale and the length with an ichthyo-meter. Otoliths are collected plates and fixed with eukitt mounting medium. Samples for fecundity are collected on board following the WG manual (SIPS 5).

The following material is used for the analysis of the samples in the laboratory:

- For histology: HEMA (2-hydroxyethyl methacrylate) resine, microtome, thermostatic plate, hematoxylin-eosin staining, eukitt mounting medium.
- For reading histological sections and whole mount samples: Microscopes with camera; the open software 'ImageJ' is used for fecundity and atresia analysis, following the protocol agreed by the group and described in SIPS 5.
- For studying eggs on board: Stereo microscopes, and filtration units.
- For egg analysis in the laboratory: Binocular microscopes Folsom plankton sub-sampler.

The results of the egg and fecundity analysis should be submitted to the survey data coordinators, using the updated excel spreadsheet, within a month of the end of each cruise. These excel templates for the data entry of the plankton and fecundity data will be distributed by the survey coordinators prior to the surveys commencing.

Data capture documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Quality checks documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Data storage

National database:

NA

International database:

ICES egg and larvae database

https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx#:~:text=The%20Eggs%20and%20Larvae%20database,to%20the%20ichthyoplankton%20survey%20data.

Quality checks and data validation documentation:

https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx#:~:text=The%20Eggs%20and%20Larvae%20database,to%20the%20ichthyoplankton%20survey%20data

Sample storage

Storage description:

The standard plankton samples collected for the SSB estimates will be handled carefully and preserved as soon as practicable. The recommended procedure will be as follows:

- Remove the end bag used on the station before washing down the net.
- Attach a clean end bag and gently wash down the net from both ends of the sampler, taking care to wash the lower surface of the net just in front of the end bucket.
- Always wash down from the nosecone.
- Make sure the net is clean, using more than one end bag if necessary.
- Make doubly sure that a clean end bag is left on the sampler ready for the next station.
- Wash the plankton from the end bags into a jar with the 4% formaldehyde solution in a wash bottle.
- Top up the jar with 4% formaldehyde, making sure that the volume of plankton does not exceed 50% of the volume of the jar.
- Any excess sample should be fixed separately in additional jars.
- Label jars with station details and put labels containing the same details in pencil into all jars.

The standard fixative for use on these surveys will be a 4% solution of buffered (pH 7 - 8) formaldehyde in either distilled or freshwater. (420g of sodium acetate trihydrate is dissolved in 10 litres of 4% formaldehyde, ICES, 2001). The sample should be directly fixed with the addition of the 4% formaldehyde solution and should not come into contact with formaldehyde strength in excess of 4%. The volume of plankton in the sample jar must never exceed 50% of the volume of the jar. Excess of sample should be fixed separately in additional jars.

All plankton samples preserved in formaldehyde 4% are permanently stored at AZTI Pasaia warehouse in closed and labeled plastic jars placed on shelves in labeled boxes. The sampling protocol as well as the egg analysis criteria is defined in the SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Mackerel ovary samples are collected and immediately preserved in formaldehyde solution in appropriately labelled containers. In the laboratory, a section of the ovary is cut for histology and the remaining ovarian tissue is retained for 3 years. These samples are stored in 3.6% formaldehyde in closed and labelled plastic jars placed on shelves in labelled boxes. After the analysis, oocyte whole mount subsamples are stored perpetually in 3.6% formaldehyde. The histological sections and cassettes of all individuals analyzed are also kept permanentlyY at AZTI Pasaia centre's warehouse. The sampling protocol, as well as the analysis criteria, is defined in the 'SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

The sampling protocol as well as the analysis criteria is defined in the 'SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation' (http://bit.ly/2aU83Lc).

Data processing

Evaluation of data accuracy (bias and precision):

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Editing and imputation methods:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Quality document associated to a dataset:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Validation of the final dataset:

AR comment: No deviations or developments.

Sampling scheme identifier: SAHMAS

MS: ESP
Region: North-East Atlantic
Sampling scheme identifier: SAHMAS
Sampling scheme type: SciObsAtSea
Observation type: Research Survey at Sea
Time period of validity: from 2022 until 2027
Short description (max 100 words): Sampling scheme aiming at recording the speciphic length and weight composition of the pelagic hauls used for echo-traces identification for the following pelagic fish species: *Sardina pilchardus, Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Micromesistius poutassou, Boops boops, Capros aper, Scomber colias*, and other species susceptible of being acoustically assessed. In addition, biological samplings of the target species are carried out (see WP Table 2.2 and ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2).
Description of the population
Population targeted: The main target species are: Sardina pilchardus, Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Micromesistius poutassou, Scomber colias, Boops boops and Capros aper.(See Text Box 2.6). The survey area corresponds to the Northern of the Iberian Peninsula shelf waters (ICES Sub-Divisions 9aN and Division 8c). **Population sampled:** This acoustic-trawl survey is a multispecies one surveying the Northern Iberian Peninsula species in Spring. The sampled fractions of the target populations will be those ones inhabiting the shelf waters. The timing and spatial coverage of this SAHMAS Spring survey have been defined to achieve containment of the target population at the survey mesoscale, which is achieved for the target species: sardine, blue whiting, boarfish and chub macherel. Not synoptic coverage and/or lack of biological information for some stock components such as anchovy, Atlantic mackerel or horse mackerel, because because they are distributed in waters of the continental slope not sampled by survey. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2). **Stratification**: The study area is stratified in 6 geographical strata: Eastern Cantabrian (8cEe), Central Cantabrian (up to the *Peñas* Cape), Western Cantabrian (up to *Estaca de Bares*), Artabre Gulf (8cW), *Rias Baixas* (9aN), and *Rias Baixas* shelf (9aN) waters.
Sampling design and protocols
Sampling design description: The sampling allocation is opportunistic since the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS). Fishes from the target species (see table 2.2) are biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached). Then, the other individuals are measured until a representative length distribution is obtained for each species. (See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2). **Is the sampling design compliant with the 4S principle?:** NA. **Regional coordination**: Y. Sampling design and protocols were developed in the framework of the WGACEGG.

Link to sampling design documentation:

See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2).

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number and location of hauls result in a relatively high sampling coverage of the Northern Iberian Peninsula SPF community.

Data capture

Means of data capture:

Length distributions are carried out by means of a measuring board. Weights of both the catches and the individual specimens are taken from marine scales, which register a maximum weight of 60, 12 and 2 kg respectively; accurately: ± 100 ± 10 and ± 2g respectively).

Biological samples are collected and stored onboard. Data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized onboard.

Data capture documentation:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.3

Quality checks documentation:

Data quality control (QC) checks and validations are performed for all spring surveys. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.6)

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database: Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

NA.

Quality checks and data validation documentation:

No documentation targeting quality checks.

Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

Sample storage

Storage description:

The otoliths of almost all these species, are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samples will be processed: Coruña, Vigo, and Santander. These pieces are stored systematically, without expiration date.

When the histological processing of the gonads is necessary, both the gonadal tissue samples included in paraffin blocks, as the slides with their respective histological sections, are also carefully kept and systematically stored in their respective places, where they remain indefinitely.

Sample analysis:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , sections 2.1.3 & 2.1.4.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of any species such as mackerel or horse mackerel for maturity ogives, missing maturity percentages are imputed from historical data.

Quality document associated to a dataset:

N

Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user?

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , sections 2.1.6.

AR comment: No deviations or developments.

Sampling scheme identifier: SDEPM

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: SDEPM

Sampling scheme type: SciObsAtSea

Observation type: Research survey at sea

Time period of validity: from 2022 until 2027

Description of the population

Population targeted:

The main target specie from a survey perspective is *Sardine pilchardus* and the main survey area is ICES divisions 8.c and 9.a North -Cantabrian Sea and Atlantic Iberian waters- for the sardine stock pil 27.8c9a.The Spanish survey (SAREVA) covers the northern area of the stock from the Spanish-Portuguese northern border to the Spanish-French Atlantic waters limit.

Population sampled:

The target population will be sampled in a triennial basis. To obtain spawning stock biomass of sardine, the SDEPM survey is directed at egg abundance and spawning area definition for daily egg production determination and at adult sampling for

daily fecundity calculation. Timing for surveying is the peak spawning period of the targeted specie; accordingly, the survey is carried out in March/April in northern Spanish waters. All surveys covered under the auspices of ICES WGACEGG (Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic) are considered ecosystem surveys and data collection is not limited to the target species alone.

Stratification:

As part of the Iberian DEPM survey for sardine (*Sardina pilchardus*), two surveys are carried out every three years by Portugal (IPMA; PT-DEMP-PIL) and Spain (IEO; SAREVA). The total spawning biomass from the two DEPM surveys 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).

Three geographical strata are considered for the sardine stock pil.27.8c9a data analyses according to biological/ecological reasons: i) South (9a S), from the Strait of Gibraltar to Cape St. Vicente; ii) West (9a W), from Cape St. Vicente to the border between northern Portugal and Spain (Minho river) and iii) North (9a N & 8c), from the Spanish-Portuguese northern border to the Spanish-French Atlantic waters limit.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined according to the life cycle component of the specie to be sampled:

For the ichthyoplankton component of the population, a grid of transects along which the fixed stations of (PairoVET) sampling are located and an adaptive design has also been applied with the aid of the auxiliary CUFES, the use of which helps in delimiting sardine spawning areas and adapting the sampling intensity and the offshore limit of PairoVET sampling.

For the adult component of the population; fishing hauls are undertaken for the estimation of adult parameters (sex ratio, female weight, batch fecundity, and spawning fraction) within the mature component of the sardine population. Surveying for adults takes place simultaneously with ichthyoplankton sampling. Fishing hauls should be distributed over the surveyed region according to fish abundance distribution. The number of samples and their spatial distribution is thus organized to ensure good and homogeneous coverage of the survey area and an adequate representation of population demography and distribution. Fishing hauls are conducted by pelagic trawling, following the detection of species schools by echosounder.

For logistical reasons, the adult samples for the DEPM that would correspond to SAREVA survey will be taken in the PELACUS survey, which coincides in time and space. In addition, complementary fish market sampling will be carried out.

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

The sardine DEPM surveys have been carried out triennially since 1999 in a collaborative work between Portugal (Instituto Portugués 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.

Link to sampling design documentation:

SDEPM survey sampling design is described in ICES Cooperative Research Report 332. Section 2.1.2.

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

Compliance with international recommendations:

Y. The sampling design of the SDEPM is in line with international recommendations. Survey is planned and coordinated under the framework of the ICES WGACEGG (Working Group on Acoustic and Egg Surveys for Small Pelagic Fish in NE Atlantic)

Link to sampling protocol documentation:

SDEPM survey sampling protocol is described in ICES Cooperative Research Report 332:

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

Compliance with international recommendations:

Y. The sampling protocol documentation of the SDEPM is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGACEGG.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

The adaptive design applied to ichthyoplankton sampling, the fact that the surveying for adults takes place simultaneously with ichthyoplankton sampling and the fishing hauls should be distributed over the surveyed region according to fish abundance distribution, should guarantee an adequate sampling for the application of the DEPM.

Data capture

Means of data capture:

For the fixed stations of ichthyoplankton (PairoVET), date, time, position (GPS), sampling and bottom depth data, cable released and flowmeter readings are registered on paper and transcribed to spreadsheet as soon as possible. Data for the CUFES sampling is registered electronically with a tailored software/hardware system connected to GPS and data are subsequently uploaded to the spreadsheet database.



Specific software consists of modular, menu-driven routines for acquisition, display, processing, and archiving of oceanographic data acquired with Sea-Bird equipment is used for the profiles of temperature, salinity and fluorescence.

Data for fishing hauls undertaken from PELACUS are captured on paper and transcribed to the IEO SIRENO database as soon as possible.

Data capture documentation:

SDEPM survey data capture is described in ICES Cooperative Research Report 332:

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

Quality checks documentation:

No documentation targeting quality checks. Analysis and detection of errors in data acquisition are carried out graphically using expert judgment, creating common graphs such as maps, scatter plots, histograms, box plots in R with (ggplot2 package), etc. Checks are usually carried out at the end of the sampling and also by analyzing certain relationships between parameters.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

To achieve the combination at a regional scale of the data from the DEPM and acoustic surveys, the ichthyoplankton and oceanographic data for each survey are block-averaged on a common spatial grid. On this grid it is possible to represent all variables (environmental parameters, egg and fish concentrations, top predators, plankton, etc.) and to structure a common database. A series of gridded data files are created by blocking the raw data from each survey institution, and available parameter.

Gridded data files are stored and available for download from the ICES website via the WGACEGG page or using the following link:

https://community.ices.dk/ExpertGroups/wgacegg/SitePages/HomePage.aspx?RootFolder=%2FExpertGroups%2Fwgacegg%2F2020%20Meeting%20Documents%2F06%2E%20Data&FolderCTID=0x012000F34CB92CB4CD3D4EA424ADBDEF7439AC&View=%7B3F76DBAE%2DB730%2D4E27%2DADE7%2D87D6C20FE3C5%7D

Quality checks and data validation documentation:.

Documentation for gridded data files can be found in ICES Cooperative Research Report 332.

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

Sample storage

Storage description:

Ichthyoplankton samples (PairoVET and CUFES) are preserved in buffered formaldehyde at 4% (sodium tetraborate) and stored in appropriately labelled containers. Once at the laboratory, after samples having been sorted, indentified and quantified, samples are preserved in individual containers with folmaldehyde at 4%, labelled and stored on the shelves of the ICES warehouse at the IEO Vigo oceanographic center.Ichthyoplankton samples are kept permanently.

Sardine otoliths, extracted on board PELACUS survey, after having been photographed for aging, are stored in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO Vigo oceanographic center i. These pieces are stored systematically without expiration data.

Sardine gonads (the two lobes of the ovary) collected on PELACUS survey are immediately preserved in formaldehyde solution in individual containers properly tagged. In the laboratory ovary sections are taken for histological processing and 3 subsamples (0.75 mg) extracted for fecundity calculation. The remaining ovary tissue is retained until the end of the year. A piece of ovary from selected samples is stored in 3.6% formaldehyde in closed and labeled plastic jars placed on shelves in labeled cardboard boxes and kept as a permanent collection. Histological sections and cassettes of all individuals studied are also kept permanently. The store place is the ICES warehouse at the IEO Vigo oceanographic centre.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

A description for ichthyoplankton and adults sample analysis can be found in ICES Cooperative Research Report 332.

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

Data processing

Evaluation of data accuracy (bias and precision):

N. Compare acoustic and DEPM biomass estimates of anchovy and sardine and evaluate their respective bias and precision with a view to providing improved data to stock assessment WGs, is included as a term of reference on the ICES WGACEGG and it is expected to be implemented on the next two years.

Editing and imputation methods:

N.

Quality document associated to a dataset

N

Validation of the final dataset:

Datasets are checked before providing to end-user analysing and detecting errors with a protocol for data exploration using packages and routines from R software (http://www.R-project.org).

AR comment: No deviations or developments.

Sampling scheme identifier: BIOMAN

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: BIOMAN

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Description of the population

Population targeted:

The target species are anchovy and sardine. The main survey area are ICES subdivisions 8abcd

Population sampled:

The pelagic species anchovy and sardine are the target species and the stock within the Bay of Biscay (ICES 8abcd) is surveyed. In years when the anchovy or sardine stock is distributed further west than 6º30'W in the Cantabric coast, this fraction of the stock is not surveyed due to time restrictions.

Stratification:

NA

Sampling design and protocols

Sampling design description:

In 1987 a study was done for the egg sampling design (Petitgas et al 1987). Since then, the strategy of egg sampling was identical, i.e. a systematic central sampling scheme with random origin and sampling intensity depending on the egg abundance found (Motos, 1994). Stations were located at intervals of 3 nm along 15 nm apart transects, perpendicular to the coast. In areas of high abundances of eggs, the transects were 7.5 nm apart.

The adult samples are obtained on board R/V Emma Bardán (pelagic trawler) coinciding in space and time with the plankton sampling. When the plankton vessel encountered areas with anchovy or sardine eggs, the R/V Emma Bardán was directed to those areas to fish. In some cases, few samples are obtained from the fleet fishing in the spawning areas to complete the sampling.

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

The BIOMAN surveys have been carried out since 1987. In WGACEGG since 19_ coordination and standardization of the DEPM surveys and analytical methodologies within this WG was carried out. The protocol can be found at (see link below)

Link to sampling design documentation:

BIOMAN survey sampling is described in ICES Cooperative Research Report 332.

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

Compliance with international recommendations:.

Y. The sampling design of BIOMAN survey is in line with international recommendations. Survey is planned and coordinated under the framework of the ICES WGACEGG (Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic)

Link to sampling protocol documentation:

BIOMAN survey sampling protocol is described in ICES Cooperative Research Report 332:

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

Compliance with international recommendations:

Yes. The sampling protocol documentation of BIOMAN survey is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGACEGG.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

An adequate sampling for the application of the DEPM is guaranteed due to the adaptative sampling carried out. For ichthyoplankton to guarantee the sampling of the spawning area, the transects are extended in the oceanic zone until no anchovy or sardine egg is encountered at least during 9 nm. In the Cantabric coast the west limit is considered when a complete transect is found with 0 eggs. To the North the limit is the 8a limit (48ºN). For the adults, the pelagic trawler coincides in space and time with the plankton sampling. When areas with anchovy or sardine eggs are encountered by the vessel sampling ichthyoplankton, the pelagic trawler is directed to those areas to fish. In that manner, the fishing trawls are distributed over the survey area according to fish abundance distribution. When the vessel fishing adults due to different issues can not fish is the ichthyoplankton vessel that fish or samples from the purse seine fleet are used.

Data capture

Means of data capture:

Ichthyoplankton data:

For PairoVET stations, date, time, position (GPS), sampling and bottom depth data, cable released, and flowmeter readings are registered on a paper and transcribed to a spreadsheet as soon as possible. Sample depth, temperature, salinity, and fluorescence profiles were obtained at each sampling station using a CTD RBR-XR420 coupled to the PairoVET. Those data are downloaded directly to the computer.

The CUFES system had a CTD to record simultaneously temperature and salinity at 3 m depth, a flowmeter to measure the volume of the filtered water, a fluorimeter, and a GPS (Geographical Position System) to provide sampling position and time. All these data are registered at real time using the integrated EDAS (Environmental Data Acquisition System) with custom software.

For adult data:

The fishing hauls data are registered on a paper and transcribed to a spreadsheet as soon as possible.

For sightings:

for first year data are register directly in a tablet

For neuston net (microplastics), eDNA, chlorophyll or other nets, data are registered on a paper and transcribed to a spreadsheet as soon as possible.

For acoustics:

data are recorded directly on the computer and later saved on a hard disk

For zooplankton:

data are recorded automatically in the computer after pass the sample through the flowcam macro system

Data capture documentation:

BIOMAN survey data capture is described in:

and

Santos, M, Uriarte, A., Ibaibarriaga, L., 2011. Spawning Stock Biomass estimates of the Bay of Biscay anchovy (Engraulis encrasicolus, L.) in 2010 applying the Daily Egg Production Method. 18(5): 76-91.

The maturity scale for anchovy and sardine is based on the one adopted at WKSPMAT (ICES Working Group, Report 20078)

The eDNA procedures can be seen at: Canals, O., Mendibil, I., Santos, M., Irigoien, X. and Rodríguez-Ezpeleta, N. 2021. Vertical stratification of environmental DNA in the open ocean captures ecological patterns and behavior of deep-sea fishes. Limnology and Oceanography Letters. doi: 10.1002/lol2.10213

The procedures for sightings can be seen at Louzao, M., García-Barón, I., Rubio, A., Martínez, U., Vázquez, J.A., Murcia, J.L., Nogueira, E., Boyra, G. 2019. Understanding pelagic seabird 3D environment from multidisciplinary oceanographic cruises to advance ecosystem-based monitoring. Marine Ecology Progress Series 617-618: 199-219.

Quality checks documentation:

No documentation targeting quality checks. Analysis and detection of errors in data acquisition are carried out graphically using expert judgment, creating common graphs such as maps, scatter plots, histograms, box plots in R with (ggplot2 package), etc. Checks are usually carried out at the end of the sampling by analyzing certain relationships between parameters.

Data storage

National database:

NA

International database:

To achieve the combination at a regional scale of the data from the DEPM and acoustic surveys, the ichthyoplankton and oceanographic data for each survey are block-averaged on a common spatial grid. On this grid it is possible to represent all variables (environmental parameters, egg and fish concentrations, top predators, plankton, etc.) and to structure a common database. A series of gridded data files are created by blocking the raw data from each survey institution, and available parameters.

Gridded data files are stored and available at ICES website:

Quality checks and data validation documentation:

Documentation for gridded data files can be found at ICES Cooperative Research Report 332.

Sample storage

Storage description:

At sea, plankton samples (PairoVET and CUFES) are preserved in buffered formaldehyde at 4% (sodium tetraborate) and stored in labelled containers. At sea eggs are sorted, identified (anchovy, sardine, *Maurolicus muelleri* and the rest of the eggs) and quantified. Once on land at AZTI Pasaia laboratory, plankton samples and eggs are stored on the shelves at AZTI Pasaia warehouses. Ichthyoplankton samples are kept permanently. Samples from 1987 to 2022 are kept at AZTI Pasaia.

At sea anchovy and sardine are measure, weight, sex and the otoliths are extracted. These are kept in black plaques by pairs. Once on land at AZTI Pasaia laboratory, otoliths are fixed and read and afterwards stored at the laboratory. They are stored without expiration date

At sea anchovy and sardine ovaries (the two lobes) are preserved in buffered formaldehyde at 4% (sodium tetraborate) in individual labelled containers. Once on land at AZTI Pasaia, in the laboratory ovary sections are taken for histological processing to estimate the Spawning fraction (S) and 3 subsamples (0.05 g) extracted for batch fecundity estimation. The remaining ovary tissues and cassettes of all individuals studied are kept for 3 years. Afterwards are discarded. Histological sections are store permanently at the laboratory at AZTI Pasaia

Sample analysis:

A description for ichthyoplankton and adults sample analysis can be found in ICES Cooperative Research Report 332.

Data processing

Evaluation of data accuracy (bias and precision):

Y. In each working document Santos et al and the year, at the WGACEGG report of each year, the values of the Standard error and coefficient of variation are calculated for each parameter estimate to obtain the total biomasfor anchovy and sardine. i.e

In annex 3 wd: Ecosystem survey approach: BIOMAN 2020 survey.DEPM anchovy and sardine in the Bay of Biscay.M. Santos Mokoroa, M. Korta, I. Garcia and A. Uriarte

Editing and imputation methods:.

The documentation will be available each year in November at the ices site ie for 2020

Quality document associated to a dataset:

Not yet

Validation of the final dataset:

The datasets are validated at the ICES WGACEGG before sending the data to the assessment WGHANSA

AR comment:

Data capture:

Sampling design and protocols

Update link to wd Santos et al 2023 DOI: 10.13140/RG.2.2.10327.24485

Sample storage:

Samples from 1987 to 2022 are kept at AZTI Pasaia. No more Cadiz university.

Sampling scheme identifier: ECOCADIZ_ESP

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: ECOCADIZ_ESP

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from pelagic hauls used for echo-traces identification for the following pelagic fish species included in Table 2.2 of the WP: *Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Scomber colias,Trachurus trachurus and Trachurus mediterraneus.* Age is sampled for anchovy, sardine and chub mackerel only. Biological sampling is used to verify the species and length/age composition/structure of echo-traces during echo-integration. Biological sampling is extended to other species such as *T. picturatus* and *Boops boops*. Length and weight are also recorded for other species susceptible of being acoustically assessed.

Description of the population

Population targeted:

The survey area corresponds to the Portuguese and Spanish shelf waters of the gulf of Cadiz (GoC, 20-200 m depth), ICES subdivision 9a South, and it is conducted in summer time (in the recent years during the first fortnight in August). The acoustic-trawl survey is aimed at the acoustic estimation of the abundance and biomass of the populations of the main small pelagic fish (SPF) inhabiting the GoC neritic waters. The main assessed target species are: anchovy *Engraulis encrasicolus,* sardine *Sardina pilchardus* and chub mackerel *Scomber colias.* The list of assessed target species is extended to: mackerel *Scomber scombrus,* horse mackerel *Trachurus trachurus,* Mediterranean horse mackerel *Trachurus mediterraneus*, blue jack mackerel *Trachurus picturatus* and bogue *Boops boops*. Round sardinella *Sardinella aurita*, blue whiting *Micromesistius poutassou*, boarfish *Capros aper*, long snipefish *Macrorhamphosus scolopax* and pearlside *Maurolicus muelleri* are also acoustically assessed when present.

Population sampled:

This acoustic-trawl survey is a multispecies one surveying the GoC neritic SPF species in summer. The sampled fractions of the target populations will be those ones inhabiting the shelf waters between 20-200 m depth isobaths. The timing and spatial coverage of this summer survey has been defined to achieve stock containment of target species at the mesoscale of the survey (and stocks) (Doray *et al*., 2021). Containment is consistently achieved at the survey mesoscale for target species whose survey indices are used in analytical stock assessment (anchovy and sardine). ECOCADIZ_ESP does not capture the

full summer distribution of blue jack mackerel, blue whiting, boarfish, horse mackerel, mackerel, pearlside, and snipefish when present because either the population or at least a component of the population of these species (e.g. larger fish) are distributed in upper continental slope waters not sampled by the survey.

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number (20-25 hauls on average) and location of these hauls results in a relatively high sampling coverage of the GoC SPF community (0.06 hauls per surveyed nautical mile; Doray *et al*., 2021).

Stratification:

The sampling design is not stratified, as SPF species can potentially be distributed over the whole sampling area. Post-stratification regions, where species/size compositions and echo-integrals are assumed to be homogeneous, are further defined for each species to estimate total fish biomass. Acoustic estimates and biological information are usually provided for the Portuguese, Spanish and the whole GoC waters.

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic since the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS) of 50 individuals from the sorted catch. The selected sample is entirely biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached).

Is the sampling design compliant with the 4S principle?:

NA.

Regional coordination:

Yes. Sampling design and protocols were developed in the framework of the WGACEGG.

Link to sampling design documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi. org/10.17895/ices.pub.7462.

Compliance with international recommendations:

Yes. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462

Compliance with international recommendations:

Yes. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number (20-25 hauls on average) and location of these hauls results in a relatively high sampling coverage of the GoC SPF community.

Data capture

Means of data capture:

Biological data from GoC *Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Trachurus mediterraneus, Trachurus picturatus* and *Boops boops* (from SRS samples of 50 individuals from the catch of pelagic hauls) are captured electronically with a tailored software/hardware system (icrOS) and data are subsequently uploaded to the IEO SIRENO database. The icrOS system simplest hardware setup comprises one or more sampling kiosks and a server connected in a local network. Each of those sampling kiosks is formed by a computer screen, a Raspberry Pi board, a waterproof keyboard and a mouse (**Figure 1**).

