

Ministerio de Agricultura, Pesca y Alimentación

Secretaría General de Pesca

Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017 on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008 (recast)

Commission Implementing Decision (EU) 2019/909 of 18 February 2019 establishing the list of mandatory research surveys and thresholds for the purposes of the multiannual Union programme for the collection and management of data in the fisheries and aquaculture sectors.

Commission Implementing Decision (EU) 2019/910 of 13 March 2019 establishing the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors.

Commission Implementing Decision (EU) 2016/1701 laying down rules on the format for the submission of work plans for data collection in the fisheries and aquaculture sectors

Commission Implementing Decision (EU) 2018/1283 laying down rules on the format and timetables for the submission of annual data collection reports in the fisheries and aquaculture sectors

**SPAIN Annual Report for data collection in the fisheries and aquaculture sectors**

2021

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# Section 1: Biological Data

Text Box 1C: Sampling intensity for biological variables

North Sea (ICES IIIa, IV and VIId areas) and Eastern Arctic (ICES areas I, II)

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| *General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, Chapter IV of the multiannual Union programme and Article 2, Article 4 paragraph 1 and Article 8 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report.* |
| Spain has fisheries only in **Eastern Arctic (ICES areas I and II)**  ***1.Evidence of data quality assurance***  See Text box 5A-North Sea&Eastern Arctic.  ***2.Deviations from the Work Plan***  Results lower than planned: (see AR comments by stock in Table 1C)  The number of sampled individuals is less than planned due to the short lasting of the observed trips (one of them due to a breakdown on board). When the trips last less than expected, like in these cases, it causes a lower number of individuals (vs. planned) sampled by the observer on board.  ***3.Actions to avoid deviations***  The main cause of the deviation is the lasting of the trips in these fisheries due to the decisions taken by vessels' owners which are independent of sampling planned, so that no specific measures are proposed for this deviation.  Although the behavior of the fleet is impossible to change, the Institutes involved in sampling will continue in improving coordination with the sectors involved: owners and administration authorities.  (max. 1000 words per Region/RFMO/RFO/IO) |

# Section 1: Biological Data

Text Box 1C: Sampling intensity for biological variables

North Atlantic

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| *General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, Chapter IV of the multiannual Union programme and Article 2, Article 4 paragraph 1 and Article 8 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report.* |
| **North Atlantic ICES areas XII, XIV and NAFO areas**  ***1.Evidence of data quality assurance***  See Text box 5A-North Atlantic- NAFO and ICES areas XII, XIV  ***2.Deviations from the Work Plan***  Results lower than planned: (see AR comments by stock in Table 1C)  In ICES areas XII, XIV and VI, there were no effort in these metiers: OTB\_DWS\_100-129\_0\_0, OTM\_DEF\_100-129\_0\_0 and OTM\_DEF\_32-69\_0\_0 in 2021 (see Table 4C: Data on the fisheries by member state), so the stocks wich are target of these metiers (Alepocephalus, Coyphaenoides and Sebastes) could not be sampled.  In North Atlantic-NAFO areas there were no effort in the metiers: OTM\_DEF\_130-219\_0\_0 and OTB\_MOL\_60-89\_0\_0 (see Table 4C: Data on the fisheries by member state), so Beryx and Illex could not be sampled in commercial fishery.  Regarding the stocks in area 3M, the sampled individuals are less than planned due to the low effort of the fleet in this area. When the trips last less than expected, like in these cases, it causes a lower number of individuals (vs. planned) sampled by the observer on board. The lasting of the trips in these fisheries is unpredictable, because they vary depending on the owner decisions  Results higher than planned (see AR comments by stock in Table 1C)  The reason for sampling more than planned is that we cannot predict in advance the lasting of the trips in these fisheries, because they vary depending on the owner decisions. When the trips last more than expected, like in these cases, it causes a higher number of individuals (vs. planned) sampled by the observer on board.  The sampling design is established to ensure the sampling quality and to ensure a minimum number of individuals by sampling for subsequent use in the assessment. To get this target, the observer is training to intensify as much as possible the length sampling (also used to get the sex ratio) since the beginning of the trip.  Sampling was carried out by scientific observers who remain on board throughout the period of the fishing trip until the vessel's arrival to port, so the whole trip is sampled. Because of this reason, sampling more than planned does not mean additional costs  ***3.Actions to avoid deviations***  The main cause of the deviations is the lasting of the trips in these fisheries due to legal measures or the decisions taken by vessels' owners which are independent of sampling planned, so that no specific measures are proposed for these deviations.  Although the behavior of the fleet is impossible to change, the Institutes involved in sampling will continue in improving coordination with the sectors involved: owners and administration authorities.  **North Atlantic ICES VI, VII (excl. VIId), VIII, IX**  ***1.Evidence of data quality assurance***  See Text box 5A-ICES VI, VII (excl. VIId), VIII, IX  ***2.Deviations from the Work Plan***  Results lower than planned  LENGHT:  As several working groups have highlighted,the planning for length sampling is not based in the number of individuals. As the column “Planned minimum no of individuals to be measured at the national level” was nevertheless requested, we fulfilled it according to last sampling results at the moment WP was done.  In this AR, the column “Achieved number of individuals measured at the national level” incorporates market sampling plus all on board sampling (retained plus discards).  Large majority of the results are quite smaller than numbers originally written under the so called “Planned minimum no of individuals”. This is partially affected because sampling results of previous years, used to fulfil this numbers, didn’t include retained catches on-board.  AZTI’s sampling programme was developed as planned, at the market for the landings taking place in the Basque Country, and on-board for basque vessels. During 2021 there were no deviations due to COVID  Results higher than planned  Some species were sampled higher than planned. This result is related with the fact that the planification is based on the number of PSUs, and not in number of individuals.  AGE, WEIGHT, SEX-RATIO, MATURITY, FECUNDITY:  The samplings were lower than planned (<90%) in most of the cases.  Although the methodology used to collect the data from landing samples is designed for achieved a representative sample of each of the commercial categories of the target species, the individuals from the commercial landings have been often 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.  Despite the fact that in some cases it has not been possible to sample the number of specimens landed planned, the data collected during the Spanish research surveys at sea compensate for this lack in the area of distribution of the stock.  The variable “weight” from surveys is not reliable when the individuals are small, due to the lack of precision of scales used to weight on board.  Sampling at a higher level than expected (> 150%):  The sampling design is not focused on the total number of individuals sampled by year, but in the distribution of several samplings throughout the year, reaching a minimum number of fishes in each sampling to ensure the quality for each of them.  A large number of samplings are needed to cover adequately all strata, because there are a large number of fisheries (target species vs. gears) in the ICES area and the sampling design is random stratified. The samplings needed by ICES assessment groups to carry out the relevant assessments require sampling an important part of the fisheries affecting the target species.  Some parameters like age@length needs a larger number of samples for obtaining representative age-length keys of the target stocks. This increase in the sample number do not involve additional cost, since work plan in laboratories is carried out according to the requirements of the working groups to which data must be provided.  When the initially planned sample size was not enough to ensure the quality of data, the sample size was increased when it was possible, to improve quality levels. For triennial review species, it has also been considered convenient to intensify landing sampling in 2021, to compensate for the impossibility of carrying it out in 2020.  Sometimes observers on board of the commercial fishing fleet, obtains a large number of samples as part of their sampling routine, without additional cost.  ***3.Actions to avoid deviations***  One of the biggest difficulties is the impossibility of correctly covering the entire length range. In most cases, this is due to the spatial distribution of the species itself in the areas where the samples came from and also to the inability of the fishery to access the tails of the length distribution.  Another difficulty is the absence of validation of growth for some species (*Trisopterus luscus, Molva molva, Conger conger, Helicolenus dactylopterus, Phycis blennoides, Mullus surmuletus, Zeus faber*)  To remedy these deficits, several actions are being implemented and the quality of the results has improved in recent years for some species.  - Optimization of the processing techniques of bony parts for better interpretation of them.  - Improving standardization of common criteria, both technical and interpretation.  - Continued participation in international forums such as “EARF”, Exchanges and Workshops of age and maturity determination.  (max. 1000 words per Region/RFMO/RFO/IO) |

# Section 1: Biological Data

Text Box 1C: Sampling intensity for biological variables

Medierranean and Black Sea

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| *General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, Chapter IV of the multiannual Union programme and Article 2, Article 4 paragraph 1 and Article 8 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report.* |
| Spain has fisheries only in **Mediterranean Sea**  ***1.Evidence of data quality assurance***  See Text box 5A-Mediterranean&BS  ***2.Deviations from the Work Plan***  Results lower than planned:  LENGTH:  The sampling design of length (biological variable related to fisheries), which is focused on the métier and not on the species, makes difficult to adjust the number of individuals sampled to the number of individuals planned. For this reason, most of the species (59 species/area) have been sampled above the threshold <90 % - > 150 %, and some of them below the threshold.  On the other hand, the on-board programme was not carried out in the GSA07 due to technical problems of refusals in the area.  AGE, WEIGHT, SEX-RATIO, MATURITY:  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. The 2021 sampling plan was focused in the Group 1 species as this was the second year of the triennial period 2020-2022. Next year the results of the sampling of the triennial species will be given.  Regarding these variables, the number of individuals achieved for some of them is out of the threshold:  In the GSA01, small pelagics species (*Sardina pilchardus* and *Engraulis encrasicolus*) were sampled below than planned (see AR comments in Table 1C) due to the decreasing in landings in the sampling ports. In the case of *Merluccius merluccius* the low sampling of some variables is related with the short length range. On the other hand, *Nephrops norvegicus* (sex ratio and maturity)was sampled higher than planned (see AR comments in Table 1C).  In the GSA05, *Engraulis encrasicolus* was sampled lower than planned (see AR comments in Table 1C). *Mullus surmuletus* and *Nephrops norvegicus* were sampled higher than planned (see AR comments in Table 1C).  In the GSA06, *Merluccius merluccius and Mullus surmuletus* were sampled lower than planned (see AR comments in Table 1C) but the achievement was considered acceptable. *Nephrops norvegicus,* whose sampling is carried out on board, was finally not sampled (see AR comments in Table 1C) because the observers prioritized the length sampling over the other variables.  As planned, the estimation of the biological parameters and their uncertainties has been 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.  Results higher than planned:  ***3.Actions to avoid deviations***  Sampling higher than planned, in the case of length, cannot be avoided due to sampling method (concurrent sampling based on the métiers, not on the number of individuals). In 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 has been the main drawbacks for sampling in 2021.  (max. 1000 words per Region/RFMO/RFO/IO) |

# Section 1: Biological Data

Text Box 1C: Sampling intensity for biological variables

CECAF

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| *General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, Chapter IV of the multiannual Union programme and Article 2, Article 4 paragraph 1 and Article 8 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report.* |
| ***1.Evidence of data quality assurance***  See Text box 5A-CECAF.  ***2.Deviations from the Work Plan***  The on-shore and the at-sea sampling programs coordinated by the IEO resumed in 2021 after administrative problems and due to covid-19 in 2020  **Fishing ground: “West Africa**” (non EU waters in West Africa).   * *Engraulis encrasicolus*, *Sardina* *pilchardus*: the low achievement in sampling was due to the lack of purse seine fleet activity during some months in 2021 (discontinuous activity of this fleet in Morocco that also operates in the Spanish waters of the Gulf of Cadiz). * *Octopus* *vulgaris*, *Sepia* spp., *Loligo* *vulgaris* and *Trachurus* *trecae*: the freezer fleet targeting mixed cephalopods + finfish (OTB\_MIS) in Guinea-Bissau focused mostly in deep fish species in 2021, consequently capturing low number of these shallower species. Eventually, these species were not properly sampled on board. * *Penaeus* *notialis*: the number of individuals is planned based on previous years' samplings, although interannual/seasonal variations in abundances and fishing strategies can provoke deviations on sampling schemes. Specifically, abundance variability caused in 2021 low numbers of length samplings on board for this species. * *Merluccius* spp: the presence of two hakes (*Merluccius* *polli* & *Merluccius* *senegalensis*), separated into several commercial categories normally translates into a greater number of individuals measured.   The fisheries in West Africa are highly dependent on the SFPAs (bilateral Sustainable Fishing Partnership Agreements) between the EU and the third countries. Some deviations to the plan could be due both to a lack of fishing activity when no Protocol of the SFPA is active, together with fishing activity changes itself in the area. These can involve alterations in the fisheries conditions, accessibility, closure of certain fisheries or introduction of new fisheries to be sampled. Although fishing activity in NW Africa has been performed regularly during 2021, sampling actions have been hindered by different issues, depending on the fishing ground or métier. Within these circumstances, only some métiers/stocks could be sampled at low levels.  **Fishing ground: “Canary”** (EU waters)  The number of individuals was planned based on previous years' samplings, but the species abundances are very variable and it is difficult to predict the number of individuals to be measured at sea. This causes deviations in both directions (*Sparisoma* *cretense* more than planned and small pelagic species less than planned). Regarding some biological variables of small pelagic species, (eg, *Sardina* *pilchardus*, *Sardinella* *aurita*), the impossibility to obtain samples at market in the months with low catches, caused a lower number of sampled individuals than planned.  ***3.Actions to avoid deviations***  **Fishing ground: “West Africa”** (non EU waters in West Africa):  Measures to avoid biases are somewhat complex to establish, as they are attributable to different reasons other than sampling intensity and methods of data collection and parameter estimation. Deviations are due to the fishing activity (limited to 4 months in Morocco) and/or to the variability of the catches of the target species from one year to another.  **Fishing ground: “Canary”** (EU waters)  It is difficult to establish actions to avoid deviations, as these are attributable to different reasons than the sampling intensity, mainly the variability in the catches of some of the target species from one year to another. For example, in the case of small pelagics, being highly demanded species, it is difficult to obtain samples at market during the months with low catches, especially for *Sardina* *pilchardus* and *Sardinella* *aurita*.  (max. 1000 words per Region/RFMO/RFO/IO) |