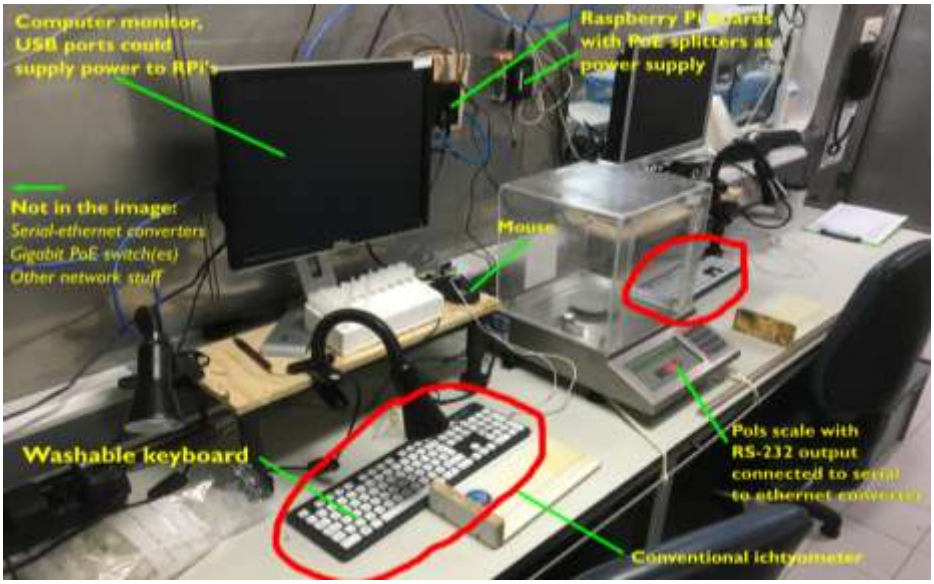


Figure 1. Typical icrOS sampling kiosks setup at R/V Ramón Margalef.

The server runs a PostgreSQL+PostGIS database where data from sampling is stored, a R-Shiny server for data quality checks and reports and a LTSP (Linux Terminal Server Project) which delivers the sampling software and applications to the sampling kiosks at boot time, easing the maintenance of the sampling software across the system.

Additional hardware such scales, GPS, echosounders, icrOS electronic measuring board, etc., can be connected to the system for data capture. In the case of scales, what is particularly recommended to reduce data errors due to bad weighing data recording, the system currently supports data capture from METTLER-TOLEDO, Marel and POLS scales. The icrOS electronic measuring board, however, is designed for sampling of length frequency distributions (LFD) and not for the biological sampling of the individual length measurement, despite it can be used as a conventional measuring board.

Label printers ZEBRA-ZPL2 language compatible can be connected to the system for printing specimen identification labels for labelling vials, etc. with a simple specimen code.

The sampling software consists in several applications for haul events data (position, time, depth...), catch sampling, LFD samplings and biological sampling. Biological sampling is performed using sampling protocols, defined before the sampling (**Figure 2**). For protocol definition, the user chooses the variables to be sampled (numerical for weight or length, categorical for keys, Boolean...) between a set of user defined variables and their sampling order, whether the variable value has a default value or not, if it can be locked (keep the value between specimens, useful when a given value, i.e., the same maturity appears across all the specimens). When the sampling starts, the sampling application reads the selected protocol (**Figure 3**), stored in the system database, and creates the user interface form for that protocol. This makes possible for the application to virtually sample any species (fishes, crustaceans...) if the proper protocol and variables have been defined for it.

The stages of the categorical variables (keys) are set at variable definition time. At sampling time, the user interface provides the user with drop-down lists for the categorical variables with that predefined stages, so the input of values not present in the keys is not possible, providing some extent of quality assurance to the system (**Figure 4**).

The sampling application can also be used for editing the values and samples previously input in case of error correction, and marking any individual variable of the sample as outlier/bad/invalid data is possible (i.e., after checking it is possible to mark as bad data only eviscerated weight for a particular sample, but the rest of the data remains valid).

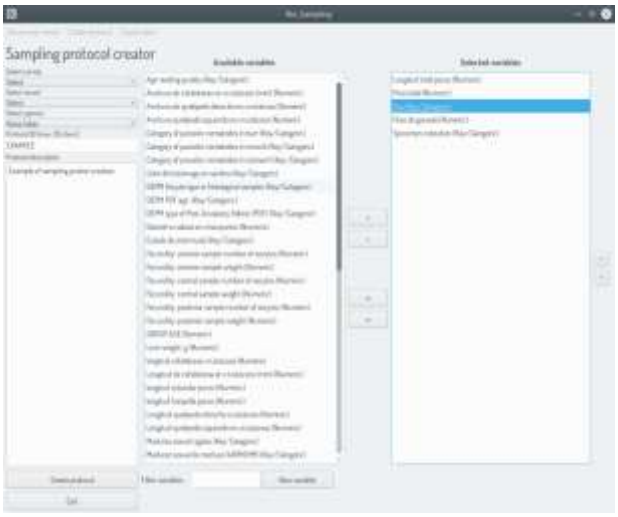


Figure 2. Sampling protocol creator.

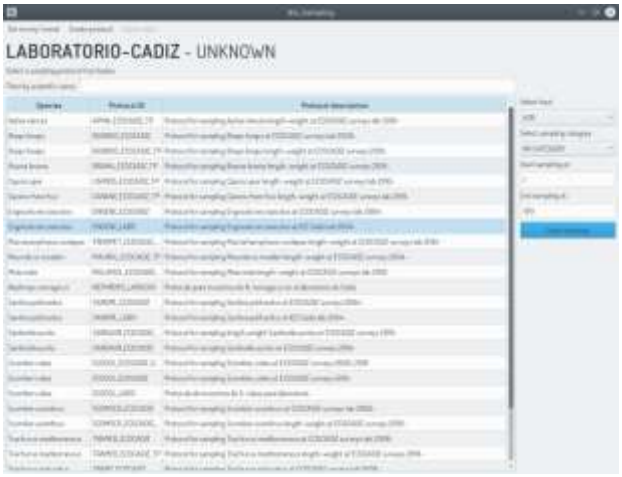


Figure 3. Selection of the sampling protocol.

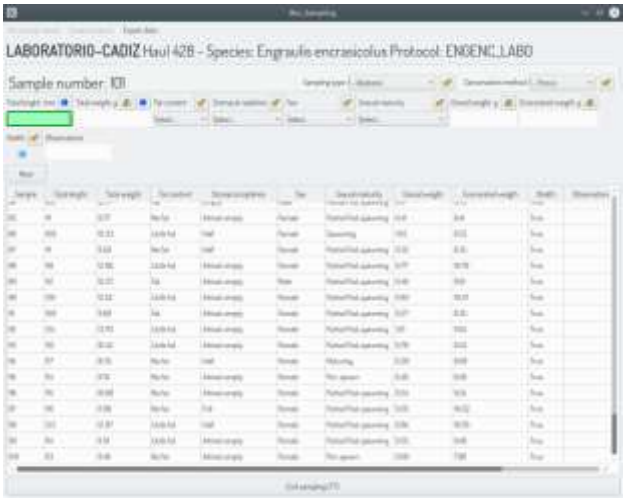


Figure 4. Biological sampling.

The system provides also applications for quality check, which are currently under development and also for data extraction and reporting. These applications are run in a R-Shiny server and can be accessed from any computer connected to the system network.

Data capture documentation:

For the icrOS software/hardware system a first description of the system can be found at ICES WKSEATEC (Workshop on Technical Development to Support Fisheries Data Collection) 2017 Report, pages 16-34 available at

https://www.ices.dk/publications/library/Pages/default.aspx#Default={%22k%22:%22wkseatec%22,%22r%22:[{%22n%22:%22owstaxIdPublicationYear%22,%22t%22:[%22\%22%C7%82%C7%824c307c233038373263363262652d353934352d343662362d396663642d6565626466643830306666617c32303137\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null},{%22n%22:%22ReportAcronymOWSCHCS%22,%22t%22:[%22\%22%C7%82%C7%82574b534541544543\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null}]}

However, most recent description of the system can be found in the RCG NANSEA RCG Baltic 2021. Part I Report. 'New data sources and technology'. icrOS. Pgs 38-39. ().

Quality checks documentation:

No documentation targeting quality checks.

Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

COST.

For small pelagic fish species sampled at ECOCADIZ_ESP, a R-Shiny application is used after sampling is complete for data checking. The application shows graphically the relationships between length, total, eviscerated and gonad weights, so outliers can be detected and corrected if necessary (Figure 5).

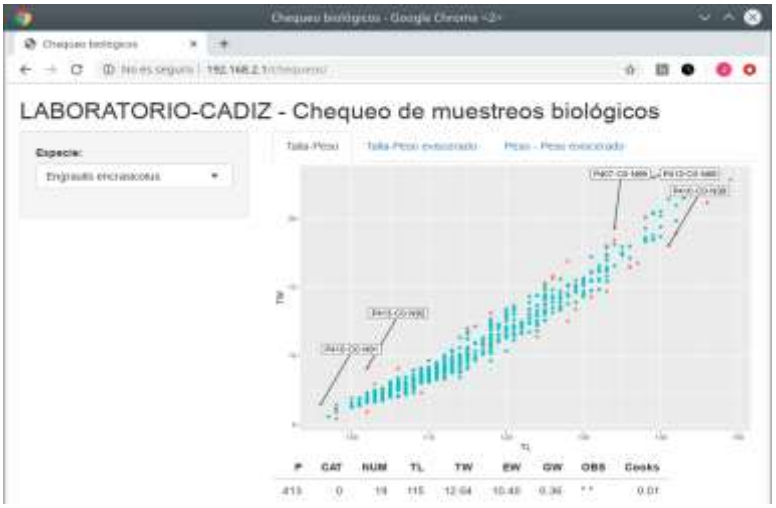


Figure 5. Application for data checking from biological sampling.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

NA.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length.

In the case of using icrOS system (GoC SPF species in 9a S), the icrOS system doesn't allow the occurrence of missing values/zeros in those variables defined as mandatory , i.e., total length or total weight.

Sample storage

The otoliths of almost all these species are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Coruña, Vigo, Santander and Cádiz. These pieces are stored systematically, without expiration date.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of anchovy from the Gulf of Cádiz, for maturity ogives, missing maturity percentages are imputed from historical data.

Quality document associated to a dataset:

No

Validation of the final dataset:

ICES Manual for acoustic surveys (WGACEGG) , sections 3.1.6

AR comment:

No survey took place in 2024 and the survey has been cancelled as ECOCADIZ index and BOCADEVA index will no longer be used in the models and no longer requested in data calls. Given that there are two other acoustic-trawl series covering the Gulf of Cadiz on an annual basis (PELAGO in spring time and ECOCADIZ-RECLUTAS in fall) and the lack of available ship time, this series has been defintiley suspended as long as the surveyed area doesn`t cover the entire distribution of the ibero-atlantic stock of sardine and only the anchovy southern stock in 9a.

During the ICES WKBANSP Benchmark assessment workshop on anchovy stocks, a data consistency analysis of acoustic surveys' age-length data of Gulf of Cadiz anchovy was presented (Zúñiga et al., WD 2024). Intra-consistency tests for the ECOCADIZ survey series result in low correlations or not correlation at all. Removing outliers did not show any improvement.

The work of the WGHANSA working group after the last benchmark has been along the lines of using the PELACUS (only for the western stock), PELAGO and ECOCADIZ RECLUTAS surveys as independent indices of the fishery, and leaving the BOCADEVA and ECOCADIZ index out of the models, which would no longer be requested in the data calls. In any case, the new approved assessment model in SS3 for the new anchovy southern stock has been designed in such a way that ECOCADIZ and BOCADEVA surveys has been included in the model only to inform on the past stock dynamics until 2023, but from 2024 onwards, neither of these two surveys series will be considered in the model. For that reason, the survey is not included in the WP from 2025 onwards.

Sampling scheme identifier: JUVENA_ESP

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: JUVENA

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The project JUVENA aims at estimating the abundance of the pelagic community, with emphasis on anchovy juvenile population as an early estimator of recruitment, with trawl-acoustic methodology in the Bay of Biscay at the end of the summer every year. The survey is coordinated between AZTI and IEO. AZTI leads the assessment studies and IEO leads the ecological studies. The methodology used to estimate the abundance of juvenile anchovy is the acoustic-trawl methodology. Details of the methodology of the JUVENA surveys were described by Boyra et al (2013).

References: Boyra, G., Martınez, 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.

Description of the population

Population targeted:

The sampling area coverS the waters of the Bay of Biscay (being 7º15' W and 47º50' N the limits, Figure 1), ICES subdivision 8 a, b, c and d2. Main target species is juvenile anchovy (*Engraules encrasicolus*). Other target species include adult anchovy, and the rest of the pelagic community in the Bay of Biscay: sardine *Sardina pilchardus* and chub mackerel *Scomber colias,* mackerel *Scomber scombrus,* horse mackerel *Trachurus trachurus,* Mediterranean horse mackerel *Trachurus mediterraneus*, and bogue *Boops boops*. blue whiting *Micromesistius poutassou*, boarfish *Capros aper*, and pearlside *Maurolicus muelleri*.

Population sampled:

This acoustic-trawl survey is a multispecies one surveying the Bay of Biscay neritic small pelagic fish species in Autumn. The sampled fractions of the target populations will be those ones inhabiting the shelf and slope waters coinciding with distribution of juvenile anchovy, i.e., tipically between 20-2000 m depth isobaths. The water column is sampled from 10 m to 500 m depth. Pelagic hauls providing biological samples are performed whenever changes are detected in echo-traces, and according to the survey time constraints (Doray *et al*., 2021).

Stratification:

At size- and at-age-abundance and biomass estimates are calculated in post-stratification regions, which are defined as areas with homogeneous species and size composition.

Sampling design and protocols

Sampling design description:

The acoustic sampling is performed during the daytime in two oceanographic vessels. The vessels follow parallel transects, spaced 18 n.mi., perpendicular to the coast along the sampling area, taking into account the expected spatial distribution of anchovy juveniles for these dates, that is, crossing the continental shelf in their way to the coast from offshore waters (Uriarte et al. 2001; Boyra et al., 2016). The transects cover fully the continental shelf and are enlarged in a semi-adaptive sampling design until at least 7.5 nautical miles (half the inter-transect distance) empty of anchovy is achieved.

Is the sampling design compliant with the 4S principle?:

NA.

Regional coordination:

Y. The JUVENA survey sampling design and methodology is coordinated every year under the ICES WGACEGG.

Link to sampling design documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi. org/10.17895/ices.pub.7462.

Compliance with international recommendations:

Yes. The JUVENA survey sampling design and methodology is coordinated and supervised every year under the ICES WGACEGG Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462

Compliance with international recommendations:

Yes. The JUVENA survey sampling protocol is coordinated and supervised every year under the ICES WGACEGG Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints.

Data capture

Means of data capture:

Survey data are collected by research vessels equipped with downward-facing echosounders (Simrad EK60 ir EK80 of 38 kHz frequency) mounted on the ship's hull, on a drop keel, or on a pole mounted on the side of the vessel. In situ on-axis calibration of the echosounders is performed before or after each survey, using standard methodology (Demer et al., 2015).

Midwater trawling (using a Hampidjan Gloria HOD 352 midwater pelagic trawl) is performed to identify acoustic targets and to assess the species and length composition of echotraces. In order to monitor the net opening, fishing depth, and fishing efficiency, all pelagic trawls are equipped with a net sounder (Marport Trawl Eye or Simrad FS70 systems) and door sensors. Trawl vertical opening varies from 10 to 15 m and minimum mesh size is 4 mm. The typical towing speed ranges from 3.5 to 4.5 knots through water. Trawl catches do not allow for the identification of single schools but are generally considered representative of fish schools observed over 2–3 nautical mile portions of the linear transects. Sampling levels for target species comprise weight, otolith, maturity and gender for anchovy (10 individuals per length class per haul), and length for all the species (100 individuals or until clear modes are obtained) using measuring board (0.5 cm resolution for anchovy and pearlside; 1 cm for the rest).

Data capture documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462

Quality checks documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462

Data storage

National database:

JUVENA data will be stored in the ICES acoustic database in December 2021.

International database:

https://www.ices.dk/data/data-portals/Pages/acoustic.aspx

Quality checks and data validation documentation:

https://www.ices.dk/data/data-portals/Pages/acoustic.aspx

Sample storage

Storage description:

The otoliths of almost all these species are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of AZTI where the samplings have been carried out: Pasaia and Sukarrieta. These pieces are stored systematically, without expiration date. Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision): No. **Editing and imputation methods:** No. **Quality document associated to a dataset:** No **Validation of the final dataset:** Using the quality checks of the ICES acoustic database.
AR comment: **Sampling design and protocols:** The vessels follow parallel transects, but the inter-transect distance has been increased from 15 to 18 n.mi. to reduce the risk of biased estimations due to insufficient coverage in case of bad weather conditions.

Sampling scheme identifier: PALPRO_ESP

MS : ESP
Region: North-East Atlantic
Sampling scheme identifier:PALPRO_ESP
Sampling scheme type: Research Survey at Sea
Observation type: SciObsAtSea
Time period of validity: from 2022 until 2027
Short description (max 100 words): Research Survey at Sea aiming at collecting data on biodiversity and biomass estimates and biological samples of the most deep-water representative species. It also tests the suitability of the commercial longline fishing gear (for dee-water sharks) modified for scientific surveys. The DST sensors installed in the main line allows to set an accurate soak time for each haul and are used to calculate fishing effort and CPUE by haul.
Description of the population
Population targeted: As the objective is to collect information about the biodiversity of the continental shelf (ICES Division 8c) around the Basque Country, target species include all the fauna present in the area at depths between 650 and 2250 meters, with special attention on sharks and teleost fishes. **Population sampled:** All species caught in the hooks are sampled. Nevertheless, the gear uses a big hook (Mustad Model 7690-9/0) and therefore only big fishes are caught and sampled. As the gear is deployed at depths higher than 650 meters not too much individuals are expected, so every single individual arriving onboard is sampled. **Stratification:**

The Bay of Biscay is located in the North-east Atlantic Ocean, in waters belonging to Spain and France. Below 4500m depth, there is an abyssal plain with some submarine mountains that rise up, often aligned in an east–west direction, reaching a height of 2000 m above the abyssal plains. The sampling stations

are located in an area 10.5 km north of Cape Matxitxako in a narrow canyon of about 28 km long that progressively decreases in depth from 500 to 2500 m. The hauls cover the whole depth range along the canyon valley in four 400 m strata: 650–1050 m, 1051–1450 m, 1451–1850m and 1851–2250m.

The stratification is based on 400m intervals following the profile of the canyon valley.

Sampling design and protocols

Sampling design description:

The experimental design is implemented to estimate and assess the inter-annual variation of the abundance and biomass indices of the deep-water ichthyofauna in the area of study. To get homogeneous and comparable data series, the hauls are carried out every year in the same position and period, covering depths from 650 to 2400 m. The stratification is based on 400m intervals following the profile of the canyon valley. A modified former commercial bottom longline fishing gear, specific

for deep-water sharks, is adapted for the survey. The gear uses 300 hooks (Mustad Model 7690-9/0), and the soak time is set at 4 h (STECF, 2013). The fishing gear consists of 150 hooks in contact with the bottom, and 150 hooks in a floating section, all of them baited with a third of Atlantic mackerel (*Scomber scombrus*)

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

N

Link to sampling design documentation:

A description of the sampling design and the results of previous surveys are available in: Diez G, Arregi L, Basterretxea M, Cuende E, Oyarzabal I (2021). Preliminary observations on abundance and distribution of fish fauna in a canyon of the Bay of Biscay (ICES Division 8c). Journal of the Marine Biological Association of the United Kingdom 101, 169–178.

Compliance with international recommendations:

Y (ICES WGEF)

Link to sampling protocol documentation:

In 2020 it was presented a Working Document in the ICES WGEF summarizing the first five years of the survey:

Diez, G., Arregi, L., Basterretxea M., Cuende E., Oyarzabal, I. Abundance, biomass and CPUE of deep-water sharks through a five-year deep-water longline survey in the Bay of Biscay (ICES 8c). Working Document presented to the Working Group on Elasmobranch Fishes. ICES WGEF, 16th – 25th, June 2020, WG On line. 9 pp.

Compliance with international recommendations:

Y (ICES WGEF)

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

NA

Data capture

Means of data capture:

Sampled fishes are measured with a measuring board and biological samples are collected and stored in a freezer onboard.

There is a specific software for the data collected by the DST sensors, which is analysed onboard.

Data capture documentation:

Results of previous surveys are available through of the annual report which is available upon request:

G. Díez, L. A. Errazkin ,M. Basterretxea, I Oyarzabal, E. Cuendes,A. Maceira, A. Abaroa,. 2019. Campaña piloto de palangre de profundidad para la estima de abundancia de tiburones y otras especies en la 8c (PALPROF 2020).

They can also be found in Diez et al, 2021

Quality checks documentation:

No

Data storage

National database:

NA

International database:

The series of data haave been presented and included in the Report of the ICES WGEF 2020 for the ssessing the status of several deep sea shark stocks.

The data series of elasmobranch data (abundance, Nº species, sex, maturity, length, position, date and haul information) have been also submitted in 2020 to data.call@ices.dk for answering the Joint OSPAR and NEAFC Request for data and metadata to be used as the basis to answer the for advice on deep sea sharks, rays and chimaeras. The aim of this request was intended to localize and record data across all countries with records on species from annex 1 from national or international coordinated surveys in order to to provide valuable information before the WKSHARK-6 meeting hold in January 2020.

Quality checks and data validation documentation:

The quality of collected data is checked with expert knowledge and comparing with data from previous years.

Sample storage

Storage description:

Biological samples (soft tissues) are stored in a freezer, inside plastic bags.

Sample analysis:

Data processing

Evaluation of data accuracy (bias and precision):

No

Editing and imputation methods:

NA

Quality document associated to a dataset:

Yes

Diez et al, 2021

Validation of the final dataset:

NA

AR comment: No deviations or developments.

Sampling scheme identifier: MEDIAS

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: MEDIAS

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The main objective of the research survey at sea MEDIAS (Mediterranean International Acoustic Survey) is to evaluate the abundance, biomass and distribution of small pelagic stocks by means of scientific echosounders (direct method), independently of the data provided by commercial fisheries (indirect method).

Description of the population

Population targeted:

The population targeted are sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) small pelagic stocks in GSAs 1, 5 and 6.

See MEDIAS handbook (April 2021)

http://www.medias-project.eu/medias/website/

Population sampled:

The species object of study and data collection are sardine and anchovy, although the accompanying pelagic community detected with scientific echo sounders is also studied

See MEDIAS handbook(April 2021)

http://www.medias-project.eu/medias/website/

Stratification:

The level of stratification is geographic strata according to GSAs (1, 5 and 6), covering the continental shelf area (from 30 to 250 m depth).

Sampling design and protocols

Sampling design description:

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, equiped 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) (m2/mn2) 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 wich abundance (nº 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. Hidrological variables are collected by CTD's.

See MEDIAS handbook(April 2021)/fish sampling

http://www.medias-project.eu/medias/website/

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

Y. MS participating are Spain, France, Greece, Croatia, Italy, Malta and Slovenia.

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Link to sampling design documentation:

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Compliance with international recommendations:

Y

Link to sampling protocol documentation

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

During the survey, hauls are adaptive, only when echotraces (schools) appear and need to be identified.

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Data capture

Means of data capture:

Biological data (pelagic hauls) are acquired by means of pelagic gears *63.5/51* and *63.5/54*; vertical opening: 16-18 m; with a cod-end mesh size of 20 mm.

The netsonder FS20/25 (Simrad) is used to monitor the correct shape of the net's mouth as well as the entering of schools through the net mouth.

The MARPORT system is used to monitor the arrival and departure of the net from near the seabed, to estimate its horizontal and vertical openings, water temperature and salinity as well as to confirm the arrival of schools to the fishing net codend.

MEDIAS handbook (April 2021) http://www.medias-project.eu/medias/website/

All data of the haul (positions, depth and velocity, as well as species list, length distributions and biological data of species in the catch) are captured on paper. All data are keyed on board into the excel database.

The treatment of catches are detailed in the MEDIAS handbook (April 2021) http://www.medias-project.eu/medias/website/

Weight of all species in the caught, as well as for individuals of the MEDIAS reference list of target species, are registered with marine scales. Length measurements of fish and cephalopods are taken with ichtyometers, while calipers are used for crustaceans.

Data capture documentation:

MEDIAS reports. http://www.medias-project.eu/medias/website/

Quality checks documentation:

Y

First, the information collected on paper is computerized by two people who do a first check of the data, correcting errors on the paper and comparing the information. Then, a cross-validation is carried out by a different pair to detect any failures in the data entry. Finally, the data is refined and filtered by an expert scientist to detect possible outliers.

Data storage

National database:

There is no specific national database

International database:

There is no specific international database.

Quality checks and data validation documentation:

The data validation is carried out once the initial data (paper) have been computerized and double checked. The data validation process consists of identifying outliers through exploratory statistical analyzes such as box-plot and verifying that

the estimated biological parameters (height, weight, sex ratio ...) are within the dynamic confidence intervals established for the historical series of surveys.
Data processing
Evaluation of data accuracy (bias and precision): A script in R to calculate geostatistical CV associated with biomass estimates from acoustic survey, based on Walline et al. (2007), has been created by Marco Barra (CNR) and tested by all MEDIAS groups. This procedure is considered mandatory to calculate geostatistical CV to be provided along with acoustic estimates. See MEDIAS handbook(April 2021)/survey design http://www.medias-project.eu/medias/website/ **Editing and imputation methods:** NA **Quality document associated to a dataset:** N **Validation of the final dataset:** The validation of the final information is checked through specific routines developed in R. R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/
AR comment: No deviations or developments.

Sampling scheme identifier: MEDITS

MS: ESP
Region: Mediterranean and Black Sea
Sampling scheme identifier: MEDITS
Sampling scheme type: Research survey at sea
Observation type: SciObsAtSea
Time period of validity: from 2022 until 2027
Short description (max 100 words): The main objective of the research survey at sea MEDITS is to evaluate the abundance and distribution of demersal stocks, independently of the data provided by commercial fisheries, and to assess the impact of the fishing activity on the environment.
Description of the population
Population targeted: The population targeted are demersal fishes, decapods crustaceans and cephalopods in GSAs 1, 2, 5 and 6. See MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm **Population sampled:** Since 2012, the MEDITS reference list of target species includes 82 demersal species, 32 of them are elasmobranches. See Annex VI of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm **Stratification:** Two levels of stratification: (1srt) geographic strata according to GSAs and, within some of them, zones limited by lines more or less perpendicular to the coast, depending on the geographical characteristics of each area; (2on) five bathymetric strata within each GSA or zone (10-50 m, 51-100 m, 101-200 m, 201-500 m and 501-800 m). See Annex II of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Sampling design and protocols

Sampling design description:

The hauls are positioned following a depth stratified sampling scheme with random drawing of the positions within each stratum. The number of positions in each stratum is proportional to the area of these strata. Except in the case of peculiar problems (e.g. damages noted in previous years), the hauls are made in the same position from year to year.

See Section 2.3 of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

Y. MS participating are Albania, Cyprus, Spain, France, Greece, Croatia, Italy, Malta, Montenegro and Slovenia.

See Table 1 and Annex I of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Link to sampling design documentation:

MEDITS Handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Compliance with international recommendations:

Y

Link to sampling protocol documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.

MEDITS Handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Compliance with international recommendations: Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

If needed, the sampling re-allocations are made to adjacent fishing grounds of the bottom trawl fleet in the GSAs 1, 2, 5 and 6, mapped from Satellite-based Vessel Monitoring System (VMS).

Data capture

Means of data capture:

The gear GOC-73 is a bottom trawl designed for experimental fishing, with a cod-end mesh size of 20 mm. The MARPORT system is used to monitor the arrival and departure of the net from the seabed and to estimate its horizontal and vertical openings. The bottom water temperature and salinity is recorded with the use of a CTD SBE-37, coupled to the flotsam of the net.

See Section 1 and Annex XVI of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm.

All data of the haul (positions, depth and velocity, as well as species list, length distributions and biological data of species in the catch) are captured on paper. All data are keyed on board into the SIRENO database.

The treatment of catches are detailed in the MEDITS Handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm.

Weight of all species in the caught, as well as for individuals of the MEDITS reference list of target species, are registered with marine scales. Length measurements of fish and cephalopods are taken with ichtyometers, while calipers are used for crustaceans.

Data capture documentation:

MEDITS Handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Quality checks documentation:

Y. Firstly, the information collected on paper is compared with the keyed data on board. Secondly, the ROME software is used for checking the data compiled in the 5 files types used to store and exchange MEDITS data: TA, TB, TC, TE and TL.

See Sections 5.2 and 5.3 of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm

The ROME software to perform multiple check of MEDITS data can be download from:

http://www.coispa.it/index.php?option=com_content&view=article&id=34&Itemid=119&lang=it#block

Sample storage

Storage description:

The otoliths and ilicia are stored dry in boxes, duly labelled, at the IEO oceanographic centers where age reading is carried out: Centro Oceanográfico de Málaga, Centro Oceanográfico de Murcia and Centro Oceanográfico de Baleares. These pieces are stored systematically, without expiration date.

See Annex XIV of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm

Stomach contents sampling is made on board and at the Laboratory. In that case, individual stomachs are preserved in ethanol and whole specimens are stored frozen.

Specimens of taxonomic interest are deposited in the Marine Fauna Collection based at the Centro Oceanográfico de Málaga (IEO): http://www.ma.ieo.es/cfm/

Sample analysis:

Otoliths reading of Mullus barbatus and M. surmuletus:

Mahé, K., Elleboode, R., Charilaou, C., Ligas, A., Carbonara, P. and Intini, S. 2012. Striped red mullet (Mullus surmuletus) and red mullet (M. barbatus) otolith and scale exchange 2011, 30 pp.

http://www.coispa.it/docs/Red%20mullet%202012.pdf.

Mahé K., Anastasopoulou A., Bekas P., Carbonara P., Casciaro L., Charilaou C., Elleboode R., Gonzalez N., Guijarro B., Indennidate A., Kousteni V., Massaro A., Mytilineou C., Ordines F., Palmisano M., Panfili M. and Pesci P., 2016. Report of the Striped red mullet (Mullus surmuletus) and Red mullet (Mullus barbatus) Exchange 2016, 21pp.

https://archimer.ifremer.fr/doc/00348/45922/45615.pdf.

Carbonara P., W. Zupa, A. Anastasopoulou, A. Bellodi, I. Bitetto, C. Charilaou, A. Chatzispyrou, R. Elleboode, A. Esteban, M.C. Follesa, I. Isajlovic, A. Jadaud, C. García-Ruiz, A. Giannakaki, B. Guijarro, S.E. Kiparissis, A. Ligas, K. Mahé, A. Massaro, D. Medvesek, C. Mytilineou, F. Ordines, P. Pesci, C. Porcu, P. Peristeraki, I. Thasitis, P. Torres, M.T. Spedicato, A. Tursi and L. Sion.- 2019. Explorative analysis on red mullet (Mullus barbatus) ageing data variability in the Mediterranean. Scientia Marina, 83S1: 271-279.

https://doi.org/10.3989/scimar.04999.19A.

OTOLITHS READING OF MERLUCCIUS MERLUCCIUS:

Report of the Workshop on Age Validation Studies of Gadoids (WKAVSG), 2013:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKAVSG/WKAVSG%202013.pdf

ILICIA READING OF LOPHIUS BUDEGASSA AND L. PISCATORIUS:

Anglerfish Illicia/Otoliths Ageing Workshop, 2011

https://www.ices.dk/community/Documents/PGCCDBS/Anglerfish%20(Lophius%20piscaorius)%20illicia%20and%20otoliths%20exchange%202011_.pdf

Data processing

Evaluation of data accuracy (bias and precision):

N

Editing and imputation methods:

NA

Quality document associated to a dataset:

N

Validation of the final dataset:

The ROME software is used for checking the data compiled in the 5 files types used to store and exchange MEDITS data: TA, TB, TC, TE and TL.

See Sections 5.2 and 5.3 of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm.

The ROME software to perform multiple check of MEDITS data can be download from:

http://www.coispa.it/index.php?option=com_content&view=article&id=34&Itemid=119&lang=it#block

AR comment: No deviations or developments.

Sampling scheme identifier: UWTV30

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: UWTV30

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Description of the population

Population targeted:

The target specie from the UWTV30 survey is the Norway lobster (*Nephrops norvegicus*) and the main survey area is ICES Division 9.a, FU 30 (Gulf of Cadiz) for the stock nep.fu.30. The UWTV30 survey (ISUNEPCA) covers the *Nephrops* distribution on the Spanish waters in the Gulf of Cadiz from 130 to 650 m of depth approximately.

Population sampled:

The target population will be sampled in a yearly basis. The UWTV30 survey is directed at *Nephrops norvergicus*. Timing for surveying is June. It can be considered an ecosystem survey because underwater images are used to collecting ancillary information about other benthic mega-fauna species, litter and trawl marks. In addition, oceanographic data are also collected using a CTD.

Stratification:

No stratification is considered.

Sampling design and protocols

Sampling design description:

The UWTV designs followed a randomized isometric grid of stations at 3.5 nm spacing. The *Nephrops* ground perimeter was established using a combination of VMS and logbook data (2011-2012), *Nephrops* abundance data from bottom trawl surveys series (SP-GCGFS-Q1_IBTS) (1994-2014) and bathymetric and morphologic information (INDEMARES project). A new

UWTV30 survey area was established in the WGBIE 2023 (ICES, 2023) since nowadays new and more accurate information is available. The new area coverage is 2332,13 Km2 (approximately 22% less than the current area). The new sampling grid with stations spacing 3.5 nm, instead 4 nm used currently, was modified to ensure good coverage and accurate burrow surfaces.

Additionally, stations located on the shallower edge of the study area are considered in order to verify the boundary of the *Nephrops* distribution. The sled, 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 sled is used to obtain the sled position. The distance over ground estimate (DOG) is calculated using the sled position and the field of view of the video footage is 75 cm (FOV), which is confirmed using fun lasers.

Is the sampling design compliant with the 4S principle

NA

Regional coordination: Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.

N.

Link to sampling design documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp. Section 3.1.1 & Annex 1.

.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

Compliance with international recommendations:

Y. The sampling design of the UWTV30 survey is in line with international recommendations. Survey is planned and coordinated under the framework of the ICES WGNEPS (Working Group on *Nephrops* Surveys).

Link to sampling protocol documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

.

Compliance with international recommendations:

Y. The sampling protocol documentation of the UWTV30 survey is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGNEPS.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA.

Data capture

Means of data capture:

The sled used to collecting underwater images is a stainless steel structure AISI 316L where all equipments are mounted. This equipment has a HD life camera, 4K UHD recording camera in a angle of 45°, 2 photo cameras (20 Mpixel) which can

be use in order to obtain the same scene since two different angles, 4 spotlights with independent intensity control, 3 point lasers forming a triangle of 70 mm side inside of the recording camera cylinder and 2 fun lasers on the structure to confirm the field of view (FOV) whose distance can be graduated between 30 cm and 1 m (FOV used 75 cm), battery to power the equipments, CTD, altimeter and a desk unit in order to control the whole of system (see figure 1).

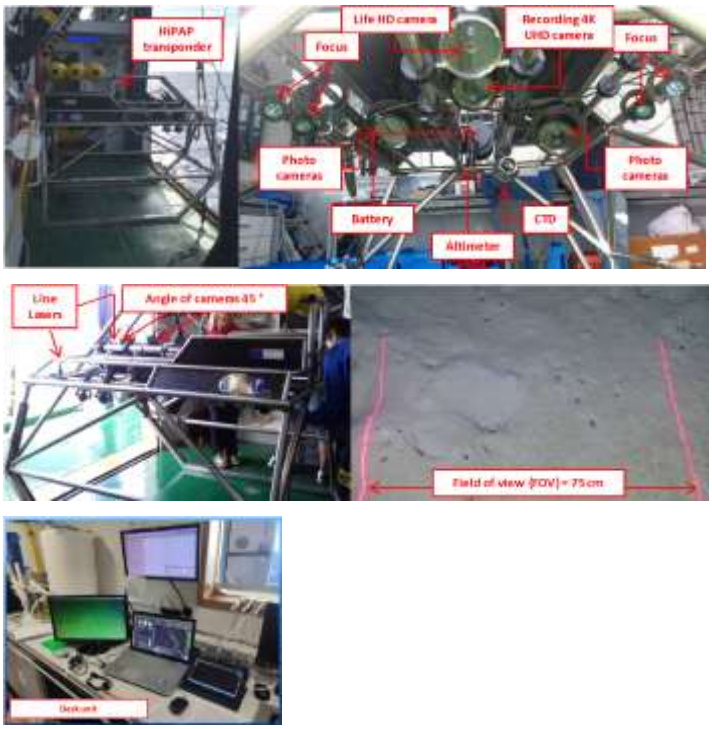


Figure 1. Sled and desk unit used in UWTV30 surveys.

For the each station, date, time, vessel position (GPS), sled position (HiPAP) and depth are recorded during the track (10 minutes) by the software/hardware system in the desk unit. In addition, initial and final data are register also on paper. Footage and data files are downloaded in a hard disc drive after each dive. Oceanographic data is recorded during the track and stored by the CTD. CTD data are downloaded in a hard disc drive after each dive.

Footages are viewed with a laptop and Ultra HD screen using VLC media player software. *Nephrops* burrows counts and ancillary information is recorded on paper and computerizes as soon as possible.

Data capture documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

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Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

Y.

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp. Sections 3.1.8, 3.2.7

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp..

Data storage

National database:

There is no specific national database for *Nephrops* UWTV surveys data.

International database:

There is no specific international database for *Nephrops* UWTV surveys data.

ICES WGNEPS recently includes a ToR about the needed to develop of an international database for *Nephrops* UWTV surveys data which will hold burrow counts, ground shape files and associated data. The first steps just have been given.

Quality checks and data validation documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

Sample storage

Storage description:

Footages, telemetry and CTD data are stored in two hard disc drives during the survey and in a network attached storage (NAS) drive in the lab when the survey is finalized.

Sample analysis:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp. Section 5.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

Data processing

Evaluation of data accuracy (bias and precision):

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

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Editing and imputation methods:

N

Quality document associated to a dataset:

N

Validation of the final dataset:

Using the quality checks of the ICES UWTV surveys

AR comment:

Sampling design and proocols

The Nephrops area distribution and coverage of the survey was accepted by the Benchmark Workshop WKNEP in 2016 and this survey was considered as appropriated to providing scientific advice on the abundance of this stock. However, experience acquired during UWTV30 ISUNEPCA survey time series suggests the survey area should be smaller than the current coverage area for this UWTV survey. A new UWTV30 survey area was established in the WGBIE 2023 (ICES, 2023) since nowadays new and more accurate information is available. The Andalusia Regional Government vessel monitoring system instead the traditional VMS, information obtained from the bottom trawl survey index time series (SpSGFS-cspr-WIBTS-Q1 (G7511) and SpGFS-caut-WIBTS-Q4 (G4309)) (1994-2020 period), beam trawl and sediment samples obtained in the ISUNEPCA UWTV survey (U9111) during 2017–2019, as well as, the more detailed seabed morphology information and new information about the relationship between sediments and habitats in the Gulf of Cadiz were used for the definition of the new area survey. The new area coverage is 2332,13 Km2 (approximately 22% less than the current area). A new sampling grid with stations spacing 3.5 nm, instead 4 nm used currently, is also modified to ensure good coverage and accurate burrow surfaces.

Sampling scheme identifier: IBTS_Q1

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBTS_Q1

Sampling scheme type: Research survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The Southern Spanish Groundfish Survey on the Gulf of Cádiz (SP-GCGFS) is con-ducted in the southern part of ICES Division 9a, the Gulf of Cádiz. The covered area extends from 15 m to 800 m depth, during spring (March).

Description of the population

Population targeted:

The survey area corresponds to the Spanish shelf waters of the Gulf of Cadiz (GoC, 20-800 m depth), ICES subdivision 9a South, and it is conducted in **spring** time. The trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main small demersal fish (SPF) inhabiting the GoC neritic waters). The main assessed target species are: hake *Merluccius merluccius*, shrimp *Parapenaeus longirostris*, Octopus *Octopus vulgaris*, Squid *Loligo vulgaris*, Cuttlefish *Sepia officinalis*

Population sampled:

This bottom-trawl survey is a multispecies one surveying the 9aS demersal and benthic fish species in autumn. The sampled fractions of the target populations will be those ones inhabiting the grounds of the shelf between 20-800 m depth isobaths, not weighted to the area since is not considered representative for the whole deep area. The timing and spatial coverage of this survey has been defined to assess abundance of the fish commercial species and the strength of the annual recruitment of species as hake, megrims or anglers.

Stratification:

Then, the whole area (7224 km2) 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.

Sampling design and protocols

Sampling design description:

Haul allocation is random avoiding sampling contiguous 5 nm squares, but number of hauls per strata is proportional to the area of the strata, area that is used to obtain abundance weighted to the area of the strata.

The sample/subsample of the catch is selected by a Simple Random Sampling (SRS) though size categories are used in species with large catches and skewed size distribution. Individuals of the selected samples are used to obtain various biological variables are collected until the expected number of samples per size range is reached).

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

Y. Sampling design and protocols are developed in the framework of the IBTSWG (ICES working group on Internation bottom trawl surveys).

PRT, FRA, IRL, GBR, DNK, BEL, DEU, NLD, NOR, SWE

Link to sampling design documentation:

The sampling design is available in the Manual for the International Bottom Trawl Surveys, Section 7.10.1

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

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

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%2011_Manual%20for%20the%20North%20Sea%20International%20Bottom%20Trawl%20Surveys.pdf

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

Trawl hauls providing biological samples and the total of muddy and sandy bottoms. The number of trawls (45) in a relatively high sampling coverage of the GoC SPF community.

Data capture

Means of data capture:

A complete report of the methodology and equipment used is available in the Manual of the International Bottom Trawl Surveys in the Western and Southern Areas sections 3 and 7.10

Data capture documentation:

IBTS Western and Southern Areas Manual sections 3 and 7.10

Quality checks documentation:

IBTS Western and Southern Areas Manual section 7.10

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

DATRAS (ICES)

Quality checks and data validation documentation:

No documentation targeting quality checks. Analysis and detection of outliers for biological parameters, their weight-length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with ggplot2 package, etc.

Sample storage

Storage description:

The otoliths are kept in vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres of Cádiz where the samplings are carried out. These pieces are stored systematically, without expiration date.

Sample analysis:

See Annex 1.1 ESP_IEO_P1_Biological_Specific.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N.

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

AR comment: No deviations or developments.

Sampling scheme identifier: BOCADEVA

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: BOCADEVA

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Adaptive sampling scheme aiming at collecting ichthyoplankton samples with PairoVET and CUFES samplers in a pre-defined grid of sampling stations along transects perpendicular to the coast for next pelagic species included in Table 2.2 of the WP: ***Engraulis encrasicolus*** (target species). *Sardina pilchardus*, *Sardinella aurita* and "Other fishes" eggs are also sorted and counted. Simultaneously to ichthyoplankton samples, CTDF casts, and fishing hauls are undertaken over the entire spawning region. The survey is coordinated with ECOCADIZ_ESP acoustic survey which provides the samples to estimate the adults parameters (sex ratio, female weight, batch fecundity and spawning fraction) needed to apply the DEPM.

Description of the population

Population targeted:

The main target species from a survey perspective is *Engraulis encrasicolus* and the survey area is ICES subdivision 9.a South (Portuguese and Spanish Gulf of Cadiz (GoC) waters). BOCADEVA survey covers the southern component of the anchovy stock in 9a (ane.27.9a).

Population sampled:

The target population will be sampled in a triennial basis. To obtain spawning stock biomass of GoC anchovy, the BOCADEVA survey is directed at egg abundance and spawning area definition for daily egg production determination and at adult sampling for daily fecundity calculation. Timing for surveying is the peak spawning period of the targeted species; accordingly, the survey is carried out in July in GoC waters. All surveys covered under the auspices of ICES WGACEGG (*Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic*) are considered ecosystem surveys and data collection is not limited to the target species alone.

Stratification:

The sampling design is not stratified, as the target species (adults and eggs) can potentially be distributed over the whole sampling area. Nevertheless, post-strata may be further defined to estimate post-stratified egg and adult parameters and total SSB if a clear spatial pattern is observed in such parameters and if the variance in these estimates can be reduced with this post-stratification.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined according to the species' life-cycle component to be sampled:

For the ichthyoplankton component of the population: a grid of transects, along which the fixed PairoVET stations PairoVET are located. An adaptive design is also applied with the aid of the auxiliary CUFES, the use of which helps in delimiting anchovy spawning areas and adapting the sampling intensity and the offshore limit of PairoVET sampling.

For the adult component of the population: fishing hauls are carried out for the estimation of adult parameters (sex ratio, female weight, batch fecundity, and spawning fraction) within the mature component of the anchovy population. Surveying for adults takes place quasi-simultaneously with ichthyoplankton sampling. Fishing hauls should be distributed over the surveyed region according to fish abundance distribution. The number of samples and their spatial distribution is thus organized to ensure good and homogeneous coverage of the survey area and an adequate representation of population demography and distribution. Fishing hauls are conducted by pelagic trawling, following the detection of species schools by echosounder.

For logistical reasons, the adult samples for the DEPM that would correspond to BOCADEVA survey will be taken in the ECOCADIZ_ESP survey, which coincides in time and space. In addition, complementary fish market sampling might be carried out if needed.

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

BOCADEVA surveys are carried out triennially since 2005 by Spain (Instituto Español de Oceanografía, IEO-CSIC). These surveys are coordinated and their sampling scheme and analytical methodologies standardized within the frame of the ICES WGACEGG.

Link to sampling design documentation:

BOCADEVA survey sampling design is described in *ICES Cooperative Research Report* 332. Section 2.5.1. Available at:

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

Compliance with international recommendations:

Yes. The sampling design of the BOCADEVA surveys is in line with international recommendations. The survey is planned and coordinated under the framework of the ICES WGACEGG.

Link to sampling protocol documentation:

BOCADEVA survey sampling protocol is described in *ICES Cooperative Research Report* 332: Section 2.5

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

Compliance with international recommendations:

Y. The sampling protocol documentation of the BOCADEVA is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGACEGG.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

The adaptive design applied to ichthyoplankton sampling and the facts that the surveying for adults takes place simultaneously with ichthyoplankton sampling and that the fishing hauls should be distributed over the surveyed region according to fish abundance distribution, should guarantee an adequate sampling for the application of the DEPM.

Data capture

Means of data capture:

Ichthyoplankton and CTDF sampling:

For the fixed stations of ichthyoplankton (PairoVET), date, time, position (GPS), sampling and bottom depth data, cable released and flowmeter readings are registered on paper and transcribed to spreadsheet as soon as possible. Data for the CUFES sampling is registered electronically with a tailored software/hardware system connected to GPS (**Figure 1**), and data are subsequently uploaded to the spreadsheet database.



Figure 1. Software/hardware system for CUFES sampling.

Specific software consisting of modular, menu-driven routines for acquisition, display, processing, and archiving of oceanographic data acquired with Sea-Bird equipment is used for the profiles of temperature, salinity and fluorescence.

Adults sampling:

Except for searching anchovy females with hydrated gonads (for the estimation of the batch fecundity, F), fishing stations are mostly conducted during daylight hours and carried out once echotraces supposedly belonging to anchovy are detected by echo-sounder. For the estimation of spawning fraction (S), a minimum of 30 mature, non-hydrated females per sample is sought, so a minimum of 60 random anchovies are sampled, adding batches of 10 random individuals to the sampling until the goal is achieved or a maximum of 120 anchovies are sampled. Sex-ratio (R) and female weight (W) are also obtained from this random sampling. When hydrated females (HF) appeared, an additional directed sampling is done in order to obtain a minimum of 150 HF for the whole area prospected. Gonads from both hydrated and non-hydrated females are preserved in 4% buffered formaldehyde.

Biological data from GoC *Engraulis encrasicolus* (collected as above)*, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus*, *Trachurus mediterraneus, Trachurus picturatus* and *Boops boops* (from SRS samples of 50 individuals from the catch of pelagic hauls) are captured electronically with a tailored software/hardware system (icrOS) and data are subsequently uploaded to the IEO SIRENO database.

The icrOS system simplest hardware setup comprises one or more sampling kiosks and a server connected in a local network. Each of those sampling kiosks is formed by a computer screen, a Raspberry Pi board, a waterproof keyboard and a mouse (**Figure 2**).

The server runs a PostgreSQL+PostGIS database where data from sampling is stored, a R-Shiny server for data quality checks and reports and a LTSP (Linux Terminal Server Project) which delivers the sampling software and applications to the sampling kiosks at boot time, easing the maintenance of the sampling software across the system.

Additional hardware such scales, GPS, echosounders, icrOS electronic measuring board, etc., can be connected to the system for data capture. In the case of scales, what is particularly recommended to reduce data errors due to bad weighing data recording, the system currently supports data capture from METTLER-TOLEDO, Marel and POLS scales. The icrOS electronic measuring board, however, is designed for sampling of length frequency distributions (LFD) and not for the biological sampling of the individual length measurement, despite it can be used as a conventional measuring board.

Label printers ZEBRA-ZPL2 language compatible can be connected to the system for printing specimen identification labels for labeling vials, etc., with a simple specimen code.

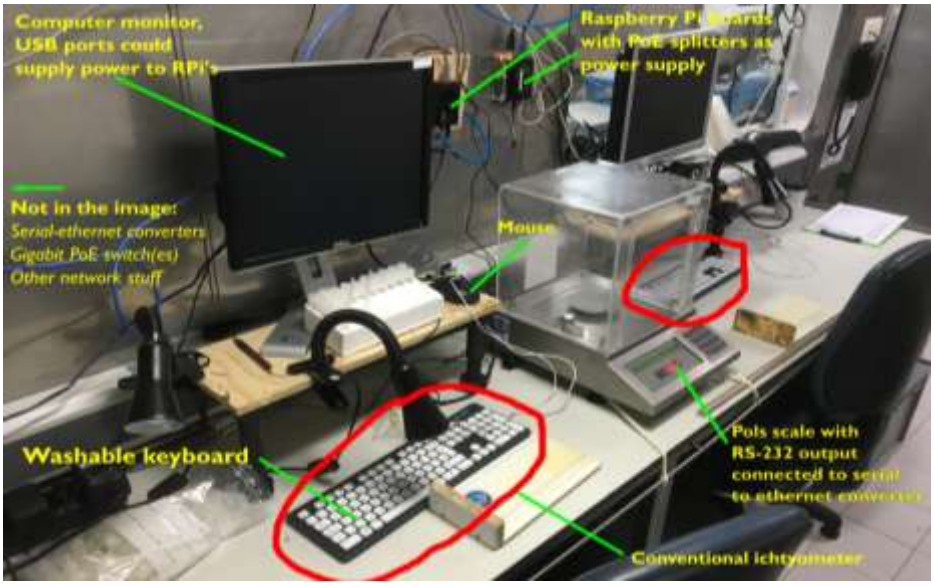


Figure 2. Typical icrOS sampling kiosks setup at R/V *Ramón Margalef*.

The sampling software consists in several applications for haul events data (position, time, depth...), catch sampling, LFD samplings and biological sampling. Biological sampling is performed using sampling protocols, defined before the sampling (**Figure 3**). For protocol definition, the user chooses the variables to be sampled (numerical for weight or length, categorical for keys, Boolean...) between a set of user defined variables and their sampling order, whether the variable value has a default value or not, if it can be locked (keep the value between specimens, useful when a given value, i.e., the same maturity appears across all the specimens). When the sampling starts, the sampling application reads the selected protocol (**Figure 4**), stored in the system database, and creates the user interface form for that protocol. This makes possible for the application to virtually sample any species (fishes, crustaceans...) if the proper protocol and variables have been defined for it.

The stages of the categorical variables (keys) are set at variable definition time. At sampling time, the user interface provides the user with drop-down lists for the categorical variables with that predefined stages, so the input of values not present in the keys is not possible, providing some extent of quality assurance to the system (**Figure 5**).

The sampling application can also be used for editing the values and samples previously input in case of error correction, and marking any individual variable of the sample as outlier/bad/invalid data is possible (i.e., after checking it is possible to mark as bad data only eviscerated weight for a particular sample, but the rest of the data remains valid).

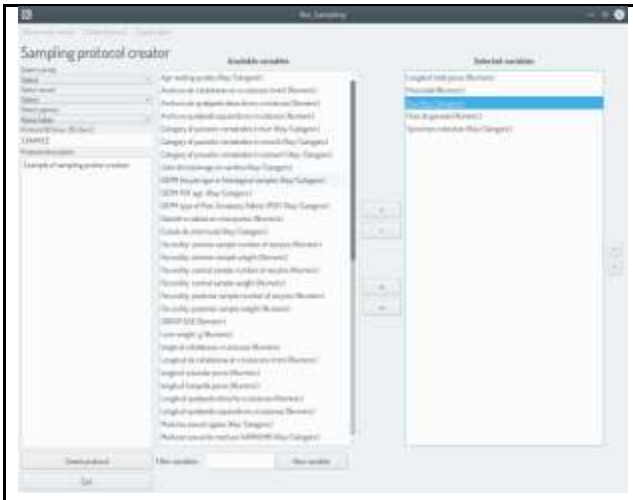


Figure 3. Sampling protocol creator.