# Section 1: Biological Data

Text Box 1C: Sampling intensity for biological variables

ICCAT, IOTC, IATTC, WCPFC

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| *General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, Chapter IV of the multiannual Union programme and Article 2, Article 4 paragraph 1 and Article 8 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report.* |
| ***1.Evidence of data quality assurance***  See Text box 5A- ICCAT, IOTC, IATTC, WCPFC.  ***2.Deviations from the Work Plan***  Mediterranean Swordfish (*Xiphias gladius*): the planned sampling on weight and length has been achieved, but the numbers for the rest of the stock-related variables were lower than planned. The main explanation is that the fish are commercialized without being gutted so it is difficult to obtain samples on age, maturity, and sex ratio. In addition, the majority of the fish caught in the fishery are immature individuals. This circumstance made it difficult to achieve the number of samples planned for Fecundity. We have increased the sampling intensity to try reach the planned number for stock-related variables.  Bluefin tuna (*Thunnus thynnus*): we have achieved the planned sampling intensity for all stock-related variables except for fecundity. To obtain samples for fecundity implies sampling a high number of females to achieve the accurate gonadal stage (spawning females). The majority of bluefin tuna spawning females in Spanish fisheries are caged for fatting, so it is difficult to achieve the planned numbers for fecundity. We have increased the sampling intensity to try reach the planned number for stock-related variables.  Atlantic little tunny (*Euthynnus alletteratus*) and Bullet tuna (*Auxis rochei*): We have achieved the planned sampling intensity for all stock-related variables except for fecundity. To obtain samples for fecundity implies sampling a high number of females to achieve the accurate gonadal stage (spawning females). We have increased the sampling intensity for stock-related variables to achieve the fecundity planning numbers, but we have only obtained a 78% for bullet tuna and 44% for little tunny.  Atlantic bonito (*Sarda sarda*): We have achieved the planned sampling intensity for all stock-related variables except for fecundity and sex ratio (61%). We have increased the sampling intensity for stock-related variables to achieve the fecundity planning numbers, but we have only obtained a 70% of achievement.  Dolphinfish (*Coryphaena hippurus*): This species is bycatch in tuna fisheries. So the number of samples available is variable. This circumstance made difficult the achievement of the sample levels planned. We have not reached the sampling levels in any of the stock-related variables.  Albacore (*Thunnus alalunga): in the Mediterránean* we have achieved the planned sampling intensity for all stock-related variables except for leghth. To obtain samples for fecundity implies sampling a high number of females to achieve the accurate gonadal stage (spawning females). In the Atlantic stock the biological sampling (hard parts for aging) was not achieved due to the COVID pandemic spetial circunstances, lack of Networking at fishing ports in 2020 and lack of staff in 2021. Moreover this type of data (age) is not required for assessment purposes within ICCAT OROP.  Skipjack tuna *(Katsuwonus pelamis),* Yellowfin tuna *(Thunnus albacares)* and Bigeye tuna *(Thunnus obesus):* due the collateral effects of covid we have increased the sampling intensity at the begining of the year, to try reach the planned number for stock-related variables to avoid likely shutdown in data collection by the covid effect and have decided that the scientific observer stand more days on borard than previous years  Also there was a change on the purse seiners strategy doing more fishing on FADs that involve an increment of the Skitpjack tuna catches.  Pacific Ocean: There was no scientific observers on board purse seiners in the Pacific Ocean in 2021 because of the collateral effect of COVID as for instance that the crew have been infected with covid and it was impossible put an observer on board or that many Pacific ports are still closed,…As a consequence, no samplings os the Pacific species could be carried out.  ***3.Actions to avoid deviations***  The Mediterranean swordfish deviations are difficult to avoid due to these deviations are related to fish commercialization. The unique possibility is to increase the sampling onboard on damaged individuals.  The other deviations are related mainly to the fecundity sampling. We have increased the sampling intensity for stock-related variables to achieve the fecundity planning numbers, but we have not obtained the planned numbers for the majority of the species. We will try to increase the sampling intensity for this variable in the future.  (max. 1000 words per Region/RFMO/RFO/IO) |

# Section 1: Biological Data

Text Box 1D: Recreational fisheries

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| *General comment: This box fulfills paragraph 2 point (a) (iv) of Chapter III of the multiannual Union programme and Article 2, Article 3 and Article 4 paragraph 1 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is intended to provide information on the design, implementation and analysis of all components of sampling schemes/ surveys that are listed in Table 1D.* |
| ***1.* *Description of the target population***  The target population consist of fishermen with licence to carry on recreational fishing techniques: on shore, boat, chartered boat and spearfishing.  ***2.* *Type of survey***  Depending on species the type of survey can be questionnaires (e-mail and, phone), census like in the case of salmon wich data collection is exhaustive because of the obligation to issue a traffic guide for all specimens caugh.  Regarding highly migratory species the catch composition and the effort per day are collected exhaustively ("census") based on the statement of anglers.  ***3.* *Data Quality***  More detailed information of quality assurance can be found in:  Spain WP 2022-2027 Annex 1.1 Quality Report for Biological Data Sampling Schemes. [Spain\_WP\_2022-2027\_text\_annex.pdf](https://datacollection.jrc.ec.europa.eu/wp/2022-2027?p_p_id=110_INSTANCE_73ztp5DgN0HT&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&_110_INSTANCE_73ztp5DgN0HT_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_73ztp5DgN0HT_redirect=https%3A%2F%2Fdatacollection.jrc.ec.europa.eu%2Fwp%2F2022-2027%2F-%2Fdocument_library_display%2F73ztp5DgN0HT%2Fview%2F1430907%3F_110_INSTANCE_73ztp5DgN0HT_keywords%3D%26_110_INSTANCE_73ztp5DgN0HT_topLink%3Dhome%26_110_INSTANCE_73ztp5DgN0HT_advancedSearch%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_cur2%3D3%26_110_INSTANCE_73ztp5DgN0HT_delta2%3D20%26p_r_p_564233524_resetCur%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_andOperator%3Dtrue&_110_INSTANCE_73ztp5DgN0HT_fileEntryId=1438420)   * ESP-AZTI\_OffSiteSurveysRecreational, pp144-145 * SelfOnShore\_recreational (off site surveys), pp146-147 * ANG\_ Basq\_SciObs water body\_Diadromous (recreational), pp 159-160 * Saeatrout\_Nava\_SciObs water body\_Diadromous (recreational), pp 190-191 * Salmon\_Cant\_SciObs water body\_Diadromous (recreational), pp 200 * Salmon\_Gali\_SciObs water body\_Diadromous (recreational, pp 202 * Salmon\_Nava\_SciObs water body\_Diadromous (recreational), pp 205, 206   And also in   [Recreational Fisheries Sampling](https://azti.sharepoint.com/:f:/s/Proyectos/DatosPesqueriasAZTI/EmQ5UkErh7dMuAhnVjmFjA8BSF-ejC2_u2DZmUNuBPBGIA)  Some of the survey metodology has been evaluated by WGRFS.  Collected data were transmitted to different end users like the ICES/EIFAC/GCFM, eel group (WGEEL) in the case of eel recreational fishery.  Data on catches obtained from tuna recreational ficheries area submitted to the relevant RFMO, (ICCAT).  ***4. Data Analysis and processing***  A cleaning and depuration of survey data has been improved and automatized in order to make use consistent criteria along the years.  (max. 900 words per survey) |

# Section 1: Biological Data

Pilot Study 1: Relative share of catches of recreational fisheries compared to commercial fisheries

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| *General comment: This box fulfils paragraph 4 of Chapter V of the multiannual Union programme and Article 2 and Article 4 paragraph (3) point (a) of the Decision (EU) 2016/1701.* |
| *General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.* |
| *1. Aim of pilot study*   * Characterize and estimate catches and discards made by recreational fishery in Spain (both Atlantic and Mediterranean region) and the impact on the species identified as target, taking special account of the species that are also targeted by commercial fishery. * Comparison between catches from recreational fishery and from commercial fisheries. * Development of a routinary sampling plan for recreational fishery to comply with EU MAP.   *2. Duration of pilot study*  The pilot study began in July 2020 and it is scheduled to take place over 8 months, until March 2021.  *3. Methodology and expected outcomes of pilot study*  In Spain, the management of recreational fishing, and therefore the sampling, is responsibility of the Spanish Autonomous Regions for inshore areas and by the Ministry of Fisheries for offshore areas. A fishing licence is mandatory for recreational fishers and is issued by the administrations of the Autonomous Regions.  There has been studies of recreational fisheries on several regions of the Spanish coast (Zarauz et al.,2015). However, this is the first study with an overall national approach, and with an objective of continuity, in terms of setting up a routinary sampling of these fisheriesThe recreational fisheries in Spain differ considerably between the Atlantic and the Mediterranean, and therefore, the sampling will need to be adapted to the specifities of each of the two regions. The methodological approach will be the following:   * Two regions are defined (Atlantic and the Mediterranean) * In each region the sampling will be coordinated by a scientific partner (experts in recreational fisheries surveys). The execution of the sampling will be done by the different Autonomous Regions. * The scientific partner will provide guidance for the sampling design, implementation and analysis according to international best practices guidelines (i.e. WGRFS). All componets of the survey programme will be documeneted to have accurate and complete documentation. Quality assessment tools will be considered to analyse the robustness of the survey. Training will be given to the people in charge for the sampling in the Autonomous Regions * The scientific partner will also ensure the coordination between the Atlantic and Mediterranean sampling and the consistency of the sampling and estimation methodologies. * The sampling will include all types of recreational fishing: from boat, from the shore and spear fishing * The sampling will consist on off-shore surveys. * The licence list has been used as a sampling frame and the people to be interviewed is selected randomly. This design, however, has been adapted to the data available in each Autonomous Region.   The sampling of recreational fishing of anadromous and catadromous species (eel and salmon) needs a different approach and will not be covered in this study.  **The main expected outcomes are the following:**   * Comparison between catches from recreational fishery and from commercial fisheries * Characterization of the recreational fisheries in Spain. * The development of a routinary sampling plan for recreational fisheries in Spain.   **References:**  *Zarauz, L., Ruiz, J., Urtizberea, A., Andonegi, E., Mugerza, E., & Artetxe, I. (2015). Comparing different survey methods to estimate European sea bass recreational catches in the Basque Country. ICES Journal of Marine Science, 72 (49, pp. 1181-1191).*  (max 900 words) |
| ***Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).***  Without prejudice to the exclusive competence of the Central Administration in the matter of maritime fishing in outer waters, whether professional or recreational, at a same time, it can not be ignored that the Autonomous Region have the recreational fisheries competency, so they regulate the practice of this activity in their respective internal waters, which makes it advisable to adapt the recreational practice in its set to the regime of finding the best way to manage it.  Acording to this national legal framework and also considering the current regulation regarding marine recreational fisheries data collection under Regulation 2017/1004 of the European Parliament and of the Council of 17 May 2017 concerning 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, together with Commission Delegated Decision (EU) 2019/910 of 13 March 2019, establishing the Multiannual Union Programme for the collection and management of biological, environmental, technical and socio-economic data in the fisheries and aquaculture sectors. Spain, through the General Secretariat for Fisheries (SGP) of the Ministry of Agriculture, Fisheries and Food, has carried out a pilot study with the aim of characterising this activity at national level and thus being able to ascertain:  1.The different types or forms of recreational fishing and the different techniques involved.  2.Periods of greatest intensity of this activity or seasonality.  3.The main target species for recreational fishing.  4.Estimated volumes of catches and discards and their comparative "weight" with professional fisheries.  5.Estimation of fishing effort and calculation of yield (catches per unit effort).  6.Possible interactions with other species (especially turtles and marine mammals).  This pilot study started in 2020 and ended in 2021.  The geographical area of application of this pilot study is:  •**Atlantic Ocean**: It covers ICES subareas 27.8.c, 27.9.a and 34.1.2. Regarding the Autonomous Regions of Spain, it includes Galicia, Cantabria, Asturias, País Vasco, Islas Canarias and the provinces of Huelva and part of Cadiz in Andalucía Region.  •**Mediterranean Sea**: It covers GSA 1, GSA 3, GSA 5 and GSA 6. Regarding the Autonomous Regions of Spain, it includes Cataluña, Comunidad Valenciana, Región de Murcia, Islas Baleares, Melilla and the provinces of Málaga, Granada, Almería and part of Cádiz in Andalucía Region.  In each region, the sampling is coordinated by experts in telephone surveys and recreational fishing.  The results are presented by sampling unit. The sampling units are the Autonomous Regions and Central Administration for licenses directly authorised by the General Secretariat of Fisheries. The next activity was to collect the licenses from the Autonomous Regions and those granted by the Central Administration. The total number of licenses constitutes the population frame of the survey. However, before defining the population framework, an association is made between the types of licenses in the Autonomous Regions and those defined in this study, for which a distinction is made: Coast-line, On boat, Submarine or spearfishing and Mixed coast and/or on boat.  **In the study, the two main variables are fishing effort, measured in days of activity, and the composition of the catch per day of effort, measured in kilograms**. To define the sampling size, fishing effort has been taken. Sample size is focused on the calculation of the annual fishing effort of those fishermen who hold a recreational maritime fishing license. The following factors have been considered for its calculation:  •Confidence range of 95%.  •Standard deviation of 20.  •Maximum error acceptable of 4 days.  The sampling to be used is simple random sampling without replacement.  To obtain data **the survey was performed through telephone surveys and a questionnaire/staging was developed**.  After conducting more than 5000 surveys it was possible to obtain data that would allow an indicative characterisation of the national recreational fisheries sector, concerning:  •Fishing effort estimation: desagregated for each type of license.  •Catches estimation: allowing the identification of main/targeted species and its disagregation by region (GSA or ICES area).  •Seasonality: it was identified a higher concentration of the activity during the summer season.  •A comparison between estimated catches calculated on this pilot study and catches registration of the profesional activity gathered on the General Secretariat for the Fisheries for the year 2019 has been made, taking into account areas and fishing technique.  ***4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.***  The results have not been entirely conclusive, obtaining:  •a species composition in % which is in line with other studies.  •an effort that falls within the estimated ranges although, given the high number of people who did not want to answer the questions, it is suspected that there could be a bias.  •catch results which are mostly over-dimensioned.  The possible bias that would cause such overestimation are detailed below:  1.The type of (telephone) survey: non-response error and recall error.  2.The impossibility of having a more segmented population.  3.How fishermen quantify catch (kg/day fished).  4.The study has not carried out data cleaning to detect outliers.  5.Finally, it is necessary to analyse the possible effect of catch-and-release and discards.  ***5. Incorporation of results from pilot study into regular sampling by the Member State.***  Having detailed the difficulties encountered during the study and possible avenues of bias, a number of improvements to optimise the quality of the data has been outlined.  Work is being carried out to improve methodology used. However, to reach to the aim of establishing a routine sampling system, more time is needed. Furthermore, an harmonisation at European Union level on methodology sampling, between different regions (Atlantic and Mediterranean), should be considered.  Report “PS1-ES-2021\_REPORT: Relative share of catches of recreational fisheries compared to commercial fisheries”, sent to the Commission on 16th March 2021. This document includes results of pilot study, but no excel is included with sampled variables by species. As stated in the report, it was observed an over-dimensioning of these data due to some biases that have already been discussed in various working groups on this subject.  (max 900 words) |