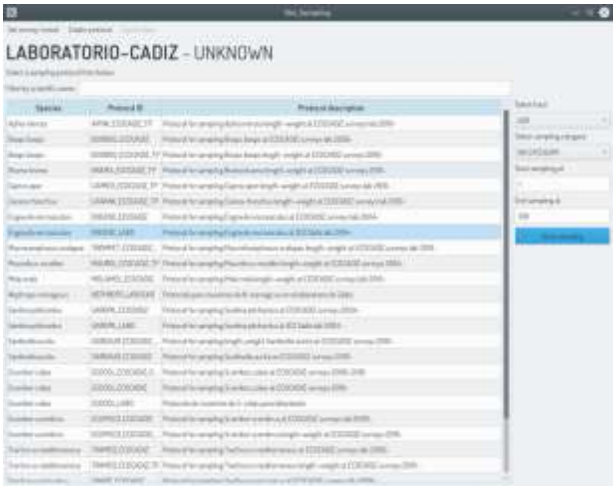


Figure 4. Selection of the sampling protocol.

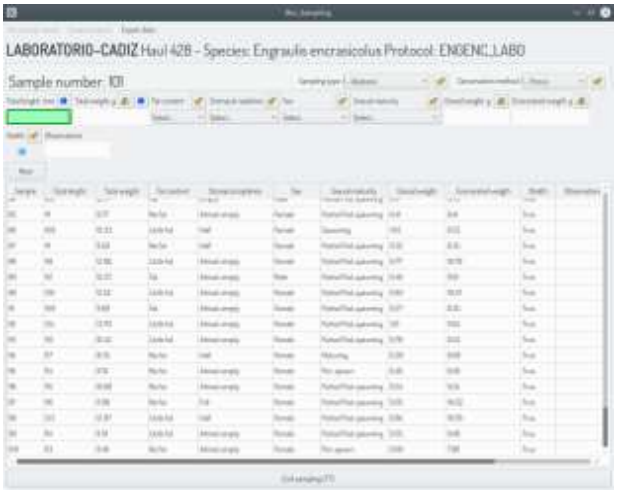


Figure 5. Biological sampling.

The system provides also applications for quality check, which are currently under development and also for data extraction and reporting. These applications are run in an R-Shiny server and can be accessed from any computer connected to the system network.

Data capture documentation:

BOCADEVA survey data capture is described in *ICES Cooperative Research Report* 332:

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

ECOCADIZ survey protocols and methods are described in Doray *et al.* (2021): Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp. Available at: https://doi. org/10.17895/ices.pub.7462.

For the icrOS software/hardware system a first description of the system can be found at ICES WKSEATEC (*Workshop on Technical Development to Support Fisheries Data Collection*) 2017 Report, pages 16-34. Available at:

(https://www.ices.dk/publications/library/Pages/default.aspx#Default={%22k%22:%22wkseatec%22,%22r%22:[{%22n%22:%22owstaxIdPublicationYear%22,%22t%22:[%22\%22%C7%82%C7%824c307c233038373263363262652d353934352d343662362d396663642d6565626466664383030666666617c32303137\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null},{%22n%22:%22ReportAcronymOWSCHCS%22,%22t%22:[%22\%22%C7%82%C7%82574b534541544543\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null}]}

However, most recent description of the system can be found in the RCG NANSEA RCG Baltic 2021. Part I Report. 'New data sources and technology'. icrOS. Pgs 38-39. (https://datacollection.jrc.ec.europa.eu/docs/rcg).

Quality checks documentation:

No documentation targeting quality checks. Analysis and detection of errors in data acquisition are carried out graphically using expert judgment, creating common graphs such as maps, scatter plots, histograms, box-plots in R with (ggplot2 package), etc. Checks are usually carried out at the end of the sampling and also by analyzing certain relationships between parameters.

For small pelagic fish species sampled at ECOCADIZ_ESP, an R-Shiny application is used after sampling is complete for data checking. The application shows graphically the relationships between length, total, eviscerated and gonad weights, so outliers can be detected and corrected if necessary (**Figure 6**).

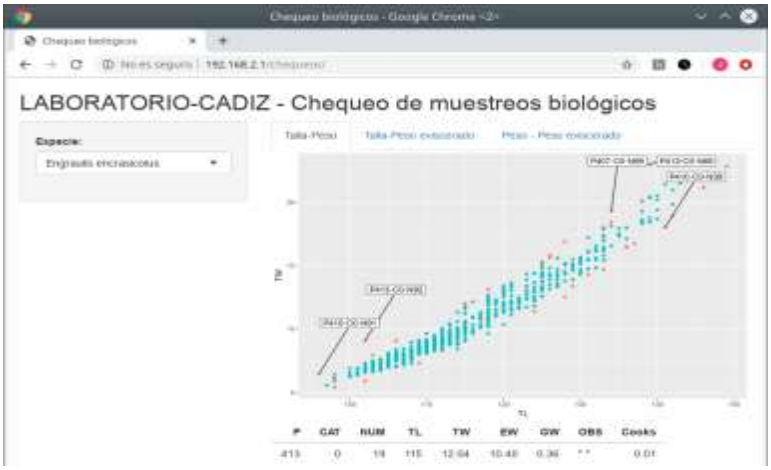


Figure 6. Application for data checking from biological sampling.

Data storage

National database:

SIRENO, the IEO database, is currently taking over the functions of the Spanish database, which has not yet finished development.

International database:

To achieve the combination at a regional scale of the data from the DEPM and acoustic surveys, the ichthyoplankton and oceanographic data for each survey are block-averaged on a common spatial grid. On this grid it is possible to represent all variables (environmental parameters, egg and fish concentrations, top predators, plankton, etc.) and to structure a common database. A series of gridded data files are created by blocking the raw data from each survey institution, and available parameter.

Gridded data files are stored and available for download from the ICES website via the WGACEGG page or using the following link:

https://community.ices.dk/ExpertGroups/wgacegg/SitePages/HomePage.aspx?RootFolder=%2FExpertGroups%2Fwgacegg%2F2020%20Meeting%20Documents%2F06%2E%20Data&FolderCTID=0x012000F34CB92CB4CD3D4EA424ADBDEF7439AC&View=%7B3F76DBAE%2DB730%2D4E27%2DADE7%2D87D6C20FE3C5%7D

Quality checks and data validation documentation: Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.

Documentation for gridded data files can be found in ICES Cooperative Research Report 332. Available at: https://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR%20332.pdf.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length.

In the case of using icrOS system (GoC SPF species in 9a S), the icrOS system doesn't allow the occurrence of missing values/zeros in those variables defined as mandatory , i.e., total length or total weight.

Sample storage

Storage description:

Ichthyoplankton samples (PairoVET and CUFES) are preserved in buffered formaldehyde at 4% (sodium tetraborate) and stored in appropriately labeled containers. Once at the laboratory, after samples having been sorted, indentified and quantified, samples are preserved in individual containers with folmaldehyde at 4%, labelled and stored on the shelves of the ICES warehouse at the IEO Cadiz oceanographic center. Ichthyoplankton samples are kept permanently.

The GoC anchovy otoliths extracted on board ECOCADIZ_ESP survey are kept in envelopes or vials, these are placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO Cadiz oceanographic centre. These pieces are stored systematically, without expiration date.

Anchovy gonads (the two lobes of the ovary) collected on ECOCADIZ_ESP survey are immediately preserved in formaldehyde solution in individual containers properly tagged. In the laboratory ovary sections are taken for histological processing and 3 subsamples extracted for fecundity calculation. The remaining ovary tissue is retained until the end of the year. A piece of ovary from selected samples is stored in 3.6% formaldehyde in closed and labeled plastic jars placed on shelves in labeled cardboard boxes and kept as a permanent collection. Histological sections and cassettes of all individuals studied are also kept permanently. The store place is the ICES warehouse at the IEO Cadiz oceanographic centre.

Sample analysis:

A description for ichthyoplankton and adults samples analysis can be found in ICES Cooperative Research Report 332.

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

Data processing

Evaluation of data accuracy (bias and precision):

N. To compare acoustic and DEPM biomass estimates of anchovy and sardine and evaluate their respective bias and precision with a view to providing improved data to stock assessment WGs, is included as a term of reference on the ICES WGACEGG and it is expected to be implemented on the next two years.

Editing and imputation methods:

N

Quality document associated to a dataset:

N

Validation of the final dataset:

Datasets are checked before providing to end-user analysing and detecting errors with a protocol for data exploration using packages and routines from R software (http://www.R-project.org).

AR comment:

Unfortunately, BOCADEVA surveys have been cancelled for the future. Therefore, the last survey in the series has been carried out in 2023.

The survey has been cancelled given that ECOCADIZ index and BOCADEVA index will no longer be used in the models and no longer requested in data calls.

The work of the WGHANSA working group after the last benchmark has been along the lines of using the PELACUS (only for the western stock), PELAGO and ECOCADIZ RECLUTAS surveys as independent indices of the fishery, and leaving the

BOCADEVA and ECOCADIZ index out of the models, which would no longer be requested in the data calls. In any case, the new approved assessment model in SS3 for the new anchovy southern stock has been designed in such a way that ECOCADIZ and BOCADEVA surveys has been included in the model only to inform on the past stock dynamics until 2023, but from 2024 onwards, neither of these two surveys series will be considered in the model. For that reason, the survey is not included in the WP from 2025 onwards.

Sampling scheme identifier: ECOCADIZ_RECLUTAS

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: ECOCADIZ-RECLUTAS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from pelagic hauls used for echo-traces identification for the following pelagic fish species included in Table 2.2 of the WP: *Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Scomber colias,Trachurus trachurus and Trachurus mediterraneus.* Age is sampled for anchovy, sardine and chub mackerel only. Biological sampling is used to verify the species and length/age composition/structure of echo-traces during echo-integration. Biological sampling is extended to other species such as *T. picturatus* and *Boops boops*. Length and weight are also recorded for other species susceptible of being acoustically assessed.

Description of the population

Population targeted.

The survey area corresponds to the Portuguese and Spanish shelf waters of the gulf of Cadiz (GoC, 20-200 m depth), ICES subdivision 9a South, and it is conducted in autumn time (in the recent years during the first 20 days in October). The acoustic-trawl survey is aimed at the acoustic estimation of the abundance and biomass of the populations of the main small pelagic fish (SPF) inhabiting the GoC neritic waters, with special emphasis in the anchovy and sardine recruitment (age 0 juvenile fish). The main assessed target species are: anchovy *Engraulis encrasicolus,* sardine *Sardina pilchardus* and chub mackerel *Scomber colias.* The list of assessed target species is extended to: mackerel *Scomber scombrus,* horse mackerel *Trachurus trachurus,* Mediterranean horse mackerel *Trachurus mediterraneus*, blue jack mackerel *Trachurus picturatus* and bogue *Boops boops*. Round sardinella *Sardinella aurita*, blue whiting *Micromesistius poutassou*, boarfish *Capros aper*, long snipefish *Macrorhamphosus scolopax* and pearlside *Maurolicus muelleri* are also acoustically assessed when present.

Population sampled:

This acoustic-trawl survey is a multispecies (recruitment) one surveying the GoC neritic SPF species in autumn. The sampled fractions of the target populations will be those ones inhabiting the shelf waters between 20-200 m depth isobaths. The timing and spatial coverage of this autumn survey has been defined to achieve stock containment of target species at the mesoscale of the survey (and stocks) (Doray *et al*., 2021). Containment is consistently achieved at the survey mesoscale for target species whose survey indices are used in analytical stock assessment (anchovy and sardine). ECOCADIZ_RECLUTAS does not capture the full summer distribution of blue jack mackerel, blue whiting, boarfish, horse mackerel, mackerel, pearlside, and snipefish when present because either the population or at least a component of the population of these species (e.g. larger fish) are distributed in upper continental slope waters not sampled by the survey.

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number (20-25 hauls on average) and location of these hauls results in a relatively high sampling coverage of the GoC SPF community (0.06 hauls per surveyed nautical mile; Doray *et al*., 2021).

Stratification:

The sampling design is not stratified, as SPF species can potentially be distributed over the whole sampling area. Post-stratification regions, where species/size compositions and echo-integrals are assumed to be homogeneous, are further

defined for each species to estimate total fish biomass. Acoustic estimates and biological information are usually provided for the Portuguese, Spanish and the whole GoC waters.

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic since the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS) of 50 individuals from the sorted catch. The selected sample is entirely biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached).

Is the sampling design compliant with the4S principle?:

NA.

Regional coordination:

Y. Sampling design and protocols were developed in the framework of the WGACEGG.

Link to sampling design documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp. Section 3.1.2

https://doi. org/10.17895/ices.pub.7462.

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp. Section 3.1.3

https://doi. org/10.17895/ices.pub.7462

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number (20-25 hauls on average) and location of these hauls results in a relatively high sampling coverage of the GoC SPF community.

Data capture

Means of data capture:

Biological data from GoC Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Trachurus mediterraneus, Trachurus picturatus and Boops boops (from SRS samples of 50 individuals from the catch of pelagic hauls) are captured electronically with a tailored software/hardware system (icrOS) and data are subsequently uploaded to the IEO SIRENO database. The icrOS system simplest hardware setup comprises one or more sampling kiosks and a server connected in a local network. Each of those sampling kiosks is formed by a computer screen, a Raspberry Pi board, a waterproof keyboard and a mouse (**Figure 1**).

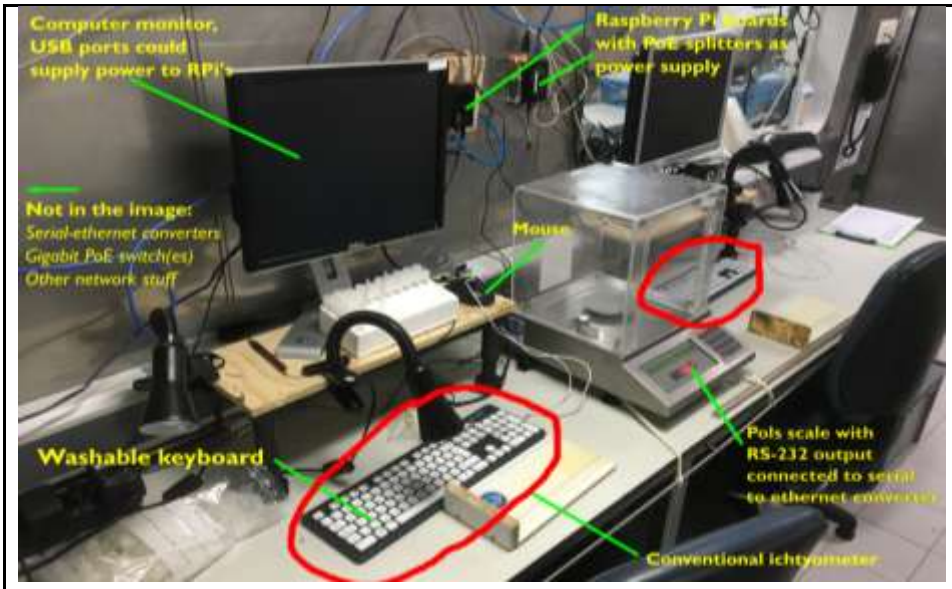


Figure 1. Typical icrOS sampling kiosks setup at R/V Ramón Margalef.

The server runs a PostgreSQL+PostGIS database where data from sampling is stored, a R-Shiny server for data quality checks and reports and a LTSP (Linux Terminal Server Project) which delivers the sampling software and applications to the sampling kiosks at boot time, easing the maintenance of the sampling software across the system.

Additional hardware such scales, GPS, echosounders, icrOS electronic measuring board, etc., can be connected to the system for data capture. In the case of scales, what is particularly recommended to reduce data errors due to bad weighing data recording, the system currently supports data capture from METTLER-TOLEDO, Marel and POLS scales. The icrOS electronic measuring board, however, is designed for sampling of length frequency distributions (LFD) and not for the biological sampling of the individual length measurement, despite it can be used as a conventional measuring board.

Label printers ZEBRA-ZPL2 language compatible can be connected to the system for printing specimen identification labels for labelling vials, etc. with a simple specimen code.

The sampling software consists in several applications for haul events data (position, time, depth...), catch sampling, LFD samplings and biological sampling. Biological sampling is performed using sampling protocols, defined before the sampling (**Figure 2**). For protocol definition, the user chooses the variables to be sampled (numerical for weight or length, categorical for keys, Boolean...) between a set of user defined variables and their sampling order, whether the variable value has a default value or not, if it can be locked (keep the value between specimens, useful when a given value, i.e., the same maturity appears across all the specimens). When the sampling starts, the sampling application reads the selected protocol (**Figure 3**), stored in the system database, and creates the user interface form for that protocol. This makes possible for the application to virtually sample any species (fishes, crustaceans...) if the proper protocol and variables have been defined for it.

The stages of the categorical variables (keys) are set at variable definition time. At sampling time, the user interface provides the user with drop-down lists for the categorical variables with that predefined stages, so the input of values not present in the keys is not possible, providing some extent of quality assurance to the system (**Figure 4**).

The sampling application can also be used for editing the values and samples previously input in case of error correction, and marking any individual variable of the sample as outlier/bad/invalid data is possible (i.e., after checking it is possible to mark as bad data only eviscerated weight for a particular sample, but the rest of the data remains valid).

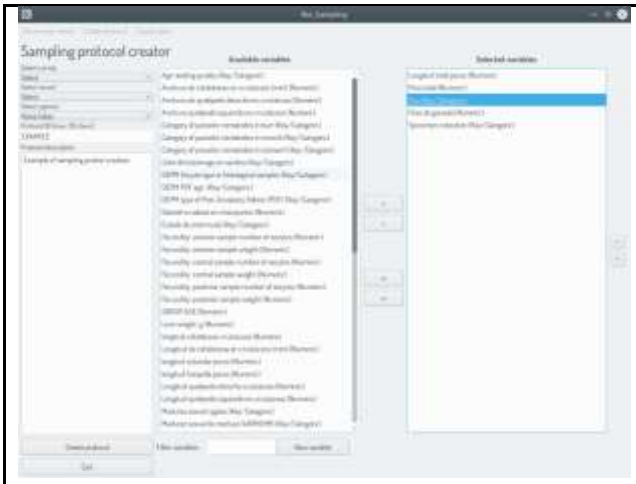


Figure 2. Sampling protocol creator.

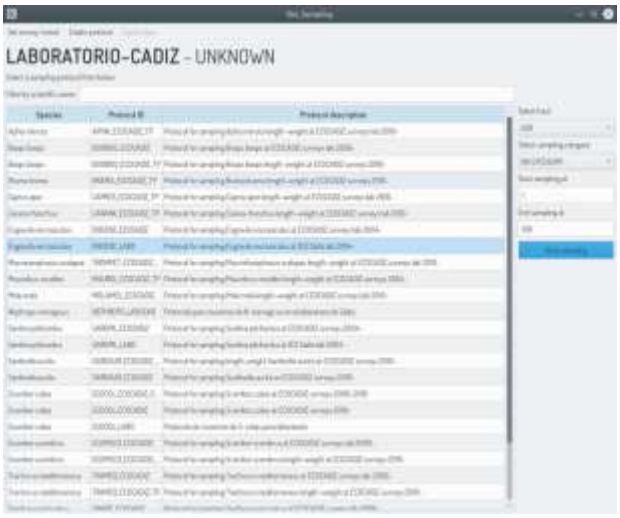


Figure 3. Selection of the sampling protocol.

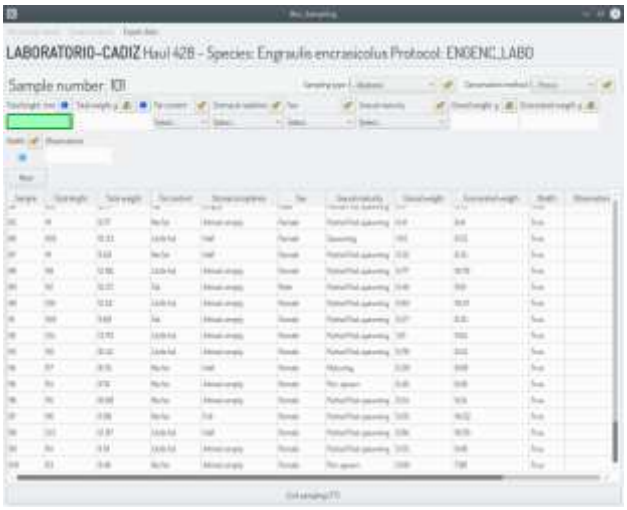


Figure 4. Biological sampling.

The system provides also applications for quality check, which are currently under development and also for data extraction and reporting. These applications are run in a R-Shiny server and can be accessed from any computer connected to the system network.

Data capture documentation:

For the icrOS software/hardware system a first description of the system can be found at ICES WKSEATEC (Workshop on Technical Development to Support Fisheries Data Collection) 2017 Report, pages 16-34 available at

(https://www.ices.dk/publications/library/Pages/default.aspx#Default={%22k%22:%22wkseatec%22,%22r%22:[{%22n%22:%22owstaxIdPublicationYear%22,%22t%22:[%22\%22%C7%82%C7%824c307c233038373263363262652d353934352d343662362d396663642d6565626466664383030666666617c32303137\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null},{%22n%22:%22ReportAcronymOWSCHCS%22,%22t%22:[%22\%22%C7%82%C7%82574b534541544543\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null}]}

However, most recent description of the system can be found in the RCG NANSEA RCG Baltic 2021. Part I Report. 'New data sources and technology'. icrOS. Pgs 38-39. (https://datacollection.jrc.ec.europa.eu/docs/rcg).

Quality checks documentation:

No documentation targeting quality checks.

Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

COST.

For small pelagic fish species sampled at ECOCADIZ-RECLUTAS, a R-Shiny application is used after sampling is complete for data checking. The application shows graphically the relationships between length, total, eviscerated and gonad weights, so outliers can be detected and corrected if necessary (**Figure 5**).

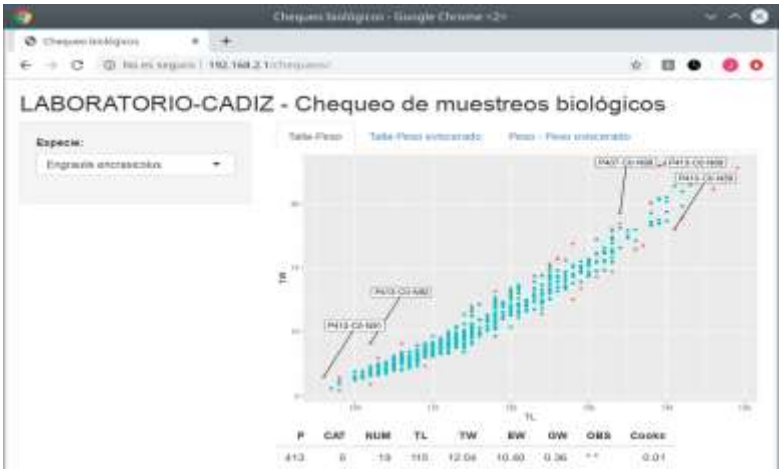


Figure 5. Application for data checking from biological sampling.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

NA.

Quality checks and data validation documentation:

No documentation targeting quality checks.

The icrOS system (GoC SPF species in 9a S), the icrOS system doesn't allow the occurrence of missing values/zeros in those variables defined as mandatory, i.e., total length or total weight.Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

Sample storage

Storage description: The otoliths are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres of Cádiz. These pieces are stored systematically, without expiration date.
Data processing
Evaluation of data accuracy (bias and precision): N **Editing and imputation methods:** Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors. Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of anchovy from the Gulf of Cádiz, for maturity ogives, missing maturity percentages are imputed from historical data. **Quality document associated to a dataset:** N **Validation of the final dataset:** Using the quality checks of the ICES acoustic database.
AR comment: No deviations or developments.

Sampling scheme identifier: BFT INDEX

MS : SPAIN
Region: North-East Atlantic (Bay of Biscay**)**
Sampling scheme identifier: ESP_AZTI_BFT INDEX
Sampling scheme type: Research Survey at Sea
Observation type: SciObsAtSea
Time period of validity: from 2022 until 2027
Short description (max 100 words): AZTI-BFT INDEX survey, carried out annually, is a systematic active acoustics survey aimed at detecting the bluefin schools present along its transects and estimating the number of individuals in each of them, for developing a fishery-independent abundance index for bluefin tuna in the Bay of Biscay.
Description of the population
Population targeted:. The target species is the Atlantic bluefin tuna (*Thunnus thynnus*) and the survey area comprises ICES subdivisions 8cd, where a 960 nm zig-zag type systematic transect is performed.

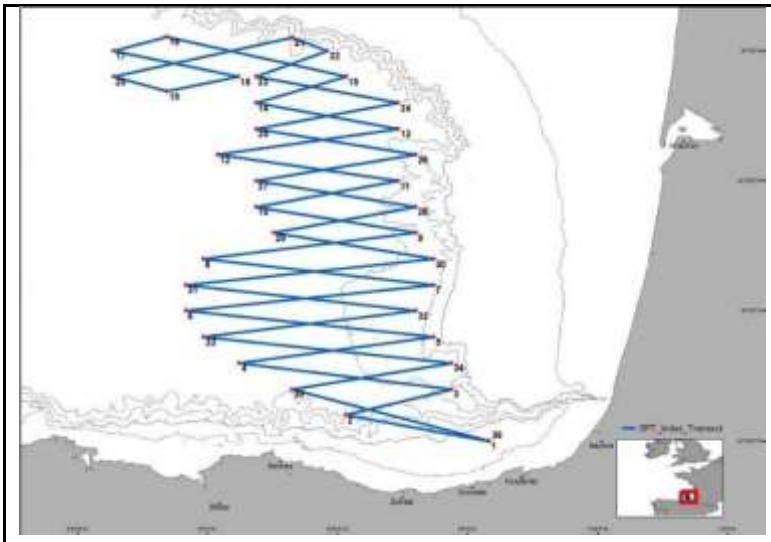


Figure 1: survey area and transects

Population sampled:

The part of the target population aimed at is the bluefin tuna present in the Bay of Biscay every summer in the framework of their annual feeding migration to this region, especially the juvenile cohorts (ages 1 to 4).

Stratification:.

NA

Sampling design and protocols

Sampling design description:.

No PSU applying. The sampling is adaptive, i.e. the survey sampling unit is each tuna detection occurring along the survey transects.

Is the sampling design compliant with the 4S principle?:

NA

Regional coordination:

Sampling design and protocols were originally developed for the BFT Index survey, which is the only survey of its type so far, i.e. direct acoustic survey directed to bluefin tuna in the Bay of Biscay. Sampling design, protocols and first results have been presented in the ICCAT working group on bluefin tuna since 2015 (SCRS bluefin tuna species group meetings and bluefin tuna intersession meeting).

Link to sampling design documentation:.

Goñi N., Uranga J., Arregui I., Onandia I., Martinez U., Boyra G., Melvin G.D., Godard I., and Arrizabalaga H. (2019) Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the Bay of Biscay: results from the first five surveys. Document SCRS/2019/185

Compliance with international recommendations:

Y

Link to sampling protocol documentation:.

Goñi N., Uranga J., Arregui I., Onandia I., Martinez U., Boyra G., Melvin G.D., Godard I., and Arrizabalaga H. (2019) Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the Bay of Biscay: results from the first five surveys. Document SCRS/2019/185

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.

NA

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

NA

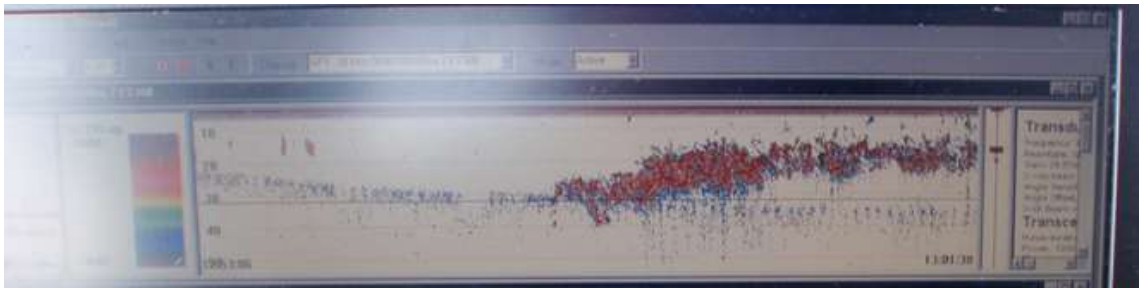
Data capture

Means of data capture:

The vessel hired for the survey sails along the defined transects (total length 960 nm). For the collection of acoustic records onboard, we use a MAQ omnidirectional sonar, set at a 320m range and 8° tilt angle, for tuna school detection. A scientific EK80 echosounder working at a combination of at least 3 frequencies mounted horizontally and vertically is recording acoustic backscattering during the whole survey. At each detection, the vessel approaches the school, and throws live bait for catching tuna by pole-and-line. Caught individuals are measured (fork-length) and immediately released. In complement of the physical size-sampling, a multibeam sonar (SIMRAD M3) is used for size-measurements of the tunas. EK80 recordings are then processed to estimate school dimension and number of individuals in each detected school.



Figure 2: Example of detection of a bluefin tuna school by omnidirectional sonar (right part of the sonar screen).



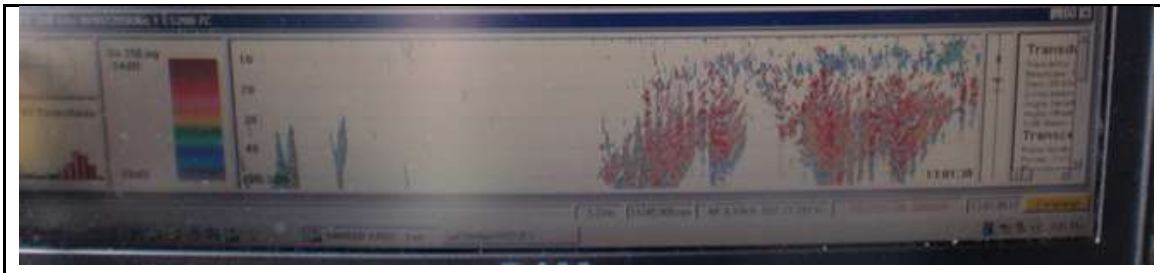


Figure 3: Example of bluefin tuna school detected by the EK80 echosounder, at 38 kHz mounted vertically (upper panel) and at 200 kHz mounted horizontally (lower panel).



Figure 4: M3 mutibeam sonar used for complementary size measurements

Data capture documentation:.

Goñi N., Uranga J., Arregui I., Onandia I., Martinez U., Boyra G., Melvin G.D., Godard I., and Arrizabalaga H. (2019) Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the Bay of Biscay: results from the first five surveys. Document SCRS/2019/185

Quality checks documentation:

N (2023)

AR comment:

Population targeted:

The survey transects have been modified in 2023 order to cover a bigger area, east boundary has been changed till 100 m isobath in the French continental shelf. North, west and south boundaries are still the same as well as the total length of the transects, 960 nm.

Sampling scheme identifier: IBERAS

MS : ESP
Region: North-East Atlantic
Sampling scheme identifier: IBERAS
Sampling scheme type: Research Survey at Sea
Observation type: SciObsAtSea
Time period of validity: from 2022 until 2027
Short description (max 100 words):
Sampling scheme aiming at first recording ecograms from multifrequency echosounder (e.g. 38 kHz, main frequency) to assess the strength of the Ibero-Atlantic sardine stock recruitment; and secondly, to perform pelagic hauls to get biological

information for the following pelagic fish species: Sardina pilchardus, Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Boops boops, Capros aper, Scomber colias, and other species susceptible of being acoustically assessed and also for echo-trace identification. In addition, biological samplings of the target species are carried out (see WP Table 2.2 and ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. ICES Techniques in Marine Environmental Sciences Vol. 64. 100 pp https://doi.org/10.17895/ices.pub.7462, section 2.2.2).

Description of the population

Population targeted:

The main target species are the Young of the Year of *Sardina pilchardus* in the main recruitment area located in the north western area of the Iberian Peninsula (9a Central North -from Nazaré to River Minho; 9a North -Cape Fisterra to River Minho; and 9a Central South, form Nazaré to Sines). Additionally , *Engraulis encrasicolus*, *Trachurus trachurus Scomber scombrus*, *Scomber colias*, *Boops boops* and *Capros aper.*

Population sampled:

This acoustic-trawl survey is mainly focussed on sardine recruitment of the Ibero-Atlantic Stock, covering only the main expected recruitment area, although the rest of the pelagic fish species located in this area, including adult sardine is also assessed. Therefore, sampled fractions of the target populations will be those ones inhabiting the shelf waters. The timing and spatial coverage of this SAHMAS autumn survey (IBERAS) has been defined to achieve a recruitment index able to be used for both the assessment model, and for short-term forecasting. Although recruitment take place in other areas, the bulk of the young of the year are mainly located on the surveyed area of this survey and the index is consistent with the spring survey targeting on SSB. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.2.2).).

Stratification:

The study area is stratified in 3 geographical strata: 9aN, 9aCN and 9aCS, up to the North Sines.

Sampling design and protocols

Sampling design description:

Acoustic sampling: tracks are systematically placed at 6-8 nmi apart, with random start, from shoreline up to 100/150 depth depending of the area. Trawl hauls are opportunistically placed the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS). Fishes from the target species (see table 2.2) are biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached). Then, the other individuals are measured until a representative length distribution is obtained for each species. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3).

Is the sampling design compliant with the 4S principle?

NA

Regional coordination:

N.

Link to sampling design documentation:

See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3.

Compliance with international recommendations:

Y. Ibero-Atlantic sardine is evaluated by international groups of experts, and their recommendations are considered and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. ICES Techniques in Marine Environmental Sciences Vol. 64. 100 pp.

Compliance with international recommendations:

Y. Sardine is evaluated by international groups of experts, and their recommendations are considered and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

Acoustic tracks are place systematically while pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number and location of hauls result in a relatively high sampling coverage over the main sardine recruitment area

Data capture

Means of data capture:

Length distributions are carried out by means of a measuring board. Weights of both the catches and the individual specimens are taken from marine scales, which register a maximum weight of 60, 12 and 2 kg respectively; accurately: ± 100 ± 10 and ± 2g respectively).

Biological samples are collected and stored onboard. Data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized onboard.

Acoustic records are recorded in raw files for further post-processing using specific software.

Data capture documentation:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3

Quality checks documentation:

Data quality control (QC) checks and validations are performed for all autumn surveys. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.6)

Data storage

National database:

SIRENO, the IEO database, is currently taking over the functions of the Spanish database, which has not yet finished development, together with this, IPMA has also his own database International database:

International database:

NA. However, it is also expected that in medium term, database will be also hosted at the (https://www.ices.dk/data/data-portals/Pages/acoustic.aspx).

Quality checks and data validation documentation:

No documentation targeting quality checks.

Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

Sample storage

Storage description:

The otoliths of almost all these species, are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres and IPMA where the samples will be processed: Coruña, Vigo, Santander, Porto and Lisbon. These pieces are stored systematically, without expiration date.

Acoustic data are post-processed and scrutinized by both IEO and IPMA experts.

Sample analysis:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, sections 2.2.3 & 2.2.4.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N

Validation of the final dataset:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, sections 2.2.6.

AR comment: No deviations or developments.

Sampling scheme identifier: ESP-AZTI_OffSiteSurveysRecreational

MS : ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP-AZTI_OffSiteSurveysRecreational

Sampling scheme type: recreational (off site surveys)

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting catch and effort data from marine recreational fisheries in the Basque Country, using offsite methods (surveys). Information is taken for sea bass and blue fin tuna. Cod, pollack and elasmobranchs are not target species for this fishery in the Basque Country.

Description of the population

Population targeted:

The population targeted are catches and effor

The population targeted are fishers fishing Basque Country (BC) waters. This includes fishing from the coast, from a boat or spearfishing.

Population sampled:

The population sampled are fishers with a fishing license, and living in the BC.

In Spain, the licences for recreational fishing are mandatory for fisheres above 14 years old, and they are delivered by regional authorities. The sampling frame is build from the list of licences delivered by the Government of the BC. Only people living in the BC is included in the sampling frame.

Some fishers didn't provide their telephone number or email when taking out the license. Those fishers are not reachable

Stratification:

No stratification

Sampling design and protocols

Sampling design description:

Sampling Frame: List of licences

PSU: individual fishers

Sampling frame: list of fishers with licence, living in the BC, and who provided contact information when taking out the license

Selection method: simple random sampling without replacement

Periodicity: 6 -months (although it can vary)

Contact method: telephones and emails are taken from the list of licences

Survey method: telephone and email surveys

More details about the sampling design can be found in AZTI's Fisheries Data Sharepoint (link)

An example of the surveys can be found in AZTI's Fisheries Data Sharepoint (link)

Is the sampling design compliant with the 4S principle?:

It has been designed to comply with the 4S principle as much as possible

Regional coordination:

Protocols have not been developed regionally, but recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Link to sampling design documentation:

More details about the sampling design can be found in AZTI's Fisheries Data Sharepoint (link)

Compliance with international recommendations:

Y. Recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Link to sampling protocol documentation:

More details about the sampling protocol can be found in AZTI's Fisheries Data Sharepoint (link)

Compliance with international recommendations:

Y. Recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

NA

Data capture

Means of data capture:

An example of the surveys can be found in AZTI's Fisheries Data Sharepoint (link)

The results from telephone surveys are stored by the interviewers in excel files.

The results from email surveys are stored automatically in excel files which can be downloaded from the platform (SurveyMonkey).

Data capture documentation:

The results from telephone surveys are stored by the interviewers in excel files.

The results from email surveys are stored automatically in excel files which can be downloaded from the platform (SurveyMonkey).

Quality checks documentation:

Collected data are checked for quality. Expert judgement is applied to correct impossible values (errors in the answers). Outliers are identified.

Data storage

National database:

Results are stored in excel files

International database:

The data are used to answer ICES general data call

Quality checks and data validation documentation:

NA

Sample storage

Storage description:

NA

Sample analysis:

NA

Data processing

Evaluation of data accuracy (bias and precision):

Estimates are calculated using the package Rsurveys. Standard error is calculated

Editing and imputation methods:

NA

Quality document associated to a dataset:

NA

Validation of the final dataset:

NA

AR comment:

The routinary survey, carried out from 2015 to 2019 and based on the list of telephones of licensed fishers, could not be done due to problems with the Data Protection Regulation. It was not possible to access the contact information of licensed fishers. This problem had been identified in previous years and some actions were proposed to overcome it (i.e. changes in the web where fishers buy their license), but the problem persists.

The offsite survey in the Basque Country, designed during 2022, was carried out during 2023. In addition, a routinary on-site sampling design has been established in early 2024, based on results the Marine Recreational Fisheries test study carried out in 2022- 2023.

Short description:

Sampling scheme aiming at collecting catch and effort data from marine recreational fisheries (MRF) in the Basque Country (BC), using onsite methods (surveys). Information is taken for all targeted species, including those for which reporting is mandatory, such as seabass (Dicentrarchus labrax) and tunids (e.g., northern albacore). Cod, pollack and elasmobranchs are not target species for this fishery in the BC.

Results from the off-site survey will be combined with the data collected onsite (new onsite sampling scheme incorporated as routinary). We are working on the estimates, and we plan to have them ready by the end of 2025.

Description of the population

Population targeted:

The population targeted are fishers fishing Basque Country (BC) waters. This includes fishing from the coast (i.e., shore fishing), from a boat (i.e., boat fishing) and spearfishing.

Population sampled:

The population sampled is the adult population practicing MRF in harbors of the BC. This is considered as representative of the whole recreational fishing population in the BC.

Stratification:

Geographical stratification: the onsite sampling was carried out along the Basque coast, with special focus on harbors and nearby areas. Sampling regions are illustrated in Figure 1 of the Sampling Procedure document, accessible through the link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

Sampling design and protocols

Sampling design description:

Sampling Frame: List of port*day

PSU: port*day

SSU: individual fishers or recreational fishing boats.

Selection method: simple random sampling without replacement

Contact method: face-to-face interviews.

Survey method: on-site questionnaires and quantification of fishing activity (number of fishers and boats)

More details about the sampling design can be found in AZTI's website https://www.azti.es/en/servicios/fisheries-sampling-programme/

Is the sampling design compliant with the 4S principle?:

It has been designed to comply with the 4S principle as much as possible

Regional coordination:

Protocols have not been developed regionally, but recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Link to sampling design documentation:

More details about the sampling design can be found in the LAKET sampling procedure document https://www.azti.es/en/servicios/fisheries-sampling-programme/

Compliance with international recommendations:

Y. Recommendations coming from regional Expert Groups (ICES WGRFS) have been followed.

Data capture

Means of data capture:

Face to face questionnaire. An example of the questionnaire can be found in the recreational sampling documentation (https://www.azti.es/en/servicios/fisheries-sampling-programme/)

Data capture documentation:

The data capture is documented in the LAKET protocol https://www.azti.es/en/servicios/fisheries-sampling-programme/

Quality checks documentation:

Collected data are checked for quality. Expert judgement is applied to correct impossible values (errors in the answers). Outliers are identified.

Data storage

To calculate the estimates, we plan to combine the telephone survey with the data collected on-site (Recreational test study). This is a new approach for us, and we expect to have the estimates ready by the end of 2025.

The data can be used to answer ICES general data call with the estimates of recreational catches calculated for the Basque Country.

Sampling scheme identifier: SelfOnShore_recreational (off site surveys)

MS : ESP
Region : North-East Atlantic and Mediterranean Sea
Sampling scheme identifier : SelfOnShore_recreational (off site surveys)
Sampling scheme type: recreational (off site surveys)
Observation type: SelfOnShore
Time period of validity : from January 2022 until December 2027
Short description (max 100 words): Sampling scheme aiming at collecting catch and effort data from marine recreational fisheries. According to RD 347/2011, all recreational fishermen must report their catches, so there is no sampling scheme.
Description of the population
Population targeted: NA. **Population sampled**: NA. **Stratification**: NA.
Sampling design and protocols
Sampling design description: NA. **Is the sampling design compliant with the 4S principle?**: NA. **Regional coordination**: NA. **Link to sampling design documentation**: NA. **Compliance with international recommendations**: NA. **Link to sampling protocol documentation**: NA.
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA.
Data capture
Means of data capture: NA.

Data capture documentation:

NA.

Quality checks documentation:

NA.

Data storage

National database:

NA.

International database:

NA.

Quality checks and data validation documentation:

NA.

Sample storage

NA.

Data processing

Evaluation of data accuracy (bias and precision):

NA.

Editing and imputation methods:

NA.

Quality document associated to a dataset:

NA.

Validation of the final dataset:

NA.

AR comment:

In response to the recommendations of the EWG 24-08 STECF meeting, additional information regarding the SelfOnShore_recreational scheme has been incorporated into the 2025–2027 Work Plan:

SAMPLING SCHEME IDENTIFIER: ESP_SGP_SELFONSHORE_RECREATIONAL (OFF SITE SURVEYS).

MS : ESP

Region : North-East Atlantic and Mediterranean Sea

Sampling scheme identifier : ESP_SGP_ SelfOnShore_recreational (off site surveys)

Sampling scheme type: recreational (off site surveys)

Observation type: SelfOnShore

Time period of validity : from January 2022 until December 2027

Short description (max 100 words):

According to RD 347/2011, all recreational fishermen must report their catches to the General Secretariat of Fishery (Ministry of Agriculture, Fisheries and Food), in number and weight of the distinct protection species listed in Annex I: highly migratory ICCAT species. This declaration must be made monthly, even if no catch was made. The sampling scheme is census.

Cod, pollack and some elasmobranchs (see Table 2.4) are not target species for the recreational fishery. Other elasmobranchs fishery is banned according to RD 347/2011.

In the Basque Country, a sampling scheme for all species, including seabass, is carried out by AZTI (ESP-AZTI_OffSiteSurveysRecreational).

Description of the population

Population targeted:

License system: All recreational fishermen who have a specific license to fish for the distinct protection species listed in Annex I. This license is issued by the General Secretariat of Fishery. Without this license, recreational fishery for the species listed in Annex I is banned

The distinct protection species listed in Annex I are:

- *Thunnus thynnus*
- *Thunnus alalunga*
- *Thunnus obesus*
- *Makaira spp*
- *Tetrapturus spp*
- *Istiophorus albicans*

Population sampled:

As the sampling is based in census (license system), the population sampled is the same as the population targeted, so there is no need to estimate the population of recreational fishers.

Stratification:

NA.

Sampling design and protocols

Sampling design description:

NA.

Is the sampling design compliant with the 4S principle?:

NA.

Regional coordination:

NA.

Link to sampling design documentation:

NA.

Compliance with international recommendations:

NA.

Link to sampling protocol documentation:

NA.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA.

Data capture

Means of data capture:

Catch declaration: the recreational fishermen holding of the specific license shall complete a catch and release declaration (Annex IV, RD 347/2011: https://www.boe.es/buscar/doc.php?id=BOE-A-2011-6099) and send it to the General Secretariat of Fishery within the first five days of each month, even when no catches have been taken.

Data capture documentation: NA. **Quality checks documentation**: With the data of bluefin tuna the pre-notifications are cross-checked with the catch declarations. For the rest of the species, the checking is a verification of the number of specimens vs. weight.
Data storage
National database: These data are integrated in SIPE (1), the Spanish fishing information database, which is where all the data on both professional and recreational fishing can be found. (1) SIPE: Sistema de Información Pesquero Español **International database**: NA. **Quality checks and data validation documentation**: NA.
Sample storage
NA.
Data processing
Evaluation of data accuracy (bias and precision): NA. **Editing and imputation methods:** NA. **Quality document associated to a dataset**: NA. **Validation of the final dataset**: NA.

Sampling scheme identifier: ANG_Anda_SciObs water body_Diadromous (scientific)

MS :ESP
Region : North-East Atlantic and Mediterranean and Black Sea
Sampling scheme identifier : ANG_Anda_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific**)**
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Sampling plan for the evolution of eel stocks in Andalucia.
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: *Anguilla Anguilla* from EMU_ES_Anda

Stratification: The population sampled is the portion of adult eels (yellow and silver) that begin their migration in rivers downstream to the sea. Upstream reaches of dams are excluded from the sampling, as it is practically impossible for the eels living there to reach lower levels. The rivers to be sampled were chosen from among those with European eel populations. As the Autonomous Community of Andalusia is divided into three Eel Management Units: Atlantic, Guadalquivir and Mediterranean; a representative number of rivers have been taken in each of the Management Units. On the other hand, the number of sampling stations per river is determined by the length of the river, with more sampling stations in longer rivers.

The primary unit is the sampling point, of which there are 40 in total, distributed as follows by province:

- Sevilla. Guadiamar River (3 stations) and Guadaira River (5 stations). Corresponding to the Guadalquivir Eel Management Unit.

- Cádiz. Guadalete River (7 stations) and Barbate River (12 stations), belonging to the Atlantic Eel Management Unit; and Palmones River (6 stations) and Guadarranque River (3 stations), belonging to the Mediterranean Eel Management Unit.

- Málaga. River Guadalhorce (4 stations), belonging to the Mediterranean Eel Management Unit.

Sampling design and protocols

Sampling design description:

Forty stations have been designated in the three Management Units: 8 in the Guadalquivir UGA, 12 in the Mediterranean UGA and 20 in the Atlantic UGA. Each station will be sampled once a year, preferably in winter and avoiding full moon days.

At each station 20 pots will be installed (10 per bank alternating eel and shrimp traps), with an approximate separation of 20 metres (so each station must have at least a length of 400m) and will be fixed with corrugated steel bars fixed to the bed. Their exact location will be recorded by GPS when the satellite error is less than 6 metres. The pots shall be installed in the direction of the end point (downstream). Three-kill eel pots and two-kill shrimp pots shall be used, according to the attached graph showing dimensions and design:

Catches shall be collected 48 hours after installation and the pots shall be lifted in the same order of setting (from start to end point). The eels caught shall be placed in a suitable container on the shore where they shall be weighed, measured and the various distinguishing parameters to determine the degree of maturity (eye diameter, presence of lateral line and fin colouring) shall be recorded. The eels shall be returned to the water as close as possible to the stretch where they were caught.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: No.

Link to sampling design documentation: Fernández Delgado, C. (2017), Sampling protocol. Internal report.

Compliance with international recommendations: It is not known whether it is in line with international recommendations. The methodology used is described below. **Link to sampling protocol documentation**: Fernández Delgado, C. (2017), Sampling protocol. Internal report.

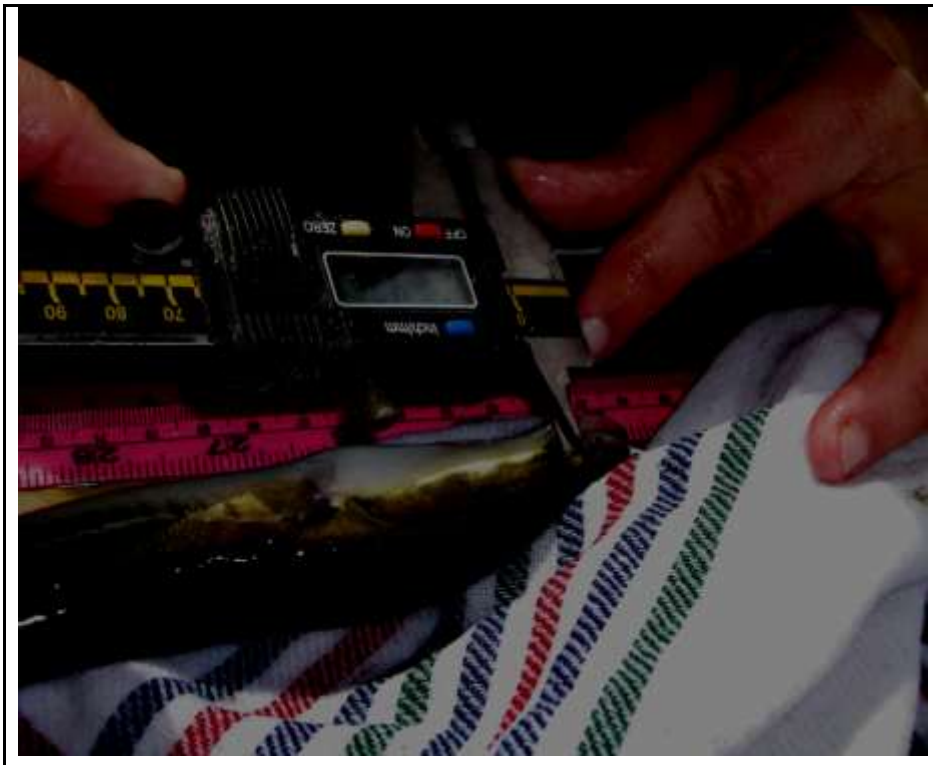
Sampling implementation

Recording of refusal rate: N

Monitoring of sampling progress within the sampling year: The sampling stations are always the same. The scientific advice of the Eel Management Plan provided 47 sampling stations at the beginning of the study, from which the 7 least viable for sampling had to be discarded, leaving 40 census stations, which are sampled annually.

Data capture

Means of data capture: Catching methods are eel pots and shrimp traps. In addition, digital calipers for measuring eye diameter and fin length, scales and measuring trays or tape measures are used.





Data capture documentation: Yes

Quality checks documentation: N. It is not known when the documentation will be available.

Data storage

National database: NA

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): N. The data collected during the campaigns carried out between 2018 and 2020 have been sent to the University of Cordoba for analysis. The evaluation of these data is pending. The date of delivery is unknown.

Editing and imputation methods: N. The date of delivery of the data evaluation is not known..

Quality document associated to a dataset: Is there a publication digital object identifier (DOI) created? Is there a document summarising the estimation process followed? N

Validation of the final dataset: The validation of the data would be carried out by the staff of the Consejería de Agricultura,Ganadería, Pesca y Desarrollo Sostenible (Regional Ministry of Agriculture, Livestock, Fisheries and Sustainable Development).

AR comment:

Description of the population:

During the sampling carried out in 2024, seven of the established census stations could not be surveyed. In the case of the Barbate River, since sampling is carried out between December and April and only when the moon's brightness is less than 60%, the weeks available to carry out the work are limited. The Barbate River is the last to be sampled, so if sampling is delayed due to adverse weather conditions, points may remain unsampled. In the case of the Guadaira River, access to the area was inaccessible because rains made it inaccessible. One point on the Guadalete River was not sampled because riparian vegetation (Arundo donax) had grown too large, preventing the traps from being placed. Finally, the Guadarranque and Barbate rivers are very close, so they are sampled as a whole, resulting in a total of nine sampling stations. With the material we had available, only 4 points could be sampled per week, so one point was left unsampled. New traps have been purchased to be able to make more than 4 points per week.

Sampling scheme identifier: ANG_Astu_SciObs water body_Diadromous (commercial)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Astu_SciObs water body_Diadromous (commercial**)**

Sampling scheme type: Diadromous (commercial)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

Total recruit estimated from daily catches report of commercial fisheries

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_Astu

Stratification:

Glass eel catches from Nalon management plan are reported by 2 fishermen´s guilds (Cudillero and San Juan de la Arena)

Catches from Tinamayor management plan are reported by 1 fishermen´s guild (Bustio)

From the rest of shore (free area), catches can be reported by any fishermen´s guild (18 in our region)

Sampling design and protocols

Sampling design description:

Professional fishery of glass eel is allowed from November to February, with a break of at least 5 days a month. Also, glass eel fishermen from boat cannot fish for a month during the campaign.

There are two specific glass eel fishing management plans:

-Nalon management plan: glass eel fishery is allowed only at Nalon estuary and San Pedro de la Ribera and Quebrantos beaches, done by 36 fishermen from boat and 48 on foot.

-Tinamayor management plan: glass eel fishery is allowed only at Deva estuary and Cabra river, done by 20 fishermen on foot.

The rest of shore is named “free area”, where glass eel fishery is allowed in any river unless Nalon and Deva estuary, done by a maximum of 84 fishermen on foot.