# Section 1: Biological Data

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

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| *General comment: This box fulfills paragraph 2 points (b) and (c) of Chapter III of the* *multiannual Union programme and Article 2 of the Decision (EU) 2016/1701.* |
| *General comment: This box is applicable to the Annual Report.* |
| Method selected for collecting data.  **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.  ES-Basque Country (ES-Bas)  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) It has been noted that there are hardly any catches in February and none in March, so it has been decided to eliminate the month of March from the sampling.  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 20 sampling points. The number of electric fishing points has been adjusted to the actual number of points that it has been possible to achieve in recent years in the Oria.  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\_Asturias (EMU\_ES\_Astu)  1)The abundance of recruits will be estimated using the glass eel fishery catch and effort data  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\_Galicia (EMU\_ES\_Gali)  1)The abundance of recruits will be estimated using a fish trap capturing elvers and yellow eel.  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 using a fish trap applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys.  EMU\_ES\_Murcía (EMU\_ES\_Murc)  The abundance of recruits, standing stock (yellow eel); and the number or weight and sex ratio of emigrating silver eels will be determined by sampling the Mar Menor fishery catches.  EMU\_ES\_Valencia (EMU\_ES\_Vale)  1)The abundance of recruits will be estimated using the glass eel fishery catch and effort data  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\_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 estimated by:  a.Monthly samplings of the glass eel entrance in the estuary using fyke nets with fine mesh during the maximum recruitment period (October-March)  b.Using the glass eel fishery catch and effort data compiled in the daily catches report.  2)The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys in 15 sampling points.  3) Size and weight will be determined from a sampling of individuals obtained by means of electrofishing surveys. The number of migrating silver eels will be determined applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys.  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 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 using a fish trap applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys  EMU\_ES\_Inner basins (EMU\_ES\_Inne)  Although historically eel was present in this EMU; nowadays it has disappear from the area. Thus, it is not possible to sample.  **Salmo salar**  There is no professional fishing targeting Salmo salar (only recreational)  País Vasco.  In the Basque Country, all the rivers with current salmon populations have been sampled. Smolt has been sampled with rotary screwtrap. Parr has been sampled with electric fishing. Adults have been sampled with Migration control station (adult trap). The Lea station no longer exists. At the end of December 2018, the existing fish passage was demolished, as it had major hydraulic deficiencies. The number of electrofishing points in the rivers Mayor and Lea has been updated (na before now two points per river)  The number of electric fishing points has been adjusted to the actual number of points that it has been possible to achieve in recent years in the Oria and Oiartzun rivers. Although the planning contemplates a greater number of points, the environmental conditions do not usually allow to do them all. If favourable conditions exist, the number of points planned will be exceeded.  Asturias  There are two important sources of information on salmon stocks. The first is the salmon catch during the fishing season and the second count of the fish in rivers, traps, as it passes through scales, in autumn.  In Asturias country, all the rivers with current salmon populations have been sampled by census of the presence of adult breeders.  Parr has been sampled with electric fishing. Adult trap in Sella river: Adults have been sampled with Migration control station. There ara an annual series of catch and presence data for adult breeders in the Sella River.  Navarra.  In Navarra, Salmon can be found in four river basins: Bidasoa, Urumea, Nivelle and Nive. However, only the Bidasoa River has a Salmon population that can be considered completely in the Navarre territory. The other three rivers only have their headwaters in the Navarrese territory (Urumea in the Basque Country and Nive and Nivelle in France) and as a result, the main sampling effort is carried out in the Bidasoa River.  Migrating adult Salmon are yearly counted in the Migration Control Station (adult trap) and parr densities are estimated in September through electric fishing sampling in 31 sites of the catchment (16 in the main river and 15 in the most important tributaries). Since the spring of 2020, migrating smolts are also counted through a new device installed in the canal of the last hydropower plant the smolts find in their way to the sea through the Bidasoa River.  Although Urumea, Nive and Nivelle rivers are not specifically monitored for salmon, information about the presence of salmon parr is gathered during the trout electrofishing samplings carried out each summer (two sites in Nivelle, one in Nive and one in Urumea).  Galicia  In Galicia, electric fishing samples were taken specifically for parr in all the basins inhabited by this specie actually. The last ones were carried out in 2019. The few captures of adults that are authorised to recreational fishery are subject to control.  *(max 250 words per Area)* |
| ***Were the Planned Number achieved?***  In Column R of Table 1. E the specific reasons for each of the basins not meeting the foreseen numbers are explained and some correction actions are proposed. The evaluation of the gaps and needs for the different Autonomous Regions is in progress, so it has not been able to hold training courses to harmonize eel sampling in the different EMUs. However, any need will be taken into consideration.  In these cases where data have been collected from sources independent of the fishery, “NA”, has been used as the sampling methods were not related to fishing gear. In these cases, the sampling method was indicated in the column “K” and/or “U”.  ***Anguilla anguilla.***  Sampling for eel has generally been carried out as planned. In almost all cases, 100% of the target has been met and in some of them the objective has even been exceeded. In a few cases it has not been possible to comply for external reasons (river flow) and in a few cases for budgetary and methodological reasons. Non-external problems are expected to be solved next season.  In any case, it is considered that the information provided is sufficient for the assessment of the stock to be carried out correctly.  Some additional comments are provided by EMU:  **EMU\_ES\_Anda**  Since 2018, 40 monitoring stations have been sampled annually, located in the rivers Guadalquivir (specifically in the rivers Guadaira and Guadiamar), Guadalete, Guadarranque, Palmones, Barbate and Guadalhorce. Sampling is carried out during the winter months, generally from November to April, on days with less moonlight, to ensure greater catchability. Ten eel pots and ten crab pots are placed in each of the monitoring stations, distributed between the two banks, and are kept for 48 hours, at which time the catches are collected and analysed. In the 2020-2021 hydrological year.  The abundance of recruits in Guadalquivir and Guadiaro as well as the abundance of yellow/silver eel in Guadioaro was not performed because the number of planned samplings was calculated on the basis of a project that ended in June 2020, so no planned sampling has been carried out after that date.  Only 27 monitoring stations have been sampled due to mobility restrictions between provinces and the closure of non-essential services. This situation led to a delay in the start of the work, making it impossible to sample the points located on the Guadarranque and Palmones rivers because the weather was no longer favourable for the work to be carried out.  **EMU\_ES\_Astu**  The abundance of recruits has been estimated using the glass eel fishery catch and effort data.  Since 2011 yellow and silver eels abundance has been determined annually by electrofishing surveys at 30 sampling stations. Sampling has been carried out as planned, during september and october, at the 30 sampling stations. The silvering rate and the sex ratio of emigrating silver eels have been determined applying Durif et al. (2003; 2005).  The length, weight and pigmentation phase have been determined as planned in glass eels obtained at the fishery guilds from three rivers.  **EMU\_ES\_Basq**  100% of the target has been meet.  **EMU\_ES\_Cant**  CantGlass eel catches are recorded daily in the rivers of Cantabria where this activity is allowed (Deva, Nansa, Pas, and Campiazo). In addition, a fishery independent recruitment survey was made in the Deva and Nansa rivers, including 3 sampling points in the first one and 1 sampling point in the second one. Sampling has been taken monthly during 5 months (November to March) when glass eels arrive at the mouth of estuaries of Cantabria and enter in freshwater.  Yellow and silver eel abundance is estimated in all catchment areas of Cantabria. The table below shows the sampling points per basin.   |  |  |  | | --- | --- | --- | |  | Yellow eel | Silver eel | | Deva | 12 | 4 | | Nansa | 4 | 1 | | Saja | 5 | 0 | | Pas | 5 | 2 | | Miera | 8 | 3 | | Asón | 10 | 2 | | Agüera | 2 | 1 | | **TOTAL** | **46** | **13** |   An estimate has been made of the proportion of silver eels that are present in the populations by basin in the rivers of Cantabria (yellow eels/ silver eels ratio).  100% of the target has been meet, however, it is worth mentioning that he number or weight and sex ratio of migratory silver eels using Durif et al. (2003; 2005) to eels obtained in electrofishing surveys has not been carried out due to lack of staff.  **EMU\_ES\_Cata**  For recruitment in the Ter, as stated in the previous year report, it is considered that 8 points are enough (planned number modified to 8 at the beginning of 2019, after WP submission), so samplings were restricted to 8 per year. Bearing that into mind the % of achievement would be 100%. That is the reason for not having 100% of achivement.  According to glass eel catch sampling on the Ebro basin, 100% of achievement was not meet because we strongly believe that it would be more appropriate not to set a specific number of individuals to be sampled but to set a specific number of samples. Further consideration will be given to modifying the monitoring characteristics at a later stage.  **EMU\_ES\_Gali**  There is a mistake in the foreseen planned numbers for Ulla River recruits and silver eels; where written “600” should be “1”, which is what has been achieved, as indicated in the columns, the sampling method it is a fish trap. Since the units are n. sites, number has to be one for each Fish trap.In view of this, 100% of the ta tarrget has been meet, since this traps have been sampled daily during 2021.  **EMU\_ES\_Murc**  100% of the target has been meet.  **EMU\_ES\_Nava**  100% of the target has been meet.  **EMU\_ES\_Vale**  Yellow and silver eel abundance determined by multispecific eletrofishing surveys. Of the 20 joint samplings planned for the Turia basin, only 10 could be carried out; the others were not possible due to excess flow, which made sampling unfeasible. In the 10 samplings carried out, 22 yellow eels and 23 "undetermined" stage eels were observed and measured.  ***Salmo salar***  Sampling for salmon has generally been carried out as planned. In almost all cases, 100% of the target has been met. In most cases it has not been possible to comply for external reasons (river flow or or non-operating trap). In any case, it is considered that the information collected is sufficient to allow a correct stock assessment to be carried out, since the proposal includes the collection of information on salmon in all the basins where salmon are currently present in Spain. Therefore, the planned sampling coverage was so wide that, although during 2019 some of the parameters were not collected in some of the basins as planned, the coverage is still very wide and allows for a correct evaluation of the species in Spain.  Some additional comments are provided by region.  **Asturias**  Sampling has been carried out as foreseen in all the rivers of Asturias with salmon population, except for the Porcia river, the underwater visual census method was not carried out due to the fact that it is a small river and visual observation was sufficient without the need to dive. No fish were seen as there was little autumn flow. It is a river where they do not spawn every year.  **País Vasco**  In general terms, sampling has been carried out as foreseen in all the rivers of the basque country with actual salmon population. The overall number of electrofishing stations sampled for 2021 was as planned, however, to improve the different habitats coverage it was decided to make one point more in the Oiartzun and one less in the Urumea. The smolt trap in the Urumea was not sampled due to no divertion channel of the paper mill where the rotary screw trap was installed and thus it was no longer working.  **Navarra**  It was foreseen to measure 61 salmon in the Bidasoa ; but, only 29 salmon were caught during the angling season and all of them were measured. As it was done last year, Navarra requests to change the value in column M, as the actual value is not appropriate (number of fish caught by the recreational fishery) because it changes every year. A different indicator is proposed: percentage of fish caught by recreational fisheries that were sampled, in which case the value for column M would be 100%, and this year the value for column P would also be 100%.  **Cantabria**:  In 2021, almost all the planned electricfishing points have been sampled, except one point on the Agüera River. The Agüera river is very small and the technical team considered 2 sample points to be suffient instead of the three planned.The increase in the number of points in some other basins is due to the increase of accessible area for salmon in those basins.  The redd counting this year has been conditioned by weather conditions, which have caused high flows with a lot of turbidity in the spawning season, which have prevented a correct count.  The sampling catches in recreationalfishing is conditioned by the number of fish caught each season. The established objective corresponds to the TAC for each river.  **Galicia**  The adult trap in the Tambre River was not operative, so this sampling was cancelled. Fishing for salmón was banned in the Lérez river for 2021, so sampling of the fishery was cancelled. Electrofishing surveys for parr could not be carried out as plannedt in rivers Sor, Mera, Xubia, Mandeo or Anllóns because no one applied to the contract procedure for electrofishing subcontracting, but some surveys could be completed in the Mera, Xubia or Anllóns rivers. In Mera one station was not available because it lacked flow and was completely covered by macrophytes, preventing electric fishing operations.The Umia river remained unsampled, because no adults or parr were detected in recent years. Lérez river could not be sampled because of unsuccessful planning and the lack of staff.  (max 500 words per Area) |

# Section 1: Biological Data

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

North Sea (ICES IIIa, IV and VIId areas) and Eastern Arctic (ICES areas I, II)

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| *General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the multiannual Union programme and Article 2 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.* |
| Spain has fisheries only in **Eastern Arctic (ICES areas I and II)**  ***1.Results***  Number of PSU sampled: 3.  Stratum ID code L1-L2: There has been no occurrence of by catch.  ***2.Deviations from Work Plan***  No deviations were recorded.  ***3.* *Data Quality***  More detailed information on the sampling protocol and further analysis, are provided in Section 5 (Data Quality) in the following link: Spain\_WP\_2022-2027\_text\_annex.pdf  Stratum ID code: L1-L2:  Observers on board have instructions for collecting data on incidental by-catch species. Specific forms designed for recording data of by-catch (fish, marine mammals, reptiles, birds and other species) 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.  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 which 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. In 2021, data of bycatch collected in 2020 in this area were sent to WGBYC.  It must be noted that Spanish onboard observer Programm 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 samples in order to estimate discards and to calculate biological variables/parameters of commercial species.  (max 900 words) |

# Section 1: Biological Data

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

North Atlantic

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| *General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the multiannual Union programme and Article 2 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.* |
| **North Atlantic ICES XII-XIV and NAFO areas**  ***1.Results***  Number of PSU sampled: 8 (NAFO areas)  Stratum ID code L3: Some fish (bony and cartilaginous) species from Table 1D of the Commission Implementing Decision (EU) 2016/1251 were recorded as by catch.  ***2.Deviations from Work Plan***  The only deviation from the work plan was the number of onboard PSU sampled in the stratum L4 (NAFO Div. 6G) that was =0 due to a ban of fishing force.  ***3.* *Data Quality***  More detailed information on the sampling protocol and further analysis, are provided in Section 5 (Data Quality) in the following link: Spain\_WP\_2022-2027\_text\_annex.pdf  Stratum ID code: L3-L4: Observers on board have instructions for collecting data on incidental by-catch species. Specific forms designed for recording data of by-catch (fish, marine mammals, reptiles, birds and other species) 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.  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 which 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. In 2021, data of bycatch collected in 2020 in this area were sent to WGBYC.  It must be noted that Spanish onboard observer Programm 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 samples in order to estimate discards and to calculate biological variables/parameters of commercial species.  **North Atlantic ICES VI, VII (excl. VIId), VIII, IX**  ***1.Results***  Concerning the IEO all by-catch is registered and stored in the IEO database. All the by-catch is submitted to ICES WGBYC.  Concerning AZTI, during the sampling on board, observers have instructions to register all the by-catch of marine mammals, birds, reptiles, elasmobrach and other fishes considered as PETS. All the bycatches, if any, are registered. Data is submitted to WGBYC  ***2.Deviations from Work Plan***  The deviations from the work plan was the number of at-sea PSU sample due to the decline in the gillnets targeting anglerfish and hake in North Iberian waters (Divison VIIIc and North of IXa, GNS\_DEF\_>=100\_0\_0) and the increase of refusals in the Gulf of Cádiz. (See Table 4A and Text box 4A-North Atlantic ICES VI, VII (excl. VIId), VIII, IX).  ***3.* *Data Quality***  More detailed information on the sampling protocol and further analysis, are provided in Section 5 (Data Quality) in the following link: Spain\_WP\_2022-2027\_text\_annex.pdf  For the IEO:  Several of the recommendations from groups such as ICES WGCATCH or ICES WGBYC are included in the protocol such as instructions to record catch of other species than fish and the reporting of specific devices in the gear. Nevertheless, some other issues need to be developed to ensure e.g. how much of the hauling process has been observed for incidental bycatches.  Data stored in different modules of the IEO data base SIRENO. All data sent to WGBYC  It must be noted that Spanish onboard observer Programm 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 samples in order to estimate discards and to calculate biological variables/parameters of commercial species.  IEO and AZTI are participating in a pilot proyect developed by the Ministry of Agriculture, Fisheries and Food to asses on the by-catch in the Bay of Biscay. Results will be analysed and compared to our DCF programme to detect potential bias. Results will be used to improve current protocols and methodologies to correctly register by-catch in our DCF on-board programme.  For the AZTI:  The onboard observer instructions ask observers to check for rare (marine mammals, birds, reptiles, elasmobrach and other fishes considered as PETS) specimens in the catch at opening of the codend. All hauls are checked. In the sampled trips, no by catch mitigation devices were used.  The sampling design and protocols for onboard observers are being developed to include the proposed recommendations from the relevant expert groups.  Data are stored in an excel file (not a database) and no quality checks have been implemented yet. We have decided the design of our Data Base to host PETs data, but the design still needs to be implemented, Work is in progress also to include quality checking procedures.  The strata AZTI\_S\_PTB\_8c, AZTI\_S\_LLS and AZTI\_S\_ART were not included in table 1F because originally, we didn’t plan to sample these fleet (note that planned number of PSU equals zero in table 4A). Plans changed and the fleets were sampled, but table 1F could not be modified. The sampling for these fleets is the same than for the rest of AZTI’s onboard sampling in ICES waters.  (max 900 words) |

# Section 1: Biological Data

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

Mediterranean and Black Sea

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| *General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the multiannual Union programme and Article 2 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.* |
| Spain has fisheries only in **Mediterranean Sea**  ***1.Results***  Only the main métier in each GSA were selected to sampling, as recommended by RCMMed&BS 2010 and, following the discard sampling program, the observers onboard would collect information on discards and bycatch for trawlers in Spanish waters (National Program 2017-2019). Despite this, a series of pilot studies to explore the incidental by-catch in the Mediterranean and Black Sea started in 2018. The sampling plan follows the recommendation of the GFCM to develop some pilot studies from 2018 to 2020, in order to obtain information of the by-catch of the following fisheries:  -2018: Bottom trawl fishery  -2019: set longline  -2020: set gillnet  The 2019 sampling study, focused in set longline fisheries, has only been carried out in the GSAs 1 and 2. In the others GSAs set longliners operating regularly in the sampling ports were not available. In general, the bycatch is composed by some fish (bony and cartilaginous) species of the Table 1D of the Decision 2016/1251. (This is in line with the results of the 2018 pilot study that confirmed the previous observations in the bottom trawl fishery: in general, the by catch was composed by some bony and cartilaginous fish species of the Table 1D of the Decision 2016/1251. (one record of *Caretta caretta* and some records of invertebrates ocurred). The observers did not report any ocurrence of marine mammals or birds bycaught in trawlers).  The 2020 sampling study was postponed to 2021. The study was focused in trammel nets as it is the fishery most important withing the set nets. It was carried out in the GSAs 1, 5 and 6. As in previous pilot studies, the bycatch is composed by some fish (bony and cartilaginous) species of the Table 1D of the Decision 2016/1251, and in this case, some species from the Appendix E.2 (Rare elasmobranchs species) of the GFCM Data Collection Reference Framework.  Also, in the sampling at market of other métiers (trammel nets, purse seiners or set gillnets), some fish species of the Table 1D of the Decision 2016/1251 have been recorded.  ***2.Deviations from Work Plan***  The sampling study, focused in set gillnet fisheries, plannified for 2020, had to be postponed to 2021 due to problems with the public tender to hire a company that provide observers on board (See Text box 1C and 4C for the Mediterranean).  Once the administrative issues were solved and the contract has been awarded and running properly, we have be able to carry out the pilot study the bycatch of trammel nets or/and set gillnets of the GSAs 1, 5 and 6.  ***3.* *Data Quality***  More detailed information on the sampling protocol and further analysis, are provided in Section 5 (Data Quality) in the following link: Spain\_WP\_2022-2027\_text\_annex.pdf  In the Mediterranean, the duration of trawlers trips is normally one day, with no large catches.  Onboard observers are instructed to check the rare or unusual specimens, but the ability to identify the species/taxon depends on observer experience. Observers always indicate if the codend was not checked in a haul.  The pilot studies carried out during the three years period 2018-2020, extended to 2021, have followed the GFCM planned bycatch sampling program for the period 2018-2020.  The methodology set out in the Handbook for monitoring incidental by catch and processing the collected data, produced under the MARE/2014/19 project, has been followed.  (max 900 words) |

# Section 1: Biological Data

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

CECAF

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| *General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the multiannual Union programme and Article 2 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.* |
| ***1.Results***  **Fishing ground: “West Africa**” (non EU waters in West Africa)  Stratum ID codes **"C2", "C3-S" & “C4**”: All fishing hauls are checked for birds, mammals and reptiles incidental mortality. Rest of species listed in Table 1D which includes some bony and cartilaginous fishes and invertebrates species are checked in random hauls sampled and subsequently recorded as discards.  Two specimens of turtles (Caretta *caretta* & *Lepidochelys olivacea*) and some fish (bony and cartilaginous) species from Table 1 D were recorded as by catch.  **Fishing ground: “Canary”** (EU waters)  Stratum ID code **“C6-S” “C7-S”:** All fishing hauls are checked for birds, mammals and reptiles incidental mortality. Rest of species listed in Table 1D which includes some bony and cartilaginous fishes and invertebrates species are checked in random hauls sampled and subsequently recorded as discards.  Incidental bycatch is very rare and only some fish (bony and cartilaginous) species from Table 1 D were recorded as by catch.  ***2.Deviations from Work Plan***  No deviations from the WP. The only deviation from the work plan was the number of onboard PSU sampled. (See Table 4A and Text box 4A.CECAF)  ***3.* *Data Quality***  More detailed information on the sampling protocol and further analysis, are provided in Section 5 (Data Quality) in the following link: Spain\_WP\_2022-2027\_text\_annex.pdf  **Stratum ID codes C2, C3-S, C4, C6-S, C7-S**: Onboard observers are instructed to collect data on bycatch 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.  Though no mitigation devices are used in the trawler fleets (C2, C3-S, C4), no marine mammals or birds have been caught, the onboard observer instructions do not indicate the need to record if the codend is (or not) checked for every haul or if and which percentage of the sorting process has been checked.  It must be noted that Spanish onboard observer program in the trawler fleets was not originally designed for the recording of incidental bycatch 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. However, observers on board monitor bycatch of "large species'' (mammals, turtles, birds ...) in all hauls in which they are operative and monitor the rest of the protected species (table 1D) only in those hauls in which discard is sampled.  (max 900 words) |