Catches are conducted by mean of a sieve net for fishery on foot. For fishery from boat, catches are made with a pair of nets placed on both sides of the boat, maximum size 200x60 cm.

Total catches per night and fisherman are reported.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: Regional coordination.

Link to sampling design documentation: NA

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: **NA**

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: By means of dedicated software

Data capture documentation: NA

Quality checks documentation: NA

Data storage

National database: Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión territorial, Principado de Asturias.

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No sample storage

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: NA

Validation of the final dataset: NA
AR comment: There were changes in the Sampling design description due to the limit of 30 fishing days for eel (**Council Regulation (EU) 2023/194 of 30 January 2023 fixing for 2023 the fishing opportunities for certain fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters, as well as fixing for 2023 and 2024 such fishing opportunities for certain deep-sea fish stocks).** So, in Asturias, professional glass eel fishery was allowed during 30 days maximum in the 2023/24 fishing season. There were 4 periods of fishing activity, one by month, from November to February. Three Management Plans and two areas were established in the Asturian shore: -Nalon Management Plan: glass eel fishery is allowed only at Nalon estuary and San Pedro de la Ribera and Quebrantos beaches, with a total of 36 licenses from boat and 48 on foot. -Tinamayor Management Plan: glass eel fishery is allowed at Deva estuary and Cabra river, done by 20 fishermen on foot. - East Management Plan: glass eel fishery allowed from Libardón river until Purón river, with 46 licenses on foot. - West Area: from Eo estuary until Esqueiro river. 12 licenses on foot. - Central Area: from Esqueiro river until Libardón river, excepting Nalon MP area.17 licenses on foot. Glass eel fishing is carried out with a hand sieve for on foot fishery. For fishery from boat, the fishing gear consists of two sieves or nets placed on both sides of the boat, maximum size 200x60 cm. Total catches per night and fisherman were reported to managers.

Sampling scheme identifier: ANG_Astu_SciObs water body_Diadromous (market)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : ANG_Astu_SciObs water body_Diadromous (market)
Sampling scheme type: Diadromous (market)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): 50 glass eels are collected from Ribadesella fishermen´s guild (Sella river basin) and 50 from San Juan de la Arena fishermen´s guild (Nalon river basin), once a month, during the glass eel fishing period (from November to February). Total: 400 glass eels.
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: *Anguilla Anguilla* from EMU_ES_Astu .**Stratification**: Glass eel collected at the two major fishermen´s guilds for glass eel marketing in the Principality of Asturias Samples from two fishermens´s guilds, belonging to Nalon and Sella basins.
Sampling design and protocols
Sampling design description: 50 individuals collected from the two main fishermen´s guilds, from November to February (4 months). The samples are preserved alive and taken to the laboratory. Each glass eel is measured total length and weight, and the pigmentation phase is noted.

After measuring, the individuals are released into the river. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: Regional coordination **Link to sampling design documentation**: N **Compliance with international recommendations**: N **Link to sampling protocol documentation**: N
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: Sampling allocations are fixed.
Data capture
Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Data capture documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality checks documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Data storage
National database: Centro de Experimentación Pesquera, Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión Territorial del Principado de Asturias **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): N **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Astu_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : ANG_Astu_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words):

Electrofishing is carried out in order to collect length and weight from every eel captured, and in case of eels longer than 30 cm, also pectoral fin length and vertical and horizontal eye diameters to determine silvering and sex by Durif.

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled:

Eel from EMU_ES_Astu

Stratification:

Yellow and silver eels 30 locations belonging to 8 river basins in EMU_ES_Astu

Sampling design and protocols

Sampling design description:

30 sampling stations located in 8 river basins. Electrofishing is carried out once a year, from September the 8th from October the 12th, by Zippin method, with three passes without replacement, following UNE-EN-14011:2003.

Every eel is measured and weighed. In case of eels longer than 30 cm, data of pectoral fin length and vertical and horizontal diameters are also taken, following the SUDOANG protocol https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: Regional coordination

Link to sampling design documentation:

https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma/?c=N0029997

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Compliance with international recommendations: 'Y'

Link to sampling protocol documentation:

https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma/?c=N0029997

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year:

Sampling allocations are adjusted if needed under CEP and University of Oviedo criteria. In 2019, a sampling station was replaced for a new one placed in a wider part of the river (another category) following the SUDOANG protocol.

Data capture

Means of data capture:

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Data capture documentation:

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Quality checks documentation: 'Y'

Data storage

National database: Centro de Experimentación Pesquera, Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión Territorial del Principado de Asturias. In addition, the SUDOANG project has compiled various eel information from electroishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation:

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Sample storage

Otholits from eels collected during 2019 and 2020 electrofishings are preserved dry in Eppendorfs at the laboratory of the Centro de Experimentación Pesquera (CEP), Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión Territorial, Principality of Asturias.

Sample analysis: Protocol https://sudoang.eu/es/grupos-de-trabajo/

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/es/visuang/

Editing and imputation methods: https://sudoang.eu/es/visuang/

Quality document associated to a dataset: https://sudoang.eu/es/visuang/

Validation of the final dataset: https://sudoang.eu/es/visuang/

AR comment: No deviations or developments

Sampling scheme identifier: ANG_Basq_SciObs water body_Diadromous (recreational)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Basq_SciObs water body_Diadromous (recreational)

Sampling scheme type: Diadromous (recreational)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

It is mandatory to fill in the Daily Catches report with catches and effort data. These notebooks are compiled by the Basque Government, which sends them to AZTI. AZTI enters this information into the database and analyzes it.

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla anguilla* from EMU_ES_Basq

Stratification: All the catches and effort in the EMU_ES_Basq is recorded.

Sampling design and protocols

Sampling design description:

There is no protocol, the catches and efforts of all recreational glass eel fishermen in the Basque Country are collected. However, the method of collection is described in: Korta, M., Diaz, E. (2017) Report on eel stock, fishery and other impacts, in Spain. Report of the EIFAAC/CIEM/GFCM joint working group on eel (WGEEL), 3-10 October 2017, Kavala, Greece. ICES CM 2017/ACOM:15. 99 pp. https://www.ices.dk/sites/pub/Publication%20reports/expert%20group%20report/acom/2017/WgeeL/wgeel_2017.pdf

Is the sampling design compliant with the 4S principle?: ***NA***
Regional coordination: ***N***
Link to sampling design documentation: ***NA***
Compliance with international recommendations: ***N***
Link to sampling protocol documentation: ***N***
Sampling implementation
Recording of refusal rate: ***N***
Monitoring of sampling progress within the sampling year: *N*
Data capture
Means of data capture: NO PERTINENT
Data capture documentation: NO PERTINENT
Quality checks documentation: *N*
Data storage:
National database: ***NA***
International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)
Quality checks and data validation documentation: the ices eel working group (WGEEL) reviews the information before incorporating it into its database.
Sample storage: No pertinent.
Data processing
Evaluation of data accuracy (bias and precision): N
Editing and imputation methods: N.
Quality document associated to a dataset: **N.**
Validation of the final dataset: **N.**
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Basq_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : ANG_ Basq_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2025
Short description (max 100 words):
Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Description of the population
Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_ES_Basq

Stratification: recruits, standing stock and silver eel from Oria River

Sampling design and protocols

Sampling design description:

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- Frebuary). ¡

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)

2)The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys in 25 sampling points.

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.

Is the sampling design compliant with the 4S principle?: Y

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed.

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

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

- Electroishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Recruitment and estimated escapement data can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

- Data generated in the Oria, can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Editing and imputation methods:** https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality document associated to a dataset**: No **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Cant_SciObs water body_Diadromous (commercial)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: ANG_Cant_SciObs water body_Diadromous (commercial)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Description of the population
Population targeted: Anguilla anguilla **Population sampled**: Anguilla Anguilla from EMU_ES_Cant **Stratification**: All the rivers from EMU_ES_Cant where Glass Eel fishery happens
Sampling design and protocols
Sampling design description: Nowadays, only professional glass eel fishery exists in Cantabria, mainly located in the Deva, Nansa, Pas and Campiazo river basin s. Recreational fishery was forbiden 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 (≤1.2 m2) per fishermen. Since 2005, fishermen report their catches. **Is the sampling design compliant with the 4S principle?**: Y **Regional coordination**: Regional coordination **Link to sampling design documentation**: NA **Compliance with international recommendations**: NA **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: Sampling allocations are fixed
Data capture
Means of data capture: NA **Data capture documentation**: NA

Quality checks documentation: NA
Data storage
National database: NA **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** MA **Quality document associated to a dataset**: No **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Cant_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : ANG_Cant_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: *Anguilla anguilla* from EMU_ES_Cant **Stratification**: Agüera River basin, Asón river basin, Miera River basin, Pas river basin, Saja-Besaya river basin, Nansa river Basin, Cantabrian Deva river basin, West Coastal basin and East Coastal basin .
Sampling design and protocols
Sampling design description: The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys in 125 sampling points with Carle & Strub 1978. **Is the sampling design compliant with the 4S principle?**: Y **Regional coordination**: Regional coordination **Link to sampling design documentation**: "Seguimiento de las poblaciones de peces continentales de Cantabria-Años 2010-2020- Ecohydros – Gobierno de Cantabria" (internal report). Not available online **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation

Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: Sampling allocations are fixed
Data capture
Means of data capture: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2020- Ecohydros – Gobierno de Cantabria" (internal report). Not available online **Data capture documentation**: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2020- Ecohydros – Gobierno de Cantabria" (internal report). Not available online **Quality checks documentation**: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2020- Ecohydros – Gobierno de Cantabria" (internal report). Not available online
Data storage
National database: - Electrofishing data from EMU_CANt have been compiled in thef the SUDOANG project are hosted at https://bit.ly/3iIgtrT. **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** MA **Quality document associated to a dataset**: No **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Cat_SciObs water body_Diadromous (commercial)_GE_RWL

MS : ESP
Region : Mediterranean and Black Sea
Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (commercial)_GE_RWL
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2025
Short description (max 100 words): Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: *Anguilla Anguilla* Glass eel from EMU_ES_Cata **Stratification**: All the rivers in EMU_Cata with Glass eel fishery
Sampling design and protocols

Sampling design description:

Girona: commercial fishery of glass eel is only allowed in 4 rivers done by 12 fishermen associated to 3 different fisherman guilds. Fisheries are allowed from October to March, only at night and a limit of sampling points (sampling point=trap) per river. Catches are conducted by means of a modified fyke net placed in the shoreline, near the river mouth. Total catches per night and fisherman are reported.

Ebro: commercial fishery of glass eel is allowed in almost 250 sampling points along the river, lagoons and canals managed by 5 different fisherman guilds. Fisheries are allowed from October to March, only at night and a limit of sampling points (sampling point=trap). Catches are conducted by means of a modified fyke net placed in the shoreline, near the river mouth, lagoon or canal. Total catches per night and fisherman are reported.

For length and weight measures glass eels are obtained from four sampling points in the Ebro. Sampling three times from October to March by professional fishermen. For each sampling point, 50 individuals are preserved alive and transported to the lab to measure total length (±1mm) the following day. After measuring, the individuals are released into the river. Following SUDOANG protocol.

Is the sampling design compliant with the 4S principle?: Y

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

National database: Direcció General de Pesca. Generalitat de Catalunya

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No samples storage

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

Quality document associated to a dataset: No

Validation of the final dataset: NA
AR comment: **Sampling design and protocols:** Due to the new directives (Council Regulation UE 2024/259 of 10 January 2024, fixing for 2024 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in the Mediterranean and Black Seas) the fishing effort has been reduced by 30% and the number of licenses is now a maximum of 180. Fishing periods have also been modified. They are now from April to May and from September/October to December depending on RBD. For length and weight measures of glass eels shall be taken from the river Ter (Girona) on the basis of scientific sampling using the same methodology and months.

Sampling scheme identifier: ANG_Cat_SciObs water body_Diadromous (scientific)_GE_RWL

MS : ESP
Region : Mediterranean and Black Sea
Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (scientific)_GE_RWL
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2025
Short description (max 100 words): Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: Glass eel **Stratification**: Te River
Sampling design and protocols
Sampling design description: One sampling point at the river mouth. Sampling monthly from October to March. Total: 6 sampling episodes. For each episode, 50 individuals are preserved alive and transported to the lab to measure total length and weight (±0.01g) the following day. After measuring, the individuals are released into the river. **Is the sampling design compliant with the 4S principle?**: Y **Regional coordination**: Regional coordination **Link to sampling design documentation**: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: Sampling allocations are fixed
Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Data capture documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality checks documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Data storage
National database: NA The SUDOANG project has compiled various Glass eel . recruitment data generated in the Ter, can be downloaded in www.sudoang.eu **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Editing and imputation methods:** https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality document associated to a dataset**: No **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Cat_SciObs water body_Diadromous (scientific)_S_EWL

MS : ESP
Region : Mediterranean and Black Sea
Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (scientific)_S_EWL
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: Silver eel **Stratification**: Ter River (pilot river basin for eel monitoring)
Sampling design and protocols

Sampling design description: 17 sampling points along the river and main tributaries. European eel sampled by means of electrofishing (two passes). Fish estimated using Seber method for two passes (removal methods) and referred to fish density. Sampling campaign conducted in September-October. Following SUDOANG protocols https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Silvering stage determined by Durif et al (2003, 2005).

Is the sampling design compliant with the 4S principle?: Y

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Once per year

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

National database: Direcció General de Pesca. Generalitat de Catalunya and University of Girona.

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

- Electroishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Data generated in the Ter silvering stage samplings, can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No samples storage

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

Quality document associated to a dataset: No

Validation of the final dataset: NA

AR comment: No deviations or developments

Sampling scheme identifier: ANG_Cat_SciObs water body_Diadromous (scientific)_Y_SWL

MS : ESP
Region : Mediterranean and Black Sea
Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (scientific)_Y_SWL
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: Yellow eel **Stratification**: Ter River (pilot river basin for eel monitoring)
Sampling design and protocols
Sampling design description: 17 sampling points along the river and main tributaries. European eel sampled by means of electrofishing (two passes). Fish estimated using Seber method for two passes (removal methods) and referred to fish density. Sampling campaign conducted in September-October. Following SUDOANG protocols https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip All the eels are measured. **Is the sampling design compliant with the 4S principle?**: Y **Regional coordination**: Regional coordination **Link to sampling design documentation**: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: Once per year
Data capture
Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Data capture documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality checks documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Data storage
National database: Direcció General de Pesca. Generalitat de Catalunya and University of Girona. The SUDOANG project has compiled various eel information from EMU_Cata that can be found at: - Electrofishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Data generated in the Ter, can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/) **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Editing and imputation methods:** https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality document associated to a dataset**: No **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Gali_SciObs water body_Diadromous (commercial)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: ANG_Gali_SciObs water body_Diadromous (commercial)
Sampling scheme type: Diadromous (commercial)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): The catches are established using auctions data from the different fishermen guilds, which are assigned to a determined river basin.
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: Catches from EMU_ES_Gali **Stratification**: Catches from EMU_ES_Gali
Sampling design and protocols
Sampling design description: 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 diciembre 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.

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.

- Pontevendra Estuary: Pontevedra fishermen guilds.

- Vigo Estuary: Arcade and Redondela fishermen guilds.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: No

Link to sampling design documentation: NA

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: The catches are established using auctions data from the different fishermen guilds, which are assigned to a determined river basin.

Data capture documentation: Auctions

Quality checks documentation: NA

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: N

Validation of the final dataset: NA

AR comment: No deviations or developments

Sampling scheme identifier: ANG_Gali_SciObs water body_Diadromous (scientific)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Gali_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: Self water body

Time period of validity : 2022-2027

Short description (max 100 words):

Electrofishing surveys for the estimation on:

- the standing stock of yellow eel
- the related silver eel escapement

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: EMU_ES_Gali for eel (*Anguilla anguilla*),

Stratification: Samples are stratified by river in order to obtain a weighted average

Sampling design and protocols

Sampling design description: Conventional catch-depletion removal methods are used, usually applying Carle-Strub or Seber-LeCren estimators or CPUE formulae in the case of a unique pass. Sampling design intends to cover the whole accessible area, in a kind of systematic sampling.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: No

Link to sampling design documentation: (Hervella & Caballero, 1999). Inventariación piscícola de los ríos gallegos. 126 pp. ISBN-13: 978-84-453-2458-5, ISBN: 84-453-2458-6

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Field forms

Data capture documentation: Original field forms are digitized and stored as pdf., and data are written and stored in a database application which is capable to analyze data and derive estimations.

Quality checks documentation: NA

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Murc_SciObs water body_Diadromous (scientific)

MS : Spain
Region : EMU_ES_Murc
Sampling scheme identifier : ANG_Murc_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Sampling aimed at capturing glass eels at one of the points of entry from the Mediterranean Sea to the coastal lake of the Mar Menor **Description of the population**
Sampling design and protocols
Sampling design description: The abundance of recruits (glass eel) will be determined by sampling with specific trap gear. The sampling point has been selected based on experience from previous campaigns. The traps are set once a month, for a series of hours on new moon nights **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: The design and sampling protocols were developed as part of a regional agreement **Link to sampling design documentation**: **Compliance with international recommendations**: NA **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**:
Data capture
Means of data capture: Specific traps for catching glass eels **Data capture documentation**: Excel file **Quality checks documentation**: NA
Data storage
National database: NA **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage

NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: NA **Validation of the final dataset**: NA
AR comment: The 3 planned samples could not be carried out, because the specific network was stolen in the first sampling

Sampling scheme identifier: ANG_Murc_SciObsOnShore_Diadromous (commercial)

MS : Spain
Region : EMU_ES_Murc
Sampling scheme identifier : ANG_Murc_SciObsOnShore_Diadromous (commercial)
Sampling scheme type: Diadromous (commercial)
Observation type: SciObsOnShore
Time period of validity : 2022-2027
Short description (max 100 words): Scientists will carry out at least 3 controls on the commercial fisheries of yellow eel and silver eel from the hypersaline lagoon of the Mar Menor.
Description of the population
Sampling design and protocols
Sampling design description: During the eel fishing season in the Mar Menor, at least 3 controls will be carried out in which the weight, length and age will be determined. The controls will be carried out in the Lo Pagan Fish Market, where all the commercialization of the eel of the Mar Menor is carried out. 50 individuals from each class will be processed. Weight, length and age will be measured (yellow or silver) **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: The design and sampling protocols were developed as part of a regional agreement **Link to sampling design documentation**: NA **Compliance with international recommendations**: NA **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**:
Data capture
Means of data capture: NA **Data capture documentation**: Excel file **Quality checks documentation**: NA

Data storage
National database: NA **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: NA **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: ANG_Murc_SelfAtShore_Diadromous (commercial)

MS : Spain
Region : EMU_ES_Murc
Sampling scheme identifier : ANG_Murc_SelfAtShore_Diadromous (commercial)
Sampling scheme type: Diadromous (commercial)
Observation type: SelfAtShore
Time period of validity : 2022-2027
Short description (max 100 words): Yellow and silver eel catches in the Mar Menor lagoon
Description of the population
Sampling design and protocols
Sampling design description: Specific monitoring of the fishery for this species consisting in for every lot of eel sold, the fisherman must fill in a document supervised by the Fishermen's Association which reflects the following data: boat, date, kg catch, type of eel (yellow or silver), gear (paranza or longline) and catch area. This documentation is sent to the Fisheries and Aquaculture Service for processing and supervision. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: The design and sampling protocols were developed as part of a regional agreement **Link to sampling design documentation**: NA **Compliance with international recommendations**: NA **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**:
Data capture
Means of data capture: NA

Data capture documentation: Excel file **Quality checks documentation**: NA
Data storage
National database: NA **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: NA **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: Nava_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: Nava_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : one year
Short description (max 100 words): sampling scheme aiming at characterizing the eel population in the Bidasoa River catchment (standing stock of yellow eels and the silver eel escapement), by collecting length and numbers of yellow eels and length, weight, sex ratio and numbers of silver eels.
Description of the population
Population targeted: The scheme covers the Bidasoa River and main tributaries and is carried out yearly in October by electrofishing 11 sites. Only yellow and silver eels are targeted. **Population sampled**: Yellow and silver eels in freshwater habitats are targeted. **Stratification**: Eels below 30cm are considered "colonising yellow eels" and are only measured. The length/weight relationship for these small eels was established years ago and the formula $y = 2E\text{-}07x^{3,3558}$ (R^2 = 0,9838) is used to estimate the biomass. Eels of 30cm or bigger are considered potentially migrant and therefore the biometric parameters to determine the silvering stage (as defined by Durif et al. 2003; 2005) are measured for each individual (length, weight, horizontal and vertical eye diameter and pelvic fin length).
Sampling design and protocols
Sampling design description: The catchment is sampled in 11 sites: 6 sites in the main Bidasoa River and 5 in the most important tributaries (Zia, Onin, Tximista, Latsa and Ezkurra streams). The entire potential distribution of eels in the catchment is covered.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: The sampling design and protocols were developed as part of the Eel Management Plan in Navarra, that was included in the Eel Management Plan in Spain.

Link to sampling design documentation: There is no link to a webpage where the documentation can be found. After some preliminary samplings carried out between 2009 and 2011, an internal document was developed in 2012 describing the sampling design and monitoring protocol: Elso J., Álvarez J. y Leunda P.M. (2012) Memoria Anguila 2011: situación de la especie y protocolo de seguimiento. Informe técnico elaborado por G.A.N.A.S.A. para el Gobierno de Navarra.

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found. An internal document was developed in 2013 describing the sampling protocol and is still in force: Elso J., Álvarez J. y Leunda P.M. (2013) Protocolo de muestreos de anguila en la cuenca del Bidasoa. Informe técnico elaborado por G.A.N.A.S.A. para el Gobierno de Navarra.

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture: The localities are sampled by electric fishing, applying the method of successive catches without return, carrying out as many passes as necessary to obtain reliable results. In the stations of the main river, a wet surface of not less than 500 m^2 is sampled, delimiting an area of 50x10 meters with stakes in those stations of the main river of greater width. In tributaries, 100 linear meters are sampled. The total area sampled is measured and the effective fishing time is taken to determine the effort made. All the catches of each fishing are kept separate for the subsequent taking of biometric data. These are taken as follows:

- Total length: with a fish measuring board, in millimeters, accuracy of ± 1 mm
- Weight: with a scale, in grams, accurate to ± 1 g
- Ocular diameter: with a digital caliper, in millimeters, precision of ± 0.01 mm. The diameter is measured on both the vertical and horizontal axes.
- Pectoral fin length: with a digital caliper, in millimeters, accurate to ± 0.01 mm. The maximum length of the fin is measured, from insertion to limit

Data capture documentation: There is no link to a webpage where the documentation can be found. An internal document was developed in 2013 describing the protocol for biometric data collection and it is reviewed every year. The last review is: Elso J. (2021) Protocolo para la toma de datos de anguila. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Ichthyological Registry of Navarra.

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage

No samples are stored or analysed.

Data processing

Evaluation of data accuracy (bias and precision): 'N'

Editing and imputation methods: 'N'

Quality document associated to a dataset: 'N'

Validation of the final dataset: 'N'

AR comment: Only 6 of the 11 planned points were sampled, since weather conditions (heavy rain with high river flows) in October prevented sampling of all the planned stations.

Sampling scheme identifier: ANG_Vale_SciObs water body_Diadromous (commercial)

MS : ESP
Region : Mediterranean and Black Sea
Sampling scheme identifier : ANG_Vale_SciObs water body_Diadromous (commercial)
Sampling scheme type: Diadromous (commercial)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Catches sampling (GE, Y and S) in EMU_Vale
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: *Anguilla Anguilla* from EMU_Vale **Stratification**: All the eel cathes (GE, Y and S) in EMU_Vale
Sampling design and protocols
Sampling design description: • 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 explotation 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. Regarding length and weight measurements, glass eels and eels are selected at random from: 1) The deliveries made by the glass eel fishermen to the administration, at the Tuéjar fish farm. Data on weight and length of 150 glass eels shall be taken from the deliveries (a part of the catch) made by all professional glass eel fishermen to the administration.

2) Thee catches of the day (or of several days if there were not enough in a single day), at the Palmar fish market. Data on the weight and length of 100 eels will be taken from a sample of the catches made by the professional fishermen of Palmar in the Albufera of Valencia. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: NA **Link to sampling design documentation**: NA **Compliance with international recommendations**: N. **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: NA **Data capture documentation**: NA **Quality checks documentation**: NA
Data storage:
National database: ***NA*** **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: the ices eel working group (WGEEL) reviews the information before incorporating it into its database.
Sample storage: NA
Data processing
Evaluation of data accuracy (bias and precision): N **Editing and imputation methods: N.** **Quality document associated to a dataset**: **N.** **Validation of the final dataset**: **N.**
AR comment: **Sampling design and protocols:** In 2023, the licenses for professional use of eel in the province of Alicante have been renewed, as the previous ones had expired. Only 7 of the 15 private properties have requested this renewal. The 8 remaining have changed to recreational fish farming (not eel) or have been deregistered

Sampling scheme identifier: ANG_Vale_SciObs water body_Diadromous (scientific)

MS : ESP
Region : Mediterranean and Black Sea
Sampling scheme identifier : ANG_Vale_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

Yellow and silver electrofishing eel sampling in the Turia River

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_Vale

Stratification: Yellow and silver eel from the the Turia River

Sampling design and protocols

Sampling design description:

The abundance of the standing stock (yellow and silver eel) will be determined by electrofishing surveys in 10 river sampling points. Silvering stage determined by Durif et al. (2003; 2005)

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: NA

Link to sampling design documentation: https://agroambient.gva.es/es/web/medio-natural/planificacion-60934/-/documentos/KuG0baLNcSxQ/folder/128779088?p_auth=BAium0DF

Compliance with international recommendations: N.

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: NA

Data capture documentation: NA

Quality checks documentation: NA

Data storage:

National database: The SUDOANG project has compiled various eel information from EMU_Vale that can be found at https://bit.ly/3iIgtrT.

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: the ices eel working group (WGEEL) reviews the information before incorporating it into its database.

Sample storage: NA

Data processing

Evaluation of data accuracy (bias and precision): N

Editing and imputation methods: N.