# Section 1: Biological Data

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

ICCAT, IOTC, IATTC, WCPFC

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| *General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the multiannual Union programme and Article 2 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.* |
| ***1.Results***  Stratum ID code T1: The onboard observer program in longliners in the Western Mediterranean Sea have observed as incidental bycatch in 2021: sharks, bony fish, marine turtles and seabirds.  Stratum ID code T5: The onboard observer program in longliners in Atlantic, Indian and Paciifc oceans have observed as incidental bycatch in 2021: sharks, marine turtles, marine mammals and seabirds.  Stratum ID code T6: The onboard observer program in purse seiners in Atlantic and Indian oceans have observed as incidental bycatch in 2021: cartalaginous fishes, and marine turtles.  ***2.Deviations from Work Plan***  The only deviation from the work plan was the number of onboard PSU sampled. There was no scientific observers on board purse seiners in the Pacific Ocean in 2021 because of the collateral effect of COVID as for instance that the crew have been infected with covid and it was impossible put an observer on board or that many Pacific ports are still closed,… (stratum ID code T7).  ***3.* *Data Quality***  More detailed information on the sampling protocol and further analysis, are provided in Section 5 (Data Quality) in the following link: Spain\_WP\_2022-2027\_text\_annex.pdf  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.  The sampling design and protocol follow the recommendations of tuna-RFMO sampling manuals, by ICCAT Subcommittee on Ecosystems and by the t-RFMOs Working Groups on ecosystems and bycatch.  Data are electronically stored in national and/or international databases and samples are stored and analyzed in the laboratory.  For tropical purse seiners, the scientific observers on board are instructed to check all the specimens contained in the codend. The scientific observers determine and register the use of Floating Objects (FOBs), registering their characteristics (non-entangling FADs, biodegradable FADs, natural and artificial logs, and others.  The observer databases are carefully reviewed by the IEO staff before storing them. Furthermore, the database itself avoids the outlier inputs. General quality indicators are used only for observer’s data coming from the Pacific Ocean. These data are also closely reviewed using an edition application which shows the outlier inputs.  Observer’s data obtained from 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.  Observer’s data obtained in the Pacific Ocean are stored in national database.  The sampling methodology at market and on board is annually reviewed by a group of experts from IRD, AZTI, IEO, SFA and CRODT for the Atlantic and Indian Oceans region, and from IATTC and IEO for the Pacific Ocean region for the national observer program.  (max 900 words) |

# Section 1: Biological Data

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

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| *General comment: This Box fulfills paragraph 3 point (c) of Chapter III of the multiannual Union programme and Article 2 and Article 4 paragraph (3) point (b) of the Decision (EU) 2016/1701.* |
| *General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.* |
| **Mediterranean Sea**  **Pilot study 2.1: Incidental Bycatch**  Following the 2016 Recommendation of RCM Med&BS-LP on pilot studies for the assessment of incidental bycatches of birds, mammals, reptiles and fish, the RCG Med&BS-LP 2017 has agreed to carry out the following pilot studies:   * + - 2018: Pilot study for assessing incidental bycatches from bottom trawlers     - 2019: Pilot study for assessing incidental bycatches from longlines     - 2020: Pilot study for assessing incidental bycatches from set nets (trammel nets).   The proposed metiers and year of sampling are in agreement with the GFCM planned bycatch sampling programme which will be performed in the period 2018-2020.  ***1. Aim of pilot study***  Collect accurate information on the species, quantities, sizes, locations and timing of bycatches of vulnerable species.  ***2. Duration of pilot study***  Each pilot study related to each selected metier will have a duration of one year.  ***3. Methodology and expected outcomes of pilot study***  In overall, the methodology that will be followed for collecting data on bycatches includes the collection of data from:   * Observer programmes * Logbook completion by fishers * Interviews with fishers.   The Handbook with guidelines for monitoring incidental by catch and processing the collected data, delivered under MARE/2014/19 project Med&BS, will be followed.  Data to be collected will include: identification of species, number and weight of individuals, size measurements, location and timing of bycatches.  Expected outcomes  With the implementation of the planned pilot studies, it is expected that accurate information will be collected on the species incidentally caught, as well as their quantities, sizes, locations and the timing of such bycatches. This information will increase the knowledge on bycatch in the region. Based on the results, systematic bycatch sampling may be proposed for certain metiers/areas.  The knowledge gained under the pilot study and possible future systematic sampling will be very useful for the formulation of possible management measures for minimising bycatch of vulnerable species in the region.  **Pilot study 2.2: Stomach contents**  The RCGMed&BS 2019 recommends to follow the methodology proposed by the STREAM project to collect data on stomach contents.  ***1. Aim of pilot study***  To increase the knowledge on predator-prey relationships, which are required for multi-species stock assessments which is one of the aspects to be taken into account for the future EU Multiannual Programmes.  ***2. Duration of pilot study***  1 year (between 2020 and 2021)  ***3. Methodology and expected outcomes of pilot study***  - Stocks. The stocks proposed by the STREAM project were *Merluccius merluccius* and *Lophius* spp.  - Sources of data. Two sources of data: MEDITS survey and commercial sampling. In the survey, both species will be sampled, but in the sampling based in the fishery only hake will be sampled, since most of the individuals of anglerfish come to market with the stomach regurgitated.  - The methodology proposed here belongs to the group of volumetric methods. It is proposed to measure the volume (cubic centimeters) of total prey groups in the stomach using a trophometer, a calibrated instrument consisting of several different-sized half-cylinders built into a tray, so that they form horizontal cylindrical moulds (Olaso, 1990). Different food items will be determined to the lowest possible taxonomic level under a stereoscopic microscope.  - Sampling plan. The sampling has been planned taking into account the following three criteria:bathymetric depth strata which is known to influence the diet of the investigated species; size class (juveniles, sub-adults and adults); seasonality (quarter). The sample size (number of full stomachs to be sampled) will be a maximum of ten individuals of each target species and size class after each fishing haul in surveys, while a maximum of 100 individuals per size class and quarter will be sampled in laboratory (only M. Merluccius).  - Expected outcomes. The study of the feeding habits of fish based upon analysis of stomach content may provide important insights not only to assess food spectra at species level, but to understand the prey-predator relationships, useful aspects to contribute to multispecies stock assessment (Rindorf et al., 2013; Casini et al., 2008, 2009) or to be included in ecological models as mentioned before. Stomach content data are also useful to evaluate the resource partitioning among the species inhabiting a particular habitat/fishing ground. At species level, the information on predator-prey relationship can also be helpful for a better evaluation of the natural mortality of the key exploited stocks. Finally, the obtained information will be useful in order to develop trophic indicators which will help in the monitoring of the ecosystem studied.  **Atlantic**  No pilot study will be carried out as the sampling scheme implemented by the pilot study carried out in 2017 has been incorporated under the routinely sampling programme.  *(max 900 words)* |
| **Mediterranean Sea**  **Pilot study 2.1: Incidental Bycatch**  ***4. Achievement of the original expected outcomes of pilot study and justification if this was not the case***  During RCM Med&BS 2017 a list of métiers important for incidental catches were be prepared and agreed. The proposed metiers and year of sampling are in agreement with the GFCM planned bycatch sampling programme which will be performed in the period 2018-2020. Based on this list and end user needs, starting from 2018, MS are carrying out three pilot studies on a yearly basis:  -2018: Pilot study for assessing incidental bycatches from bottom trawlers  -2019: Pilot study for assessing incidental bycatches from longlines  -2020: Pilot study for assessing incidental bycatches from set nets.  The 2019 sampling study, focused in set longline fisheries, has only been carried out in the GSAs 1 and 2. In the others GSAs set longliners operating regularly in the sampling ports were not available.  In general, the bycatch is composed by some fish (bony and cartilaginous) species of the Table 1D of the Decision 2016/1251. (This is in line with the results of the 2018 pilot study that confirmed the previous observations in the bottom trawl fishery: in general, the by catch was composed by some bony and cartilaginous fish species of the Table 1D of the Decision 2016/1251. (one record of *Caretta caretta* and some records of invertebrates ocurred). The observers did not report any ocurrence of marine mammals or birds bycaught in trawlers).  The 2020 sampling study was postponed to 2021.  In 2022 the study was focused in trammel nets as it is the fishery most important into the set nets. It was carried out in the GSAs 1, 5 and 6.  As in previous pilot studies, the bycatch is composed by some fish (bony and cartilaginous) species of the Table 1D of the Decision 2016/1251, and in this case, some species from the Appendix E.2 (Rare elasmobranchs species) of the GFCM Data Collection Reference Framework.  ***5. Incorporation of results from pilot study into regular sampling by the MS***  Te recording of incidental bycatch is already implemented in Observers on board Program.  **Pilot study 2.2: Stomach contents**  ***4. Achievement of the original expected outcomes of pilot study and justification if this was not the case***  The Pilot study 2.2 was postponed to 2021.  The aim of the pilot study was to study the stomach content of two main demersal species, Merluccius merluccius and Lophius spp, in two scenarios: specimens caught in a demersal survey (MEDITS), and specimens caught by the commercial fleet. The proposed methodology in the STREAM project has been followed.  In MEDITS the two species were studied throughout all the survey. However, in the pilot study carried out in the laboratory focused in commercial catches, the study was only focused in Merluccius merluccius. It was developed in the GSAs 5 and 6.  ***5. Incorporation of results from pilot study into regular sampling by the MS***  Since 2013 one of the activities carried out in MEDITS survey is the study of stomach contents of the main demersal species. It is expected to follow with this activity in the next years as far as pandemic restrictions do not limit the number of persons on board the research vessels.  On the other hand, after the pilot study on sampling stomach contents of hake from the commercial fishery, it is expected too to follow with this activity in the next years.  (max 900 words) |

# Section 1: Biological Data

Text Box 1G: List of research surveys at sea

FLEMISH CAP GROUNDFISH SURVEY

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| FLEMISH CAP GROUNDFISH SURVEY  **1. Objectives of the survey**  The main objectives of the survey were 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 were implemented.   * Detailed length distribution and biological sampling of the catch for each target species, recording length, weight, sex, and the collection of otoliths and gonads. For other species only length and length-weight sampling were performed. * Observation of the oceanographic conditions on the Bank. The collection of oceanographic data (temperature and salinity) was carried out mainly through the CTD profiling; with a grid-pattern design, placing CTD stations separated 15 nautical miles, both in latitude and longitude, with the aim of covering the whole Bank. * Feeding analysis of most abundant species, to be done every two years. * Sampling of invertebrates, with special attention to corals and sponges, to allow identification of potentially vulnerable marine ecosystems.   Target species: Cod, American plaice, Roughhead grenadier, Northern shrimp, Greenland halibut, Redfish and Shortfinned squid.  **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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.  Figure 1  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Participants: Spain+ Portugal. RV Vizconde de Eza  Relevant international planning group: Portuguese-Spanish surveys in Flemish Cap - coordination meeting for the survey  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Spain contributes with vessel, staff and samples analysis in laboratory and Portugal contributes with staff and samples analysis in laboratory.  There is not signed agreement about task sharing.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| FLEMISH CAP GROUNDFISH SURVEY  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  Fig.1.a: Location of the hauls performed (valids in green and nulls in red) during the FLEMISH CAP GROUNDFISH SURVEY–2021 in Flemish Cap Bank (NAFO Div. 3M)  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  Summary Report of the FLEMISH CAP International Survey COORDINATION MEETING (FCCM) 2021.  <http://www.repositorio.ieo.es/e-ieo/handle/10508/15670>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  Survey results, including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, roughhead grenadier and Greenland halibut, provide independent information about the stock status of commercial fisheries.  The results are provided regularly to the NAFO Scientific Council, and they are also the base for many later studies.  These results are used by the NAFO SC to make an assessment on the state of the resources, which is the key tool for the NAFO Fisheries Commission to take the appropriate management measures. Results are used in the following stocks:  Cod (Div. 3M), American plaice (Div. 3M), Redfish (Div. 3M), Northern shrimp (Div. 3M), Greenland halibut (SA2 and Div, 3KLMNO) together with Canadian surveys, Roughhead grenadier (SA2+3) together with Canadian surveys. Samples for histological assessment of sexual maturity of cod, redfish, American plaice, Greenland halibut and roughhead grenadier were taken. Oceanography studies continued to take place.  Furthermore, results have contributed to the preliminary identification of vulnerable marine ecosystem. The data was made available to the NAFO WGESA to improve mapping of Vulnerable Marine Ecosystem (VME) species in the NAFO Regulatory Area (Divs. 3LMNO). As a result of the 2020 Data call: "new information on Vulnerable Marine Ecosystems (VMEs) in the North Atlantic from ICES member countries for the Joint ICES/NAFO Working Group on Deep-water Ecology (WGDEC)", VME indicators data from the EU-NAFO surveys (2014-2020) were prepared in 2020 to were uploaded to the VME database in 2021.  ***9.Extended comments***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

3LNO GROUNDFISH SURVEY-1st part (3NO)

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| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| 3LNO GROUNDFISH SURVEY 1st part (3NO)  **1. Objectives of the survey**  The main objectives of the survey were 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 and 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 in the most accurate way and continuing in the line of a higher taxonomic identification. * Sampling of stomach contents of the main species to continue the study of their trophic relationships.   Target species: Cod, Redfish, American plaice, Yellowtail flounder, Witch flounder, Thorny skate; White hake, Greenland halibut, Northern shrimp, Roughhead grenadier and Shortfinned squid.  **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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 35 days at sea including sailing days. In NAFO division 3L there are planned 26 days at sea including sailing days.  Figure 2  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Not applicable. Spain is the only participant. The vessel is Vizconde de Eza.  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| 3LNO GROUNDFISH SURVEY 1st part (3NO)  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  Fig.2.a: Location of the hauls (blue) and CTD casts (red) obtained during the 1st part of “3LNO GROUNDFISH SURVEY – 2021” in the Grand Bank (NAFO Div. 3NO).  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  Not applicable. Spain is the only participant.  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators)***  The results of these surveys, including biomass indices with their errors and length distributions, as well as the calculated biomass based on conversion of length frequencies for Northern shrimp, Greenland halibut, American plaice, Atlantic cod, Yellowtail flounder, Redfish, Witch flounder, Roughhead grenadier, Thorny skate and White hake are presented and used by the stock evaluators to NAFO Scientific Council Research Documents. In addition, age distributions are presented for Greenland halibut and Atlantic cod. Also, results contribute to the preliminary identification of VMEs.  ***9.Extended comments.***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

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

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| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| 3LNO GROUNDFISH SURVEY 2nd part (3L)  **1. Objectives of the survey**  The main objectives of the survey were 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 and 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 in the most accurate way and continuing in the line of a higher taxonomic identification. * Sampling of stomach contents of the main species to continue the study of their trophic relationships.   Target species: Redfish, American plaice, Yellowtail flounder, Witch flounder, Thorny skate; Greenland halibut, Northern shrimp, Roughhead grenadier and Shortfinned squid.  **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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 35 days at sea including sailing days. In NAFO division 3L there are planned 26 days at sea including sailing days.  Figure 3  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Not applicable. Spain is the only participant. The vessel is Vizconde de Eza.  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| 3LNO GROUNDFISH SURVEY 2nd part (3L)  No survey was carried out in 2021. The survey was cancelled due to the COVID-19 restrictions for traveling.  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators)***  ***9.Extended comments.***  The logistic of the survey implies travelling to Canada to change the scientific team. As all the borders were closed or a 14 days quaretine was required, the survey had to be cancelled.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea-

IBTS 4th. Quarter

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| IBTS 4th. Quarter (8c y 9a north)  **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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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.  Figure 4  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Miguel Oliver; Portugal/Noruega  Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| IBTS 4th. Quarter (8c y 9a north)  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***    Fig.4.a: Map of the sampling hauls carried out during the survey IBTS 8c 9a 2021 (North Spanish shelf) and CTD stations performed).  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ICES. 2021. International Bottom Trawl Survey Working Group (IBTSWG). ICES Scientific Reports. volume 3, issue 69. <https://doi.org/10.17895/ices.pub.8219>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  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*), anglers (*Lophius budeggassa*, and *L. piscatorius*), and Norway lobster (*Nephrops norvegicus*) on the Iberian continental shelf. Moreover, survey data are provided 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.  These surveys are coordinated at IBTSWG group and all that group's recommendations are followed.  ***9.Extended comments.***  There was a time deviation from the initial planification because of a vessel (R/V Miguel Oliver) technical failure and the change of vessel (R/V Vizconde de Eza) during the second part of the survey.  In spite of continuing the restrictions created by the pandemic of the COVID-19, Northern Spanish Shelf Groundfish Survey was carried out without major problems, although participants were reduced and the objectives rearranged but all main tasks were fullfilled.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

IBTS 4th. Quarter

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| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| IBTS 4th. Quarter (9a south)  **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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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.  Figure 5  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Miguel Oliver; Portugal/Noruega  Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| IBTS 4th. Quarter (9a south)  No survey was carried out in 2021 because the ship had a breakdown.  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  -  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  -  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  -  ***9.Extended comments.***  The oceanographic vessel used to conduct the survey (R/V Miguel Oliver) had an engine problem that prevented the survey from being carried out. The ship breakdown, already appeared in the previous survey (IBTS 4th, quarter 8c,9a), could not be repaired on time. IEO tried to get another vessel to cover the sampling with no success.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

IBTS 4th. Quarter

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| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| IBTS 3th. Quarter. Porcupine groundfish survey  **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 (*Nephrops norvergicus*, *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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  The sampling design was random stratified with two geographical sectors (Northern and Southern) and three depth strata (> 300 m, 300 – 450 m and 450 - 800 m). Hauls allocation is proportional to the strata area following a buffered random sampling procedure).  Figure 6  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Viconde de Eza, Miguel Oliver; Portugal/Noruega  Relevant international planning group: IBTSWG-International Bottom Trawl survey Working Group of ICES  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| IBTS 3th. Quarter. Porcupine Groundfish survey  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***    Fig.6.a.: Geographic sectors used in the survey with hauls carried out in Porcupine Spanish ground fish survey and CTD stations performed in 2021.  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ICES. 2021. International Bottom Trawl Survey Working Group (IBTSWG). ICES Scientific Reports. volume 3, issue 69. <https://doi.org/10.17895/ices.pub.8219>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  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 WGCSE for the assessment of the Norway lobster (*Nephrops norvegicus*), 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*, *illex coindetii*).  ***9.Extended comments.***  In spite of the problems created by the pandemy and the COVID-19 disruption, Porcupine Groundifsh survey was carried out without major problems, appart the weather issues that were not worse than other years.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

MACKEREL / H. MACKEREL EGGS SURVEY

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| MACKEREL / H. MACKEREL EGGS SURVEY (triennial)-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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  WGMEGS Manual for the Mackerel and Horse Mackerel Egg Surveys (ICES, 2016a).   * 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) three sampler deployments are undertaken (in an east-west direction) in each 0.25° latitude by 1.0° longitude rectangle because of the proximity of the shelf edge to the coast. * The standard plankton samplers used in the survey are Bongo 40 (oblique tows). All of these samplers generally have temperature, salinity and depth probes (Seabird 37 CTD) 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.   Figure 7  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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  WGMEGS: Working Group on Mackerel and Horse Mackerel Egg Surveys  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| MACKEREL / H. MACKEREL EGGS SURVEY (triennial)-CAREVA  **No survey was carried out in 2020. This survey is triennial. Last survey was carried out in 2019 and the next survey will be carried out in 2022.**  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  ***9.Extended comments.***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

MACKEREL / H. MACKEREL EGGS SURVEY

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| MACKEREL / H. MACKEREL EGGS SURVEY (triennial)-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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  WGMEGS Manual for the Mackerel and Horse Mackerel Egg Surveys (ICES, 2016a).   * 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) three sampler deployments are undertaken (in an east-west direction) in each 0.25° latitude by 1.0° longitude rectangle because of the proximity of the shelf edge to the coast. * The standard plankton samplers used in the survey are Bongo 40 (oblique tows). All of these samplers generally have temperature, salinity and depth probes (Seabird 37 CTD) 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.   Figure 8  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| MACKEREL / H. MACKEREL EGGS SURVEY (triennial)-JUREVA  **No survey was carried out in 2020. This survey is triennial. Last survey was carried out in 2019 and the next survey will be carried out in 2022.**  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  ***9.Extended comments.***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

MACKEREL / H. MACKEREL EGGS SURVEY

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| MACKEREL / H. MACKEREL EGGS SURVEY (triennial)-AZTI  **1. Objectives of the survey**  The main objective of Mackerel and Horse Mackerel Egg Survey (AZTI) is to relate the number of freshly spawned eggs found in the water column to the number of females having spawned these eggs. With the estimated fecundity of the females, this provides an estimate of the spawning-stock biomass.  **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  Details of methods used during the survey can be consulted at: Manual of the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3. The working group on Mackerel and horse mackerel egg surveys. SISP 6-MEGS V1.3.62 pp.  <http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%206%20-%20MEGS%20V1.3.pdf>  The standard plankton net used in the ICES triennial egg surveys by AZTI is the Bongo 40. The procedures used in these surveys are described in detail the manual of surveys (see below). On completion of the hauls, plankton was preserved in a 4% buffered formaldehyde solution. At sea, fish eggs from plankton samples are sorted out- Once at lab, eggs are identified (Mackerel and horse mackerel species) and staged.  Adult samples of mackerel are captured using pelagic trawls at those areas where the presence of eggs is positive.  Figure 9  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  AZTI participates covering the Cantabrian sea and Bay of Biscay areas in 2 periods, period 3 (March-April) and period 5 (May). During the last years, the surveys were executed on board the B/O Ramon Margalef and B/O Enma Bardan. The survey coordinator for survey will be Brendan O’ Hea, MI, Galway, Ireland  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| MACKEREL / H. MACKEREL EGGS SURVEY (triennial)-AZTI  **No survey was carried out in 2020. This survey is triennial. Last survey was carried out in 2019 and the next survey will be carried out in 2022.**  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  ***9.Extended comments.***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

SARDINE, ANCHOVY, H. MACKEREL ACOUSTIC SURVEY

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| SARDINE, ANCHOVY, H. MACKEREL ACOUSTIC 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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  Survey design and strategies are described at ICES Cooperative Research Report No. 332. 268 pp. <https://doi.org/10.17895/ices.pub.4599>. 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.  Figure 10  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| SARDINE, ANCHOVY, H. MACKEREL ACOUSTIC SURVEY (PELACUS)  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  https://lh5.googleusercontent.com/xfJ3aO5R8Y9IAjiz2CrBnMD2uO0wpPjnVOZKrxMu-OGKqqpH9wGld6fO2SnMLrs2nMj6ROyejIkrrRBmqFK14T8gjepxJZaw2cxOs_ccNsR3Ml0crsxsolWVG8MbN5Ish1URtuI  Fig. 10 a: Acoustic tracks PELACUS 0321  https://lh5.googleusercontent.com/jLMNZ4CN8qX1zWt-ZdJRPtx6TjEEiTre8P5siD1JLs92iniOOY7VugO65EqeD-DAfO7tLY9MavedLVxUu6AdQuLb3JD9gPuuDnI0GRfMDEsrywRPxvkljw2HHdptVrnuKnjDfEc  Fig. 10 b: Fishing stations PELACUS 0321  https://lh6.googleusercontent.com/wPJivDoX0B5v8D7PpAV7oASz654Ox-N1yKzKXFnS4sFj0pszjWeaRKp9SrNqOmpkB9qQ6WK9wHBIxRPGycl9UaWOtutSo1VjWpD5iUg42qfEewiczxEcV8lS-22NpPNxH37a7Cg  Fig. 10 c: Combined Bongo+CTD stations PELACUS  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  The Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9 (WGACEGG) coordinates this survey. The latest meeting report is available at <https://doi.org/10.17895/ices.pub.8234>.  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  This suvey is providing a series of both quantitative and qualitative indices for several fish species.  Acoustic estimates of sardine in 8c and 9a is using as independent fishery index at the assessment model, while that for anchovy in 9a is using as survey index at the qualitative trends analysis for assessment purposes. For horse makerel, abundance estimates in 8c is used as survey index for the Western Stock assessment model  Information obtained from sardine, anchovy and mackerel egg underway distribution is used as a proxy of the potential spawning area. The survey is also achieving relevant information for blue whiting, mackerel and boarfish (acoustic estimates and distribution) for the ICES WGWIDE in 9a and 8c ICES Divisions.  ***9.Extended comments.***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