Quality document associated to a dataset: **N.**

Validation of the final dataset: **N.**

AR comment: No deviations or developments

Sampling scheme identifier: Saeatrout_ Nava_SciObs water body_Diadromous (recreational)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: Saeatrout_ Nava_SciObs water body_Diadromous (recreational)
Sampling scheme type: Diadromous (recreational)
Observation type: SciObs water body
Time period of validity : one year
Short description (max 100 words): sampling scheme aiming at gathering information about the sea trout that are caught by anglers during the angling season, by collecting numbers and biometric data (length, weight, sex and age). Each time an angler catches a sea trout, must call the rangers who collect the data.
Description of the population
Population targeted: The scheme covers all sea trout caught in the Bidasoa River between the sea and the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea), the only river stretch where sea trout angling is authorized. **Population sampled**: Spring migrating sea trout in their freshwater stage are targeted. **Stratification**: Males and females are distinguished (based on morphologic characters) and age (based on scale reading). Angling is only authorized between 1st of May and 31st of July.
Sampling design and protocols
Sampling design description: All sea trout captured during the angling season. Individual biometric data are taken. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: The sampling design and protocols were developed in the 90's and have been reviewed periodically. **Link to sampling design documentation**: There is no link to a webpage where the documentation can be found. **Compliance with international recommendations**: 'Y'. **Link to sampling protocol documentation**: There is no link to a webpage where the documentation can be found.
Sampling implementation
Recording of refusal rate: 'NA' **Monitoring of sampling progress within the sampling year**: No sampling allocations are adjusted
Data capture
Means of data capture: When an angler catches a sea trout, must call the rangers who verify that the fish has been legally caught. If so, a legal certificate allowing the animal to be transported is issued. The ranger then collects the following data: • Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm • Weight: with a scale, in grams, accurate to ± 50 g • Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination **Data capture documentation**: There is no link to a webpage where the documentation can be found.

Quality checks documentation: 'N'
Data storage
National database: All data gathered are stored in the Ichthyological Registry of Navarra. **International database**: 'NA' **Quality checks and data validation documentation**: 'N'
Sample storage
Scales are read for age determination (river and sea age) and stored in GAN-NIK.
Data processing
Evaluation of data accuracy (bias and precision): 'N' **Editing and imputation methods:** 'N' **Quality document associated to a dataset**: 'N' **Validation of the final dataset**: 'N'
AR comment: **Description of the population:** Sea Trout angling was banned in 2023 in the Bidasoa River. The situation continues in 2024. **Sampling design and protocols, Data capture, Data storage, Sample storage:** Since Sea Trout angling was banned in 2023 in the Bidasoa River, no data were gathered from the recreational fisheries. The situation continues in 2024.

Sampling scheme identifier: Saeatrout_ Nava_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: Saeatrout_ Nava_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : one year
Short description (max 100 words): sampling scheme aiming at characterizing the sea trout population migrating upstream in the Bidasoa River, by collecting numbers and biometric data (length, weight, sex and age)
Description of the population
Population targeted: The scheme covers all sea trout that migrate upstream the Bidasoa River through the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea). **Population sampled**: Migrating Sea Trout in their freshwater stage are targeted. **Stratification**: Males and females are distinguished (based on morphologic characters) and age (based on scale reading)
Sampling design and protocols
Sampling design description: All sea trout reaching the Migratory Fish Control Station are captured in a fish trap and individual biometric data are taken, before they are released upstream of the fish trap. **Is the sampling design compliant with the 4S principle?**: NA

Regional coordination: The sampling design and protocols were developed in the 90's and have been reviewed periodically. **Link to sampling design documentation**: There is no link to a webpage where the documentation can be found. **Compliance with international recommendations**: 'Y'. **Link to sampling protocol documentation**: There is no link to a webpage where the documentation can be found.
Sampling implementation
Recording of refusal rate: 'NA' **Monitoring of sampling progress within the sampling year**: No sampling allocations are adjusted
Data capture
Means of data capture: All sea trout reaching the Migratory Fish Control Station are captured in a fish trap, counted and individual biometric data are taken, before they are released upstream of the fish trap. After anesthetizing the fish, biometric data are taken as follows: • Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm • Weight: with a scale, in grams, accurate to ± 50 g • Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination **Data capture documentation**: There is no link to a webpage where the documentation can be found. **Quality checks documentation**: 'N'
Data storage
National database: All data gathered are stored in the Ichthyological Registry of Navarra. **International database**: 'NA' **Quality checks and data validation documentation**: 'N'
Sample storage
Scales are read for age determination (river and sea age) and stored in GAN-NIK.
Data processing
Evaluation of data accuracy (bias and precision): 'N' **Editing and imputation methods:** 'N' **Quality document associated to a dataset**: 'N' **Validation of the final dataset**: 'N'
AR comment: No deviations or developments

Sampling scheme identifier: Saeatrout_Gali_SciObs water body_Diadromous (scientific

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Seatrout_Gali_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027

Short description (max 100 words):

Counting of upstream migrants in a fish trap.

Description of the population

Population targeted: Salmo trutta

Population sampled: Sea trout run in rivers Landro, Ulla and Lérez. Smolt run in river Ulla

Stratification: The fraction of individuals that cross the obstruction through the fish trap. Samples are stratified for each river individually.

Sampling design and protocols

Sampling design description:

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

3) Biometry of adults will be derived from recreational catch and fish trap samples.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: No

Link to sampling design documentation: NA

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Field forms

Data capture documentation: Original field forms are digitized and stored as pdf., and data are written and stored in a database.

Quality checks documentation: NA

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: N

Validation of the final dataset: NA

AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Astu_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Astu_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of Asturias
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Asturias **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling. 1) The abundance of parr will be derived from electrofishing surveys in autum 2) Abundance of adults will be estimated from recreational catch and salmons passing in the fish trap traps (sampled every 1-2 days.) 3) Abundance of adults will be estimated from an annual underwater Visual Census: once a year 2 divers enter each river and make an assesment of the population. 4) Biometry of adults will be derived from recreational catch and fish trap samples. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Data is reported to the ministry **International database**: Data is reported to NASCO and ICES if required **Quality checks and data validation documentation**: NA
Sample storage

NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Basq_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Basq_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of the Basque Country with current salmon presence
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in the Basque Country **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling. 1) The abundance of parr will be derived from electrofishing surveys between March and Mau. Conventional catch-depletion removal methods are used, usually applying Carle-Strub or Seber-LeCren estimators or CPUE formulae in the case of a unique pass. 2) Abundance of adults will be estimated from salmons passing in the fish trap between March and Decemeber 3) Biometry will be derived from electrofishing and fish trap samples. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field stadia

Data capture documentation: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: NA **International database**: Data is reported ICES if required **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Cant_SciObs water body_Diadromous (recreational)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Cant_SciObs water body_Diadromous (recreational)
Sampling scheme type: Diadromous (recreational)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of Cantabria.
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Cantabria **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: the catches are reported by the fishermen are weighed and measured **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Archivos de la Dirección General de Biodiversidad, Medio Ambiente y Cambio Climático **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Cant_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Cant_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of Cantabria
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Cantabria **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling. 1) The abundance of parr will be derived from electrofishing surveys in August_september 2) Abundance of adults will be estimated from recreational catch and salmons passing in the fish trap traps (sampled every 1-2 days.) 4) Biometry of adults will be derived from recreational catch

Is the sampling design compliant with the 4S principle?: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Archivos de la Dirección General de Biodiversidad, Medio Ambiente y Cambio Climático **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Gali_SciObs water body_Diadromous (recreational)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Gali_SciObs water body_Diadromous (recreational)
Sampling scheme type: Diadromous (recreational)
Observation type: Self water body
Time period of validity : 2022-2027
Short description (max 100 words): Compilation of biometric data of the recreational catch of atlantic salmón (declaration of catches is mandatory in Galicia)
Description of the population
Population targeted: Galicia for atlantic salmon (Salmo salar) in the main rivers were recreational fishing is allowed: Eo, Masma, Mandeo, Ulla and Miño.

Population sampled: Adult fish legally caught. **Stratification**: Samples are stratified as each river has his own and separate population.
Sampling design and protocols
Sampling design description: Every salmon is measured andweighted. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field forms **Data capture documentation**: Original field forms are digitized and stored as pdf., and data are written and stored in a database. **Quality checks documentation**: NA
Data storage
National database: NA **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA
AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Gali_SciObs water body_Diadromous (scientific)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Gali_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: Self water body
Time period of validity : 2022-2027
Short description (max 100 words):

Salmon sampling int the rivers of Galicia
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Galicia Eo, Masma, Ouro, Landro, Mera, Xubia, Mandeo, Anllóns, Ulla, Lérez, Miño (tributaries) **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling. 1) The abundance of parr will be derived from electrofishing surveys. Conventional catch-depletion removal methods are used, usually applying Carle-Strub or Seber-LeCren estimators or CPUE formulae in the case of a unique pass. 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 salmons passing in the fish trap 4) Biometry of adults will be derived from recreational catch and fish trap samples. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: (Hervella & Caballero, 1999). Inventariación piscícola de los ríos gallegos. 126 pp. ISBN-13: 978-84-453-2458-5, ISBN: 84-453-2458-6 **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field forms **Data capture documentation**: Original field forms are digitized and stored as pdf., and data are written and stored in a database application which is capable to analyze data and derive estimations. **Quality checks documentation**: NA
Data storage
National database: NA **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

AR comment: No deviations or developments

Sampling scheme identifier: Salmon_Nava_SciObs water body_Diadromous (recreational)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier: Salmon_Nava_SciObs water body_Diadromous (recreational)
Sampling scheme type: Diadromous (recreational)
Observation type: SciObs water body
Time period of validity : one year
Short description (max 100 words): sampling scheme aiming at gathering information about the adult salmon that are caught by anglers during the angling season, by collecting numbers and biometric data (length, weight, sex, sanitary status and age). Each time an angler catches a salmon, must call the rangers who collect the data.
Description of the population
Population targeted: The scheme covers all adult salmon caught in the Bidasoa River between the sea and the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea), the only river stretch where salmon angling is authorized. **Population sampled**: Spring migrating adult Salmon in their freshwater stage are targeted. **Stratification**: Males and females are distinguished (based on genetic analysis) and 1SW and MSW (based on scale reading). Angling is only authorized between 1st of May and 31st of July.
Sampling design and protocols
Sampling design description: All salmon captured during the angling season. Individual biometric data are taken. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: The sampling design and protocols were developed in the 90's and have been reviewed periodically. Now they are included in the Salmon Management Plan in Navarra and in the NASCO Implementation Plan. **Link to sampling design documentation**: https://nasco.int/wp-content/uploads/2020/11/IP1914rev_EU-Spain_Navarra.pdf https://www.navarra.es/documents/48192/7222658/Memoria_Salmon_2020.pdf/d15be9f2-9058-f084-e1e3-61e19fdc3e6c?t=1624605547034 **Compliance with international recommendations**: 'Y'. **Link to sampling protocol documentation**: There is no link to a webpage where the documentation can be found. An internal document is developed every year describing the sampling protocol. The last one is: Elso J., (2021) Protocolo de toma de datos y muestras de salmón durante la temporada de pesca. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.
Sampling implementation
Recording of refusal rate: 'NA' **Monitoring of sampling progress within the sampling year**: No sampling allocations are adjusted
Data capture

Means of data capture: When an angler catches a salmon, must call the rangers who verify that the salmon has been legally caught. If so, a legal certificate allowing the animal to be transported is issued. The ranger then collects the following data:

- Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm
- Weight: with a scale, in grams, accurate to ± 50 g
- Maximum height: with a fish measuring board, in millimeters, accuracy of ± 1 mm
- Upper maxilla length: with a caliper, in millimeters, precision of ± 1 mm.
- Tissue sample: small cut from the fin (preferably from the adipose fin), preserved in a numbered Eppendorf tube with 96% alcohol. This sample is used for sex determination.
- Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination
- Sanitary status: a visual review of the health status (parasites, wounds, etc.) and the determination of the RVS (Red Vent Syndrome) is carried out
- Fish origin: it is verified if the adipose fin has been cut (fish farm origin) or not (wild origin). In case it is a fish farm salmon, the presence of a CWT (Coded Wire Tag) in the salmon head must be verified (with a CWT hand held detector). If a CWT is detected, the angler has to allow the ranger to cut the head of the salmon, so the CWT can be recovered.

Data capture documentation: There is no link to a webpage where the documentation can be found. An internal document is developed every year describing the sampling protocol. The last one is: Elso J., (2021) Protocolo de toma de datos y muestras de salmón durante la temporada de pesca. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Salmon Database of Navarra and the Ichthyological Registry of Navarra. A report is published with all the sampling results on a yearly basis and can be downloaded from

https://www.navarra.es/es/medio-ambiente/informacion-tecnica

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage

Tissue samples are analysed for sex determination and stored in the University of Vigo.

Scales are read for age determination (river and sea age) and stored in GAN-NIK.

Results of both analysis are included in the annual report that can be downloaded from

https://www.navarra.es/es/medio-ambiente/informacion-tecnica

Data processing

Evaluation of data accuracy (bias and precision): 'N'

Editing and imputation methods: 'N'

Quality document associated to a dataset: 'N'

Validation of the final dataset: 'N'

AR comment:

Description of the population:

Salmon angling was banned in 2023 in the Bidasoa River. The situation continues in 2024.

Sampling design and protocols, Data capture, Data storage, Sample storage:

Since Salmon angling was banned in 2023 in the Bidasoa River, no data were gathered from the recreational fisheries. The situation continues in 2024.

Sampling scheme identifier: Salmon_Nava_SciObs water body_Diadromous (scientific)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: Salmon_Nava_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : one year

Short description (max 100 words):

sampling scheme aiming at characterizing the juvenile salmon population in the Bidasoa River catchment, by collecting length and numbers of salmon parr (0+).

Description of the population

Population targeted:

Parr The scheme covers the Bidasoa River and main tributaries and is carried out yearly in September by electrofishing 31 sites. Only salmon parr are targeted. Most of them are 0+, but a few 1+ are also found.

Adult The scheme covers all adult salmon caught in the Bidasoa River between the sea and the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea), the only river stretches where salmon angling is authorized.

Population sampled: Salmon parr and adult (Spring migrating adult Salmon in their freshwater stage) are targeted.

Stratification:

Parr: parr below 130mm in the main river and 110mm in tributaries are considered 0+. Parr longer that those measures are considered 1+. Hatchery origin fish are distinguished from those of wild origin as the former have the adipose fin clipped.

Adult: Males and females are distinguished (based on genetic analysis) and 1SW and MSW (based on scale reading). Angling is only authorized between 1st of May and 31st of July.

Sampling design and protocols

Sampling design description:

Parr**:** The catchment is sampled in 31 sites: 16 sites in the main Bidasoa River and 15 in the most important tributaries. The entire potential distribution of salmon in the catchment is covered.

Adult: All salmon captured during the angling season. Individual biometric data are taken

Adult: All salmon reaching the Migratory Fish Control Station are captured in a fish trap and individual biometric data are taken, before they are released upstream of the fish trap.

Is the sampling design compliant with the 4S principle?: NA

Regional coordination: The sampling design and protocols were developed in the 90's and have been reviewed periodically. Now they are included in the Salmon Management Plan in Navarra and in the NASCO Implementation Plan.

Link to sampling design documentation:

https://nasco.int/wp-content/uploads/2020/11/IP1914rev_EU-Spain_Navarra.pdf

https://www.navarra.es/documents/48192/7222658/Memoria_Salmon_2020.pdf/d15be9f2-9058-f084-e1e3-61e19fdc3e6c?t=1624605547034

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found. An internal document is developed every year describing the sampling protocol. The last one is: Elso J., (2021) Protocolo de muestreo de juveniles de salmón. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture:

Parr: The localities are sampled by electric fishing, applying the method of successive catches without return, carrying out as many passes as necessary to obtain reliable results. In eight of the sampling sites of the main channel, semi-quantitative samplings (5 'of effective fishing) are carried out to calculate the abundance index and in the other eight and in the two main tributaries (Tximista and Ezkurra) a complete quantitative inventory is also carried out, to estimate population density. Only quantitative inventories are carried out at the other 13 sampling points of the tributaries. In the stations of the main river, a wet surface of not less than 500 m^2 is sampled, delimiting an area of 50x10 meters with stakes in those stations of the main river of greater width. In tributaries, 140 linear meters are sampled. The total area sampled is measured and the fishing time is taken to determine the effort made. All the catches of each fishing are kept separate for the subsequent taking of biometric data. Fork length is measured with a fish measuring board (in millimeters, accuracy of ± 1 mm) for all individuales and it is checked if the adipose fin is cut, to verify the origin of the fish (hatchery or wild)

Adult: When an angler catches a salmon, must call the rangers who verify that the salmon has been legally caught. If so, a legal certificate allowing the animal to be transported is issued. The ranger then collects the following data:

- Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm
- Weight: with a scale, in grams, accurate to ± 50 g
- Maximum height: with a fish measuring board, in millimeters, accuracy of ± 1 mm
- Upper maxilla length: with a caliper, in millimeters, precision of ± 1 mm.
- Tissue sample: small cut from the fin (preferably from the adipose fin), preserved in a numbered Eppendorf tube with 96% alcohol. This sample is used for sex determination.
- Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination
- Sanitary status: a visual review of the health status (parasites, wounds, etc.) and the determination of the RVS (Red Vent Syndrome) is carried out
- Fish origin: it is verified if the adipose fin has been cut (fish farm origin) or not (wild origin). In case it is a fish farm salmon, the presence of a CWT (Coded Wire Tag) in the salmon head must be verified (with a CWT hand held detector). If a CWT is detected, the angler has to allow the ranger to cut the head of the salmon, so the CWT can be recovered.

Data capture documentation: There is no link to a webpage where the documentation can be found. An internal document was developed in 2013 describing the protocol for biometric data collection and it is reviewed every year. The last review is: Elso J. (2021) Protocolo para la toma de datos de juveniles de salmón. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Ichthyological Registry of Navarra. A report is published with all the sampling results on a yearly basis and can be downloaded from

https://www.navarra.es/es/medio-ambiente/informacion-tecnica

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage

Parr: No samples are stored or analysed.

Adult: Tissue samples are analysed for sex determination and stored in the University of Vigo.

Scales are read for age determination (river and sea age) and stored in GAN-NIK.

Results of both analysis are included in the annual report that can be downloaded from

https://www.navarra.es/es/medio-ambiente/informacion-tecnica

Data processing

Evaluation of data accuracy (bias and precision): 'N'

Editing and imputation methods: 'N'

Quality document associated to a dataset: 'N'

Validation of the final dataset: 'N'

AR comment: Only 29 of the 30 planned points were sampled, since weather conditions (heavy rain with high river flows) in September prevented sampling of all the planned stations.

ANNEX 1.2 - QUALITY REPORT FOR SOCIOECONOMIC DATA SAMPLING SCHEME

The quality report fulfils Article 6 (3) (d) of the Regulation (EU) 2017/1004. This document is intended to specify data to be collected under chapter II, points 3, 5, 6, and 7 of the Delegated Decision annex: Socioeconomic data on fisheries, aquaculture and any complementary data collection of fishing activity and fish processing.

Use this document to describe quality aspects of the data collection process (design, sampling implementation, data capture, data storage and data processing etc.). The annex should be filled for each sampling scheme. Where applicable, use the handbook on sampling design (Deliverable 2.1 from MARE/2016/22 SECFISH study), available on the DCF website.

Provide information under each point in all sections.

Please indicate sampling scheme identifier (e.g combination of 'sector' and 'sampling scheme' or 'variables' from the annex table). Each identifier is unique and can be used only once; records with identical scheme identifiers are overwritten in the platform. Do not add any tables others than from the template.

Create a first survey specification record as a reference to the regional WP, add 'RWP ECON' in the 'sector name' field and leave the other fields empty.

Sampling scheme identifier: Fisheries. Probability sample survey

Survey specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Fisheries
Sampling scheme: Probability sample survey
Variables: All variables in tables 7 and 9 less Value of physical capital and Consumption of fixed capital (Inactives)
Supra region(s): All Supra regions
Survey planning
Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'. **The statistical unit** or observation unit is each of the vessels included in the CFP (Operative Fishing Fleet Census, in Spanish), which can perform marine fishing, classified in group 03.11 of the National Activities Classification (CNAE-2009). **The reporting unit** is the vessel's owner. **The sampling unit** is each CFP vessel with activity during the referred year. **The analysis unit**, or economic activity unit is the vessel, therefore, it coincides with the observation unit.
Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.

Describe how the sample sizes were determined.

Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.

Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.

Stratified random sampling. The main variable of this survey is the economic profitability of the ship, and the auxiliary variable to be used to stratify is the GT, a variable of which the population distribution is known.

Stratification: Survey population was divided into strata, according to the auxiliary variable GT, with the aim of obtaining groups on vessels as homogeneous as possible within stratum GT and with the greatest possible heterogeneity among the different strata, in relation to the profitability of the vessels.

Strata were defined according to statistic, biological (similarity in the fishing grounds' characteristics), and technical (type of fishing methods utilised and vessel length).

In addition to the above mentioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Strata cannot contain less than 10 elements: strata not meeting this condition are grouped with others.

Sample size: with optimum allocation. Total sample size is determined aiming to estimate the median GT of the population with an expected error of 5%, that is, a 95% level of confidence.

Sample selection: In the population database, vessel data will appear together with the vessel's owner data. By selecting the statistical units, reporting units of the survey are perfectly demarcated.

The various ships in the population are grouped according to the stratum to which they belong, and in each of these groups, membership or not of each of the vessels to the stratum will be randomly allocated. The result is a set of random and mutually independent subsamples.

The size of each of these subsamples will be previously determined by the (previously set) expected error level.

Estimation design

Describe method of calculating population estimate from sample.

Method to calculate the population estimate from the sample .

The population under study has been divided into strata, for the purposes of sample design, based on the auxiliary variable GT, with the aim of achieving groups of vessels with a GT that is as homogeneous within the stratum and with the greatest possible heterogeneity. between the different strata, in relation to the economic profitability of the vessels. All this so that the representativeness of the vessels, within each stratum, is as high as possible. In this way, when applying the corresponding sample design, samples will be obtained that will have the least possible number of units to be sampled.

Sample size.

- Total sample size with optimal allocation.

The total sample size to estimate the mean GT of the population with an expected error of 5% to 95% confidence level, has been calculated assuming that an optimal allocation is going to be made and that a normal population is considered.

The formula used to calculate the sample size n is the following:

$$n = \frac{\left(\sum_{h=1}^{h=L} N_h S_h\right)^2}{\frac{N^2 e^2 \overline{X}^2}{z^2} + \sum_{h=1}^{h=L} N_h S_h^2} \qquad (1)$$

Where: h is the number of strata ranging from 1 to L (maximum number of strata), Nh the size of stratum h, N the size of the population, Sh the standard deviation of stratum h, the mean GT of the population, and the error of the estimate and z the standardized variable for the chosen confidence level.

- Assignment of the sample by strata.

The allocation of the sample to each of the strata is calculated by applying a double allocation or distribution of the sample (allocation of commitment), considering the estimators of the totals of the variable Tonnage (GT) and the proportionality of vessels within each stratum .

The commitment of the sample to the strata is carried out using the following formulas:

Optimal Attachment

$$nOP_h = n \frac{N_h S_h}{\sum_{h=1}^{h=L} N_h S_h} \quad (2)$$

Being: n, h, Nh and Sh the same statistics as in (1).

Proportional allocation

$$nP_h = n \frac{N_h}{\sum_{h=1}^{h=L} N_h} \quad (3)$$

Being: n, h and Nh the same statistics as in (1).

The Compromise Allocation between minimum (optimal) and proportional variance will be weighted ¾, ¼ for each of the allocations.

$$n_h = nOP_h * 3/4 + nP_h * 1/4 \quad (4)$$

Sample selection

- Determination of the reporting units.

The reporting unit can articulate around the ship, but doing so would mean losing the necessary information in those in which a shipowner has more than one ship, since it can report on all the ships it controls, without additional effort.

For these reasons, it is proposed to adopt the shipowner as the reporting unit, who will be questioned about all the vessels it manages, although it must be taken into account that these vessels may not belong to the sample and will therefore not be taken into account in the elevations.

In the population database the data of the vessels will appear together with the data of the owners thereof. When selecting the statistical units, the reporting units of the survey are perfectly delimited.

- General description of the sample selection procedure.

As the ship is the sampling unit, it is necessary that the selection of any unit within the sample is random within the stratum to which it belongs.

The different vessels in the population will be grouped according to the stratum to which they belong, and in each of these groups the membership or not of each of the vessels in the stratum sample will be randomly drawn. The result is a set of random and independent subsamples.

The size of each of the aforementioned subsamples will be previously determined by the level of error that is set.

Estimators

The population estimators of the total of the main variable and the rest of the variables of interest will be estimated. The variables of interest will be estimated using stratified sampling procedures.

From the data contained in the questionnaire, the variables whose population values are of interest will be constructed.

The relevant formulas for stratified random sampling are:

- Estimation of population mean : $\hat{\bar{X}}_S$

$$\hat{\bar{X}}_S = \sum_{h=1}^{h=L} W_h \bar{x}_h \qquad (3)$$

Where: $\bar{X}_h$ the mean of the variable observed in stratum h and $W_h = N_h / N$ the weight of stratum h.

- Estimated variance of the population mean $V(\hat{\bar{X}}_S)$:

$$V\left(\hat{\bar{X}}_S\right) = \sum_{h=1}^{h=L} W_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \qquad (4)$$

Where: Nh is the population size of the stratum, nh the size of the sample in stratum h.

- Estimate of the total population, $\hat{X}_S$:

$$\hat{X}_S = \sum_{h=1}^{L} N_h \bar{x}_h \qquad (5)$$

Where: Nh is the population size of the stratum and $\bar{x}_h$ the mean of the variable observed in each stratum.

- Estimated variance of the total population, $V(\hat{X}_S)$:

$$V(\hat{X}_S) = \sum_{h=1}^{h=L} N_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \qquad (6)$$

All parameters match those described in expression (4).

Describe method of calculating derived data: e.g. imputed values.

The different economic variables requested from the informant are considered of two types; mandatory response and non-mandatory response. Those with a mandatory response are compulsorily collected, and those with a non-mandatory response can have a value or be zero in case there is no value. Therefore, no values are imputed.

Describe treatment of nonresponse.

Treatment of total lack of response and treatment of stratum change

The lack of response, generated by some heads of the sampling units, will imply an increase in the level of error. A different case is the location of the units that have been decommissioned or are no longer in operation, these cases will imply a variation in the framework of the initial population.

Total lack of response and treatment of stratum change will be treated as follows:

The basic estimator (unbiased estimator of expansion in stratified sampling)

$$\hat{X} = \sum_h \frac{N_h}{n_h} \sum_i x_i$$

being:

N_h: Total number of units in the directory in stratum h

n_h: Number of units selected for the sample in stratum h

Xi: Value of the observed variable X in unit i of stratum h

It is corrected from the corrections made in the elevation factor due to the various types of incidents that arise during field work: total non-response, change of stratum, etc.

Thus, the final elevation factor will be:

If there is no change in stratum: $\frac{N_h}{n_h}$

If there is a change of stratum: $\frac{\hat{N}_h^*}{n_h^*}$

being:

n_h: Number of units of the effective sample that has not changed stratum

$\tilde{N}_h$: Number of units in the directory in stratum h obtained by deflating as a function of losses and changes in stratum

$$\hat{N}_h^* = N_h \left(1 - \frac{b_h}{n_h}\right) - \sum_{h \neq k} \frac{N_h}{n_h} n_h^k$$

b_n: Number of units that are low in the sample (sample incidence of frame correction)

n_h^k: Number of units selected in stratum h and thatreally belong to stratum k

Final expression of the estimator:

$$\hat{X} \sum_h \left\{ \sum_{i=1}^{n_h^*} \frac{\hat{N}_h^*}{n_h^*} x_i + \sum_{k \neq h} \frac{N_k}{n_k} \sum_{i=1}^{n_k^h} x_i \right\}$$

The first addend represents the contribution of the units that have not changed stratum.