Sardine DEPM

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| Sardine DEPM (SAREVA)  1. Objectives of the survey   * Estimation of the spawning stock biomass of sardine (*Sardina pilchardus*) based on the application Method of Daily Egg Production (DEPM). * Sardine Spawning area estimation. * Estimation Daily egg production estimation of sardine. * Determine the egg distribution area and density of other commercial species (hake, mackerel, horse mackerel, etc. * Characterise the main oceanographic conditions of the surveyed area.   2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)  Survey methodology is described in ICES 2011. Report of the Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas VIII and IX (WGACEGG), 22-26 November 2010, . ICES CM 2010/SSGESST:24. 210 pp.  SAREVA survey consisted of ichthyoplankton, hydrographic and adults sampling. Plankton samplers, PairoVET and CUFES (Continuous Underway Fish Egg Sampler, Checkley et al. 1997) are used on a survey grid consisting of fixed transects perpendicular to the coast and spaced 8 nm. 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..   * PairoVET net (150 µm mesh size) collects eggs through the water column every 3 nm in the inner shelf (up to 200 m depth) and every 3 or 6 nm beyond the inner shelf. The PairoVET sampling covered the water column from 100 m depth to the surface. * 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. CUFES samples are taken every 3 nm throughout the transects * CTD profiles are obtained in each PairolVET station. A thermosalinometer and fluorometer sensors continuously register temperature, salinity and fluorescence at 5 m depth on the transects. * Fishing hauls are undertaken for the estimation of the adult parameters (sex ratio, female weight, batch fecundity and spawning fraction) and are conducted by pelagic trawling following the species schools detection by the echo-sounder. Adults sampling were undertaken from PELACUS acoustic survey which was carried out concurrently with SAREVA   Figure 11  3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey  Spain/RV, Ramon Margalef; RV. Miguel Oliver, Portugal/Noruega  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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used  Not applicable  5. Explain where thresholds apply  Not applicable  *(max 450 words per survey)* |
| Sardine DEPM (SAREVA)  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  Fig.11.a. Sampling intensity in the study area (CalVET and CTDs).  D:\Usuarios\pdiaz\Documents\Ictio PN\SAREVA0321\ESTIMAS\Mapas finales\Fishing hauls.jpg Fig.11.b. Spatial distribution of fishing hauls with sardine presence undertaken from PELACUS acoustic survey which was carried out concurrently with SAREVA).  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic:  https://www.ices.dk/community/groups/Pages/WGACEGG.aspx  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  Results of the Sardine DEPM for estimation of sardine (*Sardina pilchardus)* spawning biomass within the Atlanto-Iberian stock area (pil.27.8c9a) is used in the assessment such as fishery independent index for the sardine stockpil.27.8c9a (ICES divisions 8.c and 9.a -Cantabrian Sea and Atlantic Iberian waters). The assessment model used also includes acoustic survey index and catch data from Spain and Portugal surveys.  The survey also provides:   * Anchovy, mackerel and horse mackerel egg abundances from PairoVET and CUFES samples. * CTD profiles stored in international database   ***9.Extended comments.***  The Sardine DEPM (SAREVA) survey, planned in 2020, was cancelled few days before its planned start in March due to the COVID-19 and the subsequent state of alarm lockdown in Spain. The survey was postponed to 2021.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

BIOMAN

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| BIOMAN  **1. Objectives of the survey**   * To estimate annually the total biomass of anchovy in the Bay of Biscay applying the DEPM, the age structure of the population (numbers, percentage, weight and length by age) and the spatial distribution of the specie. These estimates are used for the assessment and posterior management of this stock. * To obtain triennially (2020) the sardine spawning stock biomass in 8abd (45ºN to 48ºN) applying the DEPM, to contribute to the triennial estimates. * To obtain the total egg production for sardine in 8abd. These estimates are used for the survey trends-based assessment of this stock. * Biological characterization of the species, spawning area delimitation of anchovy and sardine in the Bay of Biscay. * Hydrological conditions of the prospected 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 litters and human activities. * Collection of water samples for eDNA.   **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  The DEPM is applying following the protocol accorded at WGACEGG. In (ICES -Cooperative Research Report 332).  <http://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/CRR%20332.pdf>  Coverage: southeast of the Bay of Biscay (anchovy main spawning area).  Sampling strategy: adaptive. The survey starts from the West, looking for the western limit of the spawning, and continue to the north to find the Northern limit of the spawning. 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 to delimit the spawning area of the species.  Sample depth, temperature, salinity and fluorescence profiles are obtained at each sampling station using a CTD coupled to the PairoVET.  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.  Figure 12  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Spain/Viconde de Eza, Ramon Margalef; Portugal/Noruega  WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| BIOMAN  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***    Fig.12.a: Distribution of anchovy egg abundances (eggs per 0.1m2) obtained with PairoVET (left) and CUFES (right) (eggs per m3) from the DEPM survey BIOMAN2021. A CTD is performance with each vertical plankton haul. Circles represent the stations performed but no anchovy eggs were encountered in them.    Fig.12.b Distribution of sardine egg abundances (eggs per 0.1m2) obtained with PairoVET (left) and CUFES (right) (eggs per m3) from the DEPM survey BIOMAN2021. A CTD is performance with each vertical plankton haul. Crosses represent the station performed but no sardine eggs were encountered in them.    Fig.12.c: Distribution and species composition of the positive fishing hauls during BIOMAN 2021 survey    Fig.12.d: Anchovy size (left) and spatial age composition (right) per haul in BIOMAN 2021.    Fig12.e: Anchovy(left) and sardine(right) spatial age composition per haul during BIOMAN 2021    Fig.12.f: Sea Surface Temperature (left) and Sea Surface Salinity (right) maps, overlapped with anchovy egg distribution 2021.  Diagrama  Descripción generada automáticamente con confianza baja  Fig.12.g: Distribution and abundance of common dolphins (left) and northern gannet (right), the most abundant marine mammal and seabird respectively in 2021. Grey points represent the effort while the size of the circles is proportional to observed abundances. Blue background lines represent the bathymetry. Abundance of other marine mammals, sea birds and human activities are showed in the survey report (link below).  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  Relevant international planning group: WGACEGG: Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic. Link to de last meeting report: <https://doi.org/10.17895/ices.pub.8234>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  This survey provides input to the assessment working group on horse mackerel, anchovy and sardine (WGHANSA):   * Anchovy spawning biomass (this equals total stock biomass since all anchovies are mature in spring) and and biomass-at-age estimates in ICES 8abcd that are used yearly in the assessment of anchovy for the international catch advice in ICES 8abcd.. * Sardine egg abundance estimated that is used yearly for the trends-based assessment for the international advice in ICES 8abd   Moreover:   * Size of all the species catched on the trawl hauls as an environmental indicator * The CTD profiles are send to an international database * Data on marine mammals and seabirds are in a common inernational database   ***9.Extended comments.***  Tables 1G and 1H: Other objectives were added to the survey since 2016: to obtain other indicators of the MSFD as sardine total biomass and biomass at age for ICES 8abd, microplastic abundances, marine mammals and sea bird abundances, human activities and marine litter abundances. eDNA to identify marine mammals and fish. This objetive was not in the planification in the original national plan (2017).  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

MEDITS

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| MEDITS (Mediterranean International bottom trawl survey)  **1. Objectives of the survey**  Since the article 12 of the Council Regulation (EC) Nº 199/2008, of 25 February 2008, concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy, the main objective of the research surveys at sea 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. The specific objectives of MEDITS surveys are:   * To get standardized indices of abundance and biomass of demersal species distributed in the circalittoral and batial soft bottoms of the Mediterranean * To know the geographic and bathymetric distribution of these species. * To describe the demographic structure of their populations. * To collect biological data of the target species for fisheries. * To get physical-chemical parameters (e.g. temperature and salinity) of the water masses where communities and demersal resources are distributed.   **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  The MEDITS survey is carried out along the Spanish Mediterranean coast: Geographical sub-areas GSA01 (Northern Alboran Sea), GSA02 (Alboran Island), GSA05 (Balearic Islands) and GSA06 (Northern Spain) of the General Fisheries Commission for the Mediterranean (GFCM). See map below.  MEDITS_GSA_WORK_PLAN_2.jpgFigure 13  According to MEDITS protocol, the hauls are positioned applying a stratified sampling scheme with random drawing of the positions within each stratum. The stratification parameter adopted is the depth with the following bathymetric limits: 10, 50, 100, 200, 500 and 800 m. The duration of the hauls is fixed to 30 minutes on depth less than 200 m and 60 minutes on more than 200 m. The hauls are performed only during daylight.  The survey is carried out in April-June (around 55 days), on board the research vessel "Miguel Oliver" (70 meters long, 14 meters wide, 2495 TRB and 2000 KW). The gear (GOC-73) is a bottom trawl designed for experimental fishing, with a cod-end mesh size of 20 mm. A SCANMAR 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.  The data are stored in the IEO database SIRENO. Five file types are defined in order to store and exchange the data:   * Type A: Characteristics of haul. This file includes the data on bottom temperature and stratification * Type B: Catches by haul * Type C: Length, sex, and maturity at aggregated level * Type E: Age weight and maturity by length at individual level * Type L: Collection of marine litter data. According to the current common protocol, the collection of these data is voluntary.   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 Antoni Quetglas (IEO Baleares) for GSA05.  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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\_v8.  [www.sibm.it/MEDITS%202011/principaleprogramme.htm](http://www.sibm.it/MEDITS%202011/principaleprogramme.htm)  The international coordination of the survey is carried out during the annual “MEDITS coordination meeting”.  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| MEDITS (Mediterranean International bottom trawl survey)  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  D:\Feines\EVADEMED\Campanyes\MEDITS_2022\Mapa_Campanya_Estacions_MEDITS_2021.jpg  Fig.13.a : Map with the sampling positions during the MEDITS\_survey 2021  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  <http://www.sibm.it/MEDITS%202011/principale%20project.htm>.  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  Standardised data obtained has been used for tuning assessments models XSA (Extended Survivors Analysis) and a4a (Statistical cath at age) developed by IEO within the framework of GFCM working group for demersal stock assessment, for the most important species exploited by the bottom trawl fishery along the Iberian Peninsula (mainly GSA 6) and the Balearic Islands (GSA 5). MEDITS data and samples are also used for scientific papers, PhDs and Master Theses, as well as in several project funded at regional, national and European level.  Number and weight of all species or taxons captured during the survey and mean yields of most abundant species were estimated. Sheets including mean standardized abundance and biomass and length frequency distribution of these species were also prepared from MEDITS data during 2021. This information is part of the National Reports (see below) and the Outline Reports, presented to the Secretaría General de Pesca (National Authority of the Data Collection Framework) and the annual MEDITS coordination meeting, respectively:   * García-Ruiz C., E. López & J.M. Serna.- 2021. Informe campaña MEDITS\_ES\_2105. GSAs 1 y 2. Instituto Español de Oceanografía, 73 pp. * Esteban A.- 2021. Informe de la campaña MEDITS\_ES\_0521. GSA 6. Instituto Español de Oceanografía, 58 pp. * Ordines F., M. Farré, S. Joher, M.T. Farriols, M. Valls, E. Massutí & B. Guijarro.- 2021. Informe Campaña MEDITS\_ES\_2021. GSA 5 (3ª parte). Instituto Español de Oceanografía, 35 pp.   ***9.Extended comments.***  During 2021, the Spanish MEDITS survey was carried out from 26 April to 24 June (60 days), on board the R/V *Miguel Oliver* (70x14.4 m, 2495 GT and 2000 kW), between 30 and 800 m depth, covering the GSA 1 (Northern Alboran Sea), the GSA 2 (Alboran Island), the GSA5E (Mallorca-Menora in the Balearic Islands) and GSA 6 (Northern Spain). The sampling stations followed a stratified scheme by GSA and the bathymetric strata: 30-50, 51-100, 101-200, 201-500 and 501-800 m. A total of 236 bottom trawls (60 in GSA 1, 8 in GSA 2, 62 in GSA 5E and 106 in GSA 6) were performed by several scientific teams of the Instituto Español de Oceanografía (IEO), following the MEDITS protocol. Two of these stations in GSA 5E were considered nul.  From 17 to 26 August 2021 (10 days), a second MEDITS survey was developed on board R/V *Miguel Oliver* and 34 hauls were performed in GSA 5W (Ibiza-Formentera in the Balearic Islands), following the same protocol. The following two tables show some figures summarizing data and samples collected on board   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | GSA | Total catches | | Number of species/taxa identified | | | | | Individuals\* | Weight (kg) | Fishes | Crustaceans | Molluscs | Other invertebrates and Algae | | 1 | 412598 | 7399 | 138 | 65 | 60 | 81 | | 2 | 42323 | 1967 | 56 | 32 | 33 | 32 | | 5E | 321042 | 8945 | 154 | 58 | 49 | 223 | | 5W | 177615 | 4140 | 122 | 47 | 47 | 178 | | 6 | 1260767 | 7691 | 157 | 82 | 65 | 101 |   (\*) Not including algae and some colonial species.   |  |  |  |  | | --- | --- | --- | --- | | GSA | Number of individuls/samples | | | | Length frequency sampling | Biological sampling | Otoliths and Illicia | | 1&2 | 47340 | 10635 | 696 | | 5E | 30917 | 10273 | 631 | | 5W | 22644 | 6768 | 352 | | 6 | 66245 | 15281 | 942 |   *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

MEDIAS

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| MEDIAS (Mediterranean International Acoustic Survey)  **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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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 EK60 (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.  National coordinator of the survey is Magdalena Iglesias (IEO-C.O. de Baleares).  Figure 14  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Participating Member States: France, Italy, Greece, Slovenia, Malta, Croatia and Spain/ RV. Miguel Oliver.  The international coordination of the survey is carried out in the “MEDIAS coordination meeting”.  <http://www.medias-project.eu/medias/website/>  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| MEDIAS (Mediterranean International Acoustic Survey)  MEDIAS survey could not be carried out due to a serious problem with the electrical system on the ship  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  <http://www.medias-project.eu/medias/website/>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  Standardised data obtained over the years of the ECOMED and MEDIAS surveys are used for tuning assessments models developed by IEO 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  ***9.Extended comments.***  There were problems with the electrical system on the ship (R/V Miguel Oliver) that affected the echosounder-sistem. Although part of the survey have been carried out, the data could not be used due to the failure of the acoustic echosounder.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