The second addend represents the contribution of the units selected in stratum k and that really belong to h.

Treatment of incidents

In the event that an incident occurs once the questionnaires have been collected, they will be treated as follows.

First, the different situations are defined:

E: RESPONDENTS, sample units located and surveyed, are considered Surveyable.

B: LOW, units which are on leave during the reference year and it is not expected that they will be active again, therefore they will be considered Non-surveyable.

I: INACTIVE, those units that have not had activity during the study period are considered, but it is known that in future periods they will be able to do so. They are considered to be surveyable with incidents.

N: NEGATIVE, those sample units that have not wanted to answer the survey or that after several attempts to carry out the survey have been unsuccessful. They are considered to be surveyable with incidents.

IL: ILOCALIZABLE, sample units that could not be surveyed because they were not located. They will be considered Surveyable with incidents.

AS: ABSENT, sample units that are absent in all data collections. They will be considered pollstable with incidents.

F: DECEASED, those sample units located but deceased. They are considered not surveyable.

J: RETIRED, retired sample units, will be considered not surveyable.

IN: DISABLED, are the sample units that during the period under study have been unable to carry out their activity. Each particular case will be studied to determine whether in successive periods the sample unit will be able to carry out the activity or will have to be terminated. In the first case, they will be considered Surveyable with incidents.

In the case of the sample units considered Not to be surveyed, the reason for not having their information for the design of future surveys will be noted and they will affect the survey frame by reducing it by the corresponding percentage.

It will be necessary to document each of the situations described above with confirmation from the interviewer.

The theoretical design of the sampling work is developed in the published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All questionnaires are checked and their information is recorded. This is done visually by comparing the physical questionnaire with the electronic one.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded for that ship.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

Described in published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx

Data storage and documentation

Describe how the data is stored.

Provide link to webpage where additional methodological documentation can be found, if any.

INFORMATION STORAGE METHOD

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to be able to identify the holders.

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx

Revision

Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.

The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection.

The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU

Confidentiality

Are procedures for confidential data handling in place and documented?

Are protocols to enforce confidentiality between DCF partners in place and documented?

Are protocols to enforce confidentiality with external users in place and documented?

Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.

The confidentiality of the information is subject to the Data Protection regulations and the Law of the Public Statistical Function of Spanish legislation.

In accordance with confidentiality legislation, data will not be published or shared if they identify the owner of the same.

AR comment:

The Updated planned sample rate reflects the updated sampling situation in the 2023 data collection, the planned population and sample varies depending on segment sizes and variability of sampling units.

For the "Consumption of fixed capital" variable, the method of collecting the information was changed from a Sample method to a Census method implemented through the PIM method to include inactive vessels. This change was applied to all vessels in order to standardize the methodology.

"Value of physical capital" active and inactive vessels, is collected within the Sampling scheme identifier: Fisheries. Census.

The method of data collection for all the activity fisheries variables is Census. These data are collected in the General Fishing Fleet Register,

Sampling scheme identifier: Fisheries. Census

Survey specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Fisheries
Sampling scheme: Census
Variables: Value of physical capital and Consumption of fixed capital (Inactives)
Supra region(s): All Supra regions
Survey planning
Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'. **The statistical unit** or observation unit is each of the vessels included in the CFP (Operative Fishing Fleet Census, in Spanish), which can perform marine fishing, classified in group 03.11 of the National Activities Classification (CNAE-2009). **The reporting unit** is the vessel's owner. **The sampling unit** is each CFP vessel . **The analysis unit**, or economic activity unit is the vessel, therefore, it coincides with the observation unit.
Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.

The data source are data collection questionnaires and estimates obtained through the PIM method.

Describe how the sample sizes were determined.

The sample sizes for these variables are all active and inactive vessels from the Operational Fleet Census.

Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.

The information is collected through questionnaires carried out in person and by telephone.

Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.

To obtain the information necessary for the estimation of the variables through the PIM method, the annual information is collected in the questionnaires of the economic survey and through consultations on the Operational Fleet Census, and they are stored in historical databases that are used to obtain data on the age of the vessels, GT, prices per unit of capacity ...

Stratification: Strata were defined according to statistic, biological (similarity in the fishing grounds' characteristics), and technical (type of fishing methods utilised and vessel length).

In addition to the above mentioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Strata cannot contain less than 10 elements: strata not meeting this condition are grouped with others.

Estimation design

Describe method of calculating population estimate from sample.

The population estimate is calculated as the sum of the values obtained by stratum of the PIM method.

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All questionnaires are checked and their information is recorded. This is done visually by comparing the physical questionnaire with the electronic one.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded for that ship.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

Data storage and documentation

Describe how the data is stored.

Provide link to webpage where additional methodological documentation can be found, if any.

INFORMATION STORAGE METHOD

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to be able to identify the holders.

Revision

Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.

The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection.

The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU.

Confidentiality

Are procedures for confidential data handling in place and documented?

Are protocols to enforce confidentiality between DCF partners in place and documented?

Are protocols to enforce confidentiality with external users in place and documented?

Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.

The confidentiality of the information is subject to the Data Protection regulations and the Law of the Public Statistical Function of Spanish legislation.

In accordance with confidentiality legislation, data will not be published or shared if they identify the owner of the same.

AR comment: For the "Consumption of fixed capital" variable, the method of collecting the information was changed from a Sample method to a Census method implemented through the PIM method to include inactive vessels. This change was applied to all vessels in order to standardize the methodology.

"Value of physical capital" active and inactive vessels, is collected within the Sampling scheme identifier: Fisheries. Census.

The method of data collection for all the activity fisheries variables is Census. These data are collected in the General Fishing Fleet Register,

Sampling scheme identifier: Aquaculture. Probability sample survey

Survey specifications

Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex.

Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.

Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2

of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.

Sector name(s): Aquaculture

Sampling scheme: Probability sample survey

Variables: All variables in tables 10

Variables with C-Census Data Collection scheme and the following comment in WP comment: "*Planned sample rate for PSS cannot be changed as this rate is derived from a formula. Any change would imply that some of the variables have to be modified. To adapt these registers to comments from EWG 22-18, PPS has been changed into C, but we would like to highlight that PSS scenarios with Planned sample rate (%) of 100% may occur.*" in Table are sampled by Probability sample survey sampling scheme. As it is stated in "WP comments", PPS has been changed to C, because Planned sample rate for PSS cannot be changed.

Supra region(s):

Survey planning

Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'.

The statistical unit or observation unit is each of the establishments authorised to perform aquaculture activities, as described in group 03.2 of CNAE-2009.

The reporting unit is the person who, owning the company to which the establishment belongs, or having the power and ability to respond, can be asked the questions contained in the corresponding questionnaire, related to the observation unit.

Sample units are the establishments performing aquaculture activities which in the reference year were authorised to do so.

The analysis unit, or economic activity unit is the establishment. It is the part of the company which undertakes its activity in a given geographical situation. Hence, in most cases it coincides with the observation unit.

When a company of the same owner and the same main activity has several establishments of aquaculture and data collected in the questionnaire are not disaggregated by each of the establishment, an proportional estimation of the corresponding fraction for each establishment is made.

Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.

Describe how the sample sizes were determined.

Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.

Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.

The methodology used for data collection is mixed. One part of the population is surveyed exhaustively (with a census) and the other part is surveyed with stratified random sampling.

Stratified random sampling. The main variable of this survey is the result before taxes. However, the main variable will be determined at the end of the survey. This is why, in order to determine the simple size, it is necessary to have an auxiliary variable that is both previously known and correlated to the main variable. The effectively used capacity of the establishment will be the auxiliary variable, referred to as the size of the existing facilities in the establishment used to accommodate the species during the different phases or processes of aquaculture, which are effectively being used to this end.

Within stratified random sampling or Probability sample survey there are strata that are exhaustively collected due to the fact that being the small populations and the high variabilities or the interest for the important study, so the planned sample rates will be 100%

The population to be sampled has been divided into strata, aiming to obtain groups of establishments with characteristics as homogeneous as possible within the stratum and with the greatest possible heterogeneity among the different strata.

Another criterion when defining the strata has been to obtain a number of them which can be handled, ensuring that each either includes a significant number of establishments or it represents a given species or zone.

In addition to the abovementioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Stratification was made based on the establishments' characteristics: type of aquaculture according to water origin, type of aquaculture facilities (ground, in natural spaces. Horizontal culture, cages), and main species rose.

Strata have been surveyed thoroughly or by sampling according to the following criteria:

-Strata including less than 20 establishments for each main species cultivated: exhaustive survey.

-Strata including 20 or more establishments and homogeneous characteristics: sampled and then extrapolated to obtain data for the population.

In this second group we must consider that sample size is calculated according to the auxiliary variable, the capacity effectively used by the establishment, and that, when variability within the stratum is high, it may be the case that sample size is the same as the population size for a particular stratum.

Sample size: with optimum allocation. Total sample size is determined aiming to estimate the economics results of the population with an expected error of 5%, that is, a 95% level of confidence.

Sample selection: In the population database, data from the aquaculture establishments will appear together with the corresponding owner data, for both the exhaustive survey and sampling. By selecting the statistical units, reporting units of the survey are perfectly demarcated.

In the exhaustive survey, each statistical unit will represent one unit in the population as a whole.

In sampling, the units will represent the corresponding population. Therefore, it will be necessary to select sampling units randomly.

For sampling, the population of different groups will be grouped according to the stratum to which they belong, and in each of these groups sampling will be made randomly obtaining as many random and mutually independent subsamples as there are strata.

The size of each of these subsamples will be previously determined by the (previously set) expected error level.

Estimation design

Describe method of calculating population estimate from sample.

Type of sampling. Stratification.

The strata have been investigated on a census or sample basis, according to the following criteria:

- Those strata that due to their low number of establishments (less than 20), for each main cultivated species, all establishments of the stratum are investigated (exhaustive investigation).

- Those strata that have a high number of establishments, 20 or more, and, usually, homogeneous characteristics, are investigated by sampling the establishments of the stratum, with their subsequent elevation to obtain results from the population.

In this second group, it must be taken into account that the sample size is calculated using the auxiliary variable, used capacity of the establishment and that, when its variability within the stratum is high, it may be the case that the sample size is equal to the population size, in that stratum.

Sample size.

- Total sample size with optimal allocation

The total size of the sample to estimate the Economic Result of the population with an expected error of 5% to 95% confidence level, has been calculated assuming that an optimal allocation will be made.

The formula used to calculate the sample size n is the following:

$$n = \frac{\left(\sum_{h=1}^{h=L} N_h S_h\right)^2}{\frac{N^2 e^2 \overline{X}^2}{z^2} + \sum_{h=1}^{h=L} N_h S_h^2} \quad (1)$$

Where: h is the number of strata ranging from 1 to L (maximum number of strata), Nh the size of stratum h, N the size of the population, Sh the standard deviation of stratum h, mean capacity of the population, and the error of the estimate and z the standardized variable for the chosen confidence level.

- Assignment of the sample by strata

The optimal allocation of the sample to the strata is carried out using the following formula:

$$n = \frac{N_h S_h}{\sum_{h=1}^{h=L} N_h S_h} \quad (2)$$

Being: n, h, Nh and Sh the same statistics as in (1)

Sample selection

- Determination of the reporting units

An informant unit is considered to be that natural person, who, being the owner of the company to which the establishment belongs, or having the power and capacity to respond, can be asked the questions collected in the corresponding questionnaires, in relation to the observation unit. Therefore, the reporting unit is related to the statistical unit of the survey, aquaculture establishment.

In the population database, the data of the aquaculture establishments will appear together with the data of the owners of the companies of these establishments, both for exhaustive research and sampling.

For these reasons, when selecting the statistical units, the reporting units of the survey are perfectly delimited.

- General description of the sample selection procedure

The data collection of this survey is carried out in two ways, one exhaustive and the other by stratified random sampling.

In the exhaustive collection part, each statistical unit will represent one unit in the total population.

The units of the sample collection part will represent their corresponding population, for this it will be necessary that the selection of the sample units is made randomly.

For sampling, the population of the different groups will be grouped by strata and the necessary sample will be drawn randomly from them, obtaining as many independent subsamples as strata.

The size of each subsample is predetermined by the level of error that is set.

Estimators

For the part of the study in which the collection is to be carried out exhaustively, there is an imputation method for cases of non-response to mandatory questions within partially answered questionnaires. For these questionnaires, after trying to collect them by all possible means, revisiting the holders, telephone contact, etc., the unanswered units will be analyzed and if any common characteristic is found with the units that do have a response, then the value will be imputed taking this into account. If no common characteristic is found, the missing data will be imputed with the mean value of that question for the units of the same stratum.

The relevant formulas for estimating the population results corresponding to stratified random sampling are:

• Estimation of the population mean,: $\hat{\bar{X}}_S$

$$\hat{\bar{X}}_S = \sum_{h=1}^{h=L} W_h \bar{x}_h \quad (3)$$

Where: $\bar{X}_h$ the mean of the variable observed in stratum h and $W_h = N_h/N$ the weight of stratum h.

• Estimated variance of the population mean, $V(\hat{\bar{X}}_S)$

$$V\left(\hat{\bar{X}}_S\right) = \sum_{h=1}^{h=L} W_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \quad (4)$$

Where: Nh is the population size of the stratum, nh the size of the sample in stratum h.

Estimation of the total population,: $\hat{X}_S$

$$\hat{X}_S = \sum_{h=1}^{L} N_h \bar{x}_h \quad (5)$$

Where: Nh is the population size of the stratum and $\bar{x}_h$ the mean of the variable observed in each stratum.

• Estimated variance of the total population,: $V(\hat{X}_S)$

$$V(\hat{X}_S) = \sum_{h=1}^{h=L} N_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \quad (6)$$

All parameters match those described in expression (4).

Describe method of calculating derived data: e.g. imputed values.

The different economic variables requested from the informant are considered of two types; mandatory response and non-mandatory response. Those with a mandatory response are compulsorily collected, and those with a non-mandatory response can have a value or be zero in case there is no value. Therefore, no values are imputed.

Describe treatment of nonresponse.

Treatment of total lack of response and treatment of stratum change

The lack of response, generated by some heads of the sampling units, will imply an increase in the level of error. A different case is the location of the units that have been decommissioned or are no longer in operation, these cases will imply a variation in the framework of the initial population.

Total lack of response and treatment of stratum change will be treated as follows:

The basic estimator (unbiased estimator of expansion in stratified sampling)

$$\hat{X} = \sum_{h} \frac{N_h}{n_h} \sum_{i} x_i$$

being:

N_h: Total number of units in the directory in stratum h

n_h: Number of units selected for the sample in stratum h

X_i: Value of the observed variable X in unit i of stratum h

It is corrected from the corrections made in the elevation factor due to the various types of incidents that arise during field work: total non-response, change of stratum, etc.

Thus, the final elevation factor will be:

If there is no change in stratum: $\frac{N_h}{n_h}$

If there is a change of stratum: $\frac{\tilde{N}_h^{\cdot}}{n_h^{\cdot}}$

being:

n_h: Number of units of the effective sample that has not changed stratum

$\tilde{N}_h$: Number of units in the directory in stratum h obtained by deflating as a function of losses and changes in stratum

$$\tilde{N}_h^{\cdot} = N_h \left(1 - \frac{b_h}{n_h}\right) - \sum_{h \neq k} \frac{N_h}{n_h} n_h^k$$

b_h: Number of units that are low in the sample (sample incidence of frame correction)

n_h^k: Number of units selected in stratum h and that really belong to stratum k

Final expression of the estimator:

$$\hat{X} = \sum_h \left\{ \sum_{i=1}^{n_h^{\cdot}} \frac{\hat{N}_h^{\cdot}}{n_h^{\cdot}} x_i + \sum_{k \neq h} \frac{N_k}{n_k} \sum_{i=1}^{n_k^h} x_i \right\}$$

The first addend represents the contribution of the units that have not changed stratum.

The second addend represents the contribution of the units selected in stratum k and that really belong to h.

The theoretical design of the sampling work is developed in the published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/encuesta-economica-acuicultura/default.aspx

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All questionnaires are checked and their information is recorded. This is done visually by comparing the physical questionnaire with the electronic one.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

A control of non-sampling errors is carried out throughout the statistical process.

The survey framework is formed from the Directory of Aquaculture Establishments. This directory is made up of all the establishments authorized to carry out aquaculture activities. The directory is updated annually by the Survey of Aquaculture Establishments, either by means of the records that authorize the activity, or by the fieldwork of said survey itself. The population object of study in the Economic Survey of Aquaculture is obtained from the analysis of said framework and is made up of the set of farms with cultivation that, in the reference period, had authorization to develop aquaculture activity.

The interviewers go out into the field with a copy of the questionnaires and their corresponding roadmaps. The roadmaps are a fundamental instrument to keep track of the situation of the surveys and the possible incidents produced. By completing them, the validity of the study framework is checked and the number of questionnaires collected is validated.

The data collection, at the beginning, is used to analyze the possible errors in the completion of questionnaires and to correct them in the successive field trips of the interviewers.

The lack of response, generated by some managers of establishments considered as sample data, implies an increase in the level of error. A different case is the location of establishments that have been canceled or are no

longer in operation; These cases imply a change in their situation within the initial population and a change, therefore, in the elevation coefficient.

Total non-response and treatment of stratum change are addressed by estimating stratum values.

The data collected is purified by correcting possible inconsistencies in them. Once they are received and after they have been recorded, it is again observed if there are possible deviations of values at a global level and any inconsistencies are corrected.

Described in published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/encuesta-economica-acuicultura/default.aspx

Data storage and documentation

Describe how the data is stored.

Provide link to webpage where additional methodological documentation can be found, if any.

INFORMATION STORAGE METHOD

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to be able to identify the holders

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/encuesta-economica-acuicultura/default.aspx

Revision

Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.

The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection.

The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU.

Confidentiality

Are procedures for confidential data handling in place and documented?

Are protocols to enforce confidentiality between DCF partners in place and documented?

Are protocols to enforce confidentiality with external users in place and documented?

Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.

The confidentiality of the information is subject to the Data Protection regulations and the Law of the Public Statistical Function of Spanish legislation.

In accordance with confidentiality legislation, data will not be published or shared if they identify the owner of the same.
AR comment: No deviations or developments

Sampling scheme identifier: Aquaculture. Census

Survey specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Aquaculture
Sampling scheme: Census
Variables: All variables in tables 9 (Social data) Variables with C-Census Data Collection scheme and the following comment in WP comment: "*Planned sample rate for PSS cannot be changed as this rate is derived from a formula. Any change would imply that some of the variables have to be modified. To adapt these registers to comments from EWG 22-18, PPS has been changed into C, but we would like to highlight that PSS scenarios with Planned sample rate (%) of 100% may occur.*" in Table are sampled by Probability sample survey sampling scheme. As it is stated in "WP comments", PPS has been changed to C, because Planned sample rate for PSS cannot be changed.
Supra region(s):
Survey planning
Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'. **The statistical unit or observation unit** is each of the establishments authorised to perform aquaculture activities, as described in group 03.2 of CNAE-2009. **The reporting unit** is the person who, owning the company to which the establishment belongs, or having the power and ability to respond, can be asked the questions contained in the corresponding questionnaire, related to the observation unit. **Sample units** are the establishments performing aquaculture activities which in the reference year were authorised to do so. **The analysis unit**, or economic activity unit is the establishment. It is the part of the company which undertakes its activity in a given geographical situation. Hence, in most cases it coincides with the observation unit. When a company of the same owner and the same main activity has several establishments of aquaculture and data collected in the questionnaire are not disaggregated by each of the establishment, an proportional estimation of the corresponding fraction for each establishment is made.
Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.

Data on social and employment variables are collected from the Survey of Aquaculture Establishments carried out by the Ministry of Agriculture.

From this exhaustive survey, all the information necessary to obtain the requested variables is collected.

Describe how the sample sizes were determined.

The sample sizes for these variables are all aquaculture establishments with aquaculture activity during the study year.

Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.

The information is collected from the databases provided by the Ministry, selecting the information necessary to obtain the variables of the study

Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.

The population to be sampled has been divided into strata, aiming to obtain groups of establishments with characteristics as homogeneous as possible within the stratum and with the greatest possible heterogeneity among the different strata.

Another criterion when defining the strata has been to obtain a number of them which can be handled, ensuring that each either includes a significant number of establishments or it represents a given species or zone.

In addition to the above mentioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Stratification was made based on the establishments' characteristics: type of aquaculture according to water origin, type of aquaculture facilities (ground, in natural spaces. Horizontal culture, cages), and main species rose.

Each statistical unit will represent one unit in the population as a whole.

Estimation design

Describe method of calculating population estimate from sample.

The population estimate is calculated as the sum of the values obtained by stratum.

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All data are checked and their information is recorded.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

Data storage and documentation

Describe how the data is stored. Provide link to webpage where additional methodological documentation can be found, if any. INFORMATION STORAGE METHOD The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry. The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample. This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to be able to identify the holders.
Revision
Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc. The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection. The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU.
Confidentiality
Are procedures for confidential data handling in place and documented? Are protocols to enforce confidentiality between DCF partners in place and documented? Are protocols to enforce confidentiality with external users in place and documented? Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. The confidentiality of the information is subject to the Data Protection regulations and the Law of the Public Statistical Function of Spanish legislation. In accordance with confidentiality legislation, data will not be published or shared if they identify the owner of the same.
AR comment: No deviations or developments

Sampling scheme identifier: Processing. Probability sample survey

Survey specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Processing

Sampling scheme: Probability sample survey

Variables: Variables defined in the methodology

The following variables are not collected by the main source of the survey

- Subsidies on investments
- Consumption of fixed capital
- Total value of assets
- Financial income
- Financial expenditures
- Gross Investments, net
- Debt

Variables with C-Census Data Collection scheme in Table are sampled by Probability sample survey sampling scheme. As it is stated in "WP comments", PPS has been changed to C, because Planned sample rate for PSS cannot be changed.

Supra region(s):

Survey planning

Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'.

Units of the survey

The basic survey unit is the industrial company. The company may perform one or more activities in one or more places.

In the scheme of the survey, the company assumes at the same time, the roles of informing unit and observation unit.

However, although the company is the main unit of the survey, given the numerous objectives to be reached with this investigation, there are units that complement the information system, such as the industrial establishment (as observation unit) and the economic activity unit at local level (as analysis unit).

Population scope

The population under sampling is comprised by the companies whose main activity is included in the CNAE-2009 following sections:

- Section B: harvesting industries
- Section C: manufacture industry
- Section D: air conditioning, steam, gas and electric provider
- Section E: water provider, sanitation activities, waste management and decontamination.

Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.

Describe how the sample sizes were determined.

Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.

Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.

Collecting of information

The collection of information is carried out annually by the "*Collection Units*" of INE, responsible also for answering telephones to clear up doubts of the informers and for recording and filtering questionnaires.

The process of this collection of reference year "t" is carried out from the second trimester of the year "t+1", with an aproximate duration of 4 months.

It will be assumed that the company has been surveyed if its main activity is one of those included in the population scope of the survey; also, if the questionnaire has been obtained duly fullfilled and the data comply with the consistency and completeness as established.

Besides, during the collection of all the information, some incidences may arise that dont allow to obtain the questionnaire: definite closure of the bussines, temporary closure o inactive company, mistakenly included in the survey, not in the scope, duplicated or impossible to locate, negative or not responding.

Models of questionnaires

Four models of questionnaires have been designed with the purpose of adequating the requested information to the specific features of the companies:

- Companies with less than 10 employees.
- Companies between 10-49 employees.
- Companies with 50 or more employees and whose activity is included in sections B and C of CNAE-2009.
- Companies with 50 or more employees and whose activity is included in sections D and E of CNAE-2009.

Sampling and design

Population framework: Companies Central Directory ("*DIRCE*") which contains the information on the companies identification, as well as its main economic activity, location and size.

Type of sampling. Estratification

The population under study has been divided in different strata, according to the following variables:

- Company main activity, at 4 digit level (class), according to CNAE-2009.
- Autonomous region
- Company size interval, depending on the number of employees:
    - Up to 3 employees
    - From 4 to 9
    - From 10 to 19
    - From 20 to 49
    - 50 or more employees
- Characteristics of the subsidiary company (if it is subsidiary of a foreign company or not)

It has been thoroughly investigated those companies with 50 or more employees, as well as all companies included in the "*Foreing subsidiary companies*" record in Spain. Also, all companies that, although with a small size in terms of employees, have an important facturation volume, have been exhaustively surveyed.

The rest of the companies have been sampled. Each stratum, which has been determined by the crossing of the above mentioned variables, has conformed an independent population, in terms of the sampling.

Size sampling. Affixation.

Within each stratum, it has been calculated the size sample by optimum affixation or Neyman´s affixation, by fixing in advance the relative sampling error for the variable "number of employees", at national level of 1%, and at regional level of 5%.

The size sampling has been increased, if necessary, to a minimum of two companies by stratum. On the other hand, and with the purpose of reaching more precise aggregated results, it has been determined by statistical criteria, within each strata, the outlier companies (in terms of facturation volume and employees) with the objective of including them in the thorough part of the sample.

By size intervals, sampling fraction have been as follows:

Strata by size	**Sampling fraction**
Up to 3 employees	10%
From 4 to 9 employees	29%
From 10 to 19 employees	42%
From 20 to 49 employees	69%
50 or more	100%
TOTAL	21%

Size selection: by means of the assigning aleatory number, which allows the coordination of the sample with other surveys.

The selection process is independent from one year to another: the probability of a company being selected in year "t" is independent from the fact that this company has been selected the previous year (t-1).

Estimation design

The theoretical design of the sampling work is developed in the published methodology

https://www.ine.es/en/metodologia/t37/metodologia_eee2019_en.pdf

Error checks

Described in published methodology

https://www.ine.es/en/metodologia/t37/metodologia_eee2019_en.pdf

Data storage and documentation

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

https://www.ine.es/en/metodologia/t37/metodologia_eee2019_en.pdf

Revision

The population is adjusted annually to the stratification defined in the methodology.

Confidentiality

Are procedures for confidential data handling in place and documented?

Are protocols to enforce confidentiality between DCF partners in place and documented?

Are protocols to enforce confidentiality with external users in place and documented?

Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. The confidentiality of the information is subject to Law 12/1989 on the Public Statistical Function establishes that the INE cannot disseminate, nor do available in any way, individual or aggregated data that could lead to identification of data previously unknown to a person or entity.

The INE adopts the logical, physical and administrative measures necessary so that the protection of confidential data is effective, from data collection to publication

AR comment: No deviations or new developments in relation to the specifications and survey plan.

This year, information has been collected on the variables: Consumption of fixed capital and Gross Investments, net and all social variables.