Anchovy DEPM-BOCADEVA

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| Anchovy DEPM-BOCADEVA  **1. Objectives of the survey**   * The main objective of BOCADEVA survey 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 * characterize oceanographic and meteorological conditions in the study area during the survey.   **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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).  ESTACIONES_BOCADEVA0714.pngFigure 15  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Spain/RV Ramon Margalef; Portugal/Noruega  WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| Anchovy DEPM-BOCADEVA  **No survey was carried out in 2021. This survey is triennial. Last survey was carried out in 2020 and the next survey will be carried out in 2023.**  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  ***9.Extended comments****.*  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

ECOCADIZ

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| ECOCADIZ  **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 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 apply the Daily Egg Production Method to Gulf of Cadiz anchovy.   **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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). 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. 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.  Figure 16  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Spain/Miguel Oliver;  WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas VII, VIII and IX  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| ECOCADIZ  No survey was carried out in 2021 because the ship had a breakdown and could not be repaired in time.  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  -  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  -  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  -  ***9.Extended comments.***  The oceanographic vessel used to conduct the survey (R/V Miguel Oliver) has a problem with the electrical system that affected the echosounder-system and prevented the survey from being carried out. This electrical problem already appeared in the previous survey (MEDIAS) could not be repaired in time The IEO tried to get another vessel to cover the sampling with no success.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

ECOCADIZ-RECLUTAS

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| 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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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, 200 and 333 kHz; ICES CRR 332, Massé et al., 2018). Since 2018 on, the EK-60 echosounder has been 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. 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.  Figure 17  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  Spain/ RVRamon Margalef,  WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| ECOCADIZ-RECLUTAS  **4.*Graphical representation (map) showing the positions (locations) of the realized samples***  Z:\PEQUEPEL\CAMPANAS\ECOCADIZ-R-2021\DATOS\INFORME_CAMPANA\MAPAS\ECOR2021_RADIALES.pngFig.17.a: Acoustic transects sampled  Z:\PEQUEPEL\CAMPANAS\ECOCADIZ-R-2021\DATOS\INFORME_CAMPANA\MAPAS\ECOR2021_HAULS.pngFig.17.b: Ground-truthing fishing hauls.  Z:\PEQUEPEL\CAMPANAS\ECOCADIZ-R-2021\DATOS\INFORME_CAMPANA\MAPAS\ECOR2021_CTD.pngFig.17.c. CTD-LADCP stations.  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  This survey is internationally coordinated and standardized within the frame of the ICES WGACEGG and follows the standardized protocols of the acoustic surveys coordinated within the above WG (Doray *et al.*, 2021). Such protocols are also discussed and updated in the WGACEEG groups. A final edited version of the WGACEGG 2021 report is not yet available in the ICES repository (library). A draft final version is neither yet available in the WG sharepoint. The last report available in the ICES repository corresponds to the surveys and meeting in 2020:  https://community.ices.dk/ExpertGroups/wgacegg/2020%20Meeting%20Documents/03.%20Report%202020/Report\_final/WGACEGG%20Report%202020.pdf  A working document containing the 2021 survey report (only preliminary information) is uploaded in the WGACEGG 2021 sharepoint:  https://community.ices.dk/ExpertGroups/wgacegg/2021%20Meeting%20Documents/04.%20Working%20documents/WD\_Ramos%20et%20al\_ECOCADIZ-RECLUTAS%202021-10\_WGACEGG%202021.pdf  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  Survey’s data and estimates are utilized in the ICES expert groups of both stock assessment of pelagic fish species (WGHANSA, WGWIDE) 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. Although the series is still short is expected that in a few years may be included in the respective stock assessments.  ***9.Extended comments.***  The current name of ICES WGACEGG is Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic.  ECOCADIZ and 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).  No duplication with other surveys.  At present there is no a relevant international database to upload the survey series data. 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. WGACEEG 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.  The initially planned target (in Table 1G) of CTD-LADCP stations (155 casts) was based on the usual number of CTD casts performed in most years (about 155-160 stations). 168 casts were performed in 2021. The number of casts performed in 2019 (181) and 2020 (178) was close to the extremely intensive sampling of 2014 and 2015 surveys (176 and 170 stations respectively).  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

IBTS 1st. Quarter

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| IBTS 1th. Quarter (9a south)  **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 invertebrate species * Collect data for the determination of biological parameters for selected species * Collect hydrographical and environmental information.   **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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.  Figure 18  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Miguel Oliver; Portugal/Noruega  Relevant international planning group: IBTSWG-International Bottom Trawl Survey Working Group of ICES  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| IBTS 1th. Quarter (IXa sur)  No survey was carried out in 2021 because the ship had a breakdown and could not be repaired in time.  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  -  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  -  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  -  ***9.Extended comments.***  The oceanographic vessel used to conduct the survey (R/V Miguel Oliver) had an engine problem that prevented the survey from being carried out. IEO tried to get another vessel to cover the sampling with no success.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

JUVENA

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| 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 include: * 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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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*."  Figure 19  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| JUVENA  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  Gráfico, Gráfico de dispersión  Descripción generada automáticamente  Fig.19.a: Species composition of the hauls (by descending order: anchovy, mackerel, horse mackerel, sprat, gelatinous, blue whiting, Mueller’s pearlside, hake, krill, others and sardine).  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  https://ices-library.figshare.com/articles/report/Working\_Group\_on\_Acoustic\_and\_Egg\_Surveys\_for\_small\_pelagic\_fish\_in\_NE\_Atlantic\_WGACEGG\_outputs\_from\_2020\_meeting\_/18618404  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  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.  ***9.Extended comments.***  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

PALPRO

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| 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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  The methodology is published in the report of WGDEEP 2016.  A modified commercial deep-water fishing gear adapted was used for the survey. The fishing gear is a two equal horizontal line sections of 1750 m +1750 m, each with 150 hooks (300 in total). Each hook was baited with 1/3 of mackerel.  The horizontal line was attached to the bottom with 1.5 kg stone each five hooks. To improve the catch efficiency of species that feed above the bottom, the stones of the horizontal line were removed in two “floating” sections of 75 + 75 hooks allowing these sections to get more buoyancy. The fishing gear was linked to the surface by two vertical lines and two buoys placed at the beginning and end of the horizontal line.  For the continuous recording of depth, temperature and salinity the long line was monitored with five small sensors DST centi and DST CTD able to withstand 2500 m depth. The survey areas 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  \\ssrfichero\rp$\Demersales\1_1_PROY_ACT\IM15PALPRO\4 MEMORIAS E INFORME\IMAGENES\mapa lances EMODnet.jpg\\ssrfichero\rp$\Demersales\1_1_PROY_ACT\IM15PALPRO\4 MEMORIAS E INFORME\IMAGENES\mapa Pais vasco.jpg  Figure 20  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  It is not an International coordinated survey  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| PALPRO  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  \\ssrfichero\rp$\Demersales\1_1_PROY_ACT\IM15PALPRO\4 MEMORIAS E INFORME\IMAGENES\mapa Pais vasco.jpg    Fig 20 a  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  Results of the surveys are available through of the annual report:  G. Díez, M. Basterretxea, l Oyarzabal, E. Cuende, A. Maceira, A. Abaroa, A. Pedrajas. 2021. Campaña de palangre de profundidad para la estima de abundancia de tiburones y otras especies en la Subdivisión ICES 8c (PALPROF 2021). Informe Interno de AZTI para Dirección de Pesca y Acuicultura, Dpto. de Desarrollo Económico y Competitividad, Eusko Jaurlaritza – Gobierno Vasco., 88 pp.  In 2021 it was presented a Working Document in the ICES WGEF summarising the first six years of the survey:  Diez, G., Basterretxea M., Cuende E., Oyarzabal, I., Pedrajas, A. Abundance, biomass and CPUE of deep-water sharks in the longline survey (PALPROF) in the Bay of Biscay (ICES 8c) from 2015 to 2020. Working Document presented to the Working Group on Elasmobranch Fishes. ICES WGEF, 15th – 24th, June 2021, WG On line. 10 pp.  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  Results of abundance and biomass index (kg (in 300 hooks)/min) as well as biodiversity information by depth strata have been used for a characterization of the deep-water fish fauna in the Basque Country continental slope.  The series of data have been presented and included in the Report of the ICES WGEF 2021 for the assessing 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 2021 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 ICES WGEF 2021 meeting.  ***9.Extended comments.***  A scientific publication was released after the survey:  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. <https://doi.org/10.1017/S0025315420001265>.  *(max 450 words per survey)* |

Text Box 1G: List of research surveys at sea

BFT index

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| 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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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.”*  BFT_iNDEX_radwaipoints Figure 21  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  The survey is coordinated by AZTI. Sscientists 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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| BFT index  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***    Fig.21.a: Left Panel: visited transects during the survey in 2015 to 2021.Right Panel: detections of bluefin tuna schools during the 2021 survey. Red dots: detections with vessel stopped. Blue dots: detections along the tracks of the vessel  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  *Goñi N, Uranga J, Arregui I, Martinez U, Rico I, Onandia I, Boyra G, Santiago J (2022). Datos independientes de pesquerías de atún rojo: EP BFT Index - índice acústico de juveniles de BFT en el Golfo de Vizcaya 2022. Informe Final para GOBIERNO VASCO, Departamento de Desarrollo Económico e Infraestructuras - Viceconsejería de Agricultura, Pesca y Políticas Alimentarias.*  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  The main use of the results of the survey is to build an acoustic-based, fishery-independent index to be used in the assessment of the Eastern Atlantic and Mediterranean bluefin tuna stock by ICCAT. The need for fishery-independent abundance indices is growing, in a context of highly altered fishing strategies following TAC reductions, and as in this region the only juvenile abundance index for bluefin tuna so far is based in baitboat catches, i.e. sensitive to tuna vertical distribution and feeding behavior. After gathering 7 years of survey (started in 2015) we hope to provide an abundance index for the stock assessment.  The results were presented in the bluefin species group of the SCRS species groups meetings in 2015, in the bluefin species group intersessional meeting in 2016, and in the bluefin species group of the SCRS species groups meetings in 2018 and 2019. Due to the shortess and different focus of the SCRS bluefin tuna group meeting in 2020, it was not presented at that occasion. Likewise, an analysis based on data collected during the BFT Index survey was submitted for presentation at the ICES Annual Science Conference, but this conference was postponed to 2021.  <https://www.iccat.int/Documents/CVSP/CV073_2017/n_6/CV073062044.pdf>  <https://www.iccat.int/Documents/CVSP/CV072_2016/n_7/CV07201862.pdf>  https://www.iccat.int/Documents/CVSP/CV075\_2018/n\_6/CV075061399.pdf  https://www.iccat.int/Documents/CVSP/CV076\_2019/n\_2/CV076020455.pdf  ***9.Extended comments.***  The summer 2021 was characterized by a similar abundance of bluefin tunas in the area compared to 2018 and 2019 but lower than 2020. Size measurement were made through the omnidirecctional high resolution sonar Simrad M3i, to complete sampling by fishing. An important aggregation of adult fish was detected in the survey transects, while only fish up to 3 years old were detected in the survey transects themselves, which underlines the patchiness of bluefin tuna spatial distribution. This observation gives a new perspective to interpret the absence or scarcity of certain age classes in some editions of the campaign: the most probable cause of their absence or scarcity is the spatial heterogeneity of the distribution of bluefin tuna.  (max 450 words per survey) |

Text Box 1G: List of research surveys at sea

ISUNEPCA\_TV Survey

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| ISUNEPCA\_TV Survey (Nephrops FU 30, Gulf of Cadiz, ICES 9a)  **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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  The UWTV 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 footages is 75 cm (FOV), which was confirmed using lasers.  Estaciones con isobatas.jpg Figure 22  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  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, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| ISUNEPCA\_TV Survey (Nephrops FU 30, Gulf of Cadiz, ICES 9a)  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  Estaciones realizadas con fondo.jpg  Fig.22.a: Map on the left represents the spatial distribution of the TV and CTD stations carried out during the survey. Red symbols represent stations considered null due poor or null visibility on the seabed once footages were analysed. Oceanographic data was obtained using a sledge mounted CTD.  ***7.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 ISUNEPCA TV survey. The link to access the 2021 report is not yet available. The following links corresponds to the 2019 and 2020 report. Survey in 2020 was not conducted due the pandemic.  <https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=36556>  <https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37541>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  The Nephrops abundance estimates obtained in ISUNEPCA TV survey 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). 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.  ***9.Extended comments.***  The UWTV survey in 2021 was carried out one month later in relation to the plan due to external issues (vessel requested by the Spanish government for a special mission considered urgent), which could have had an effect on the 2021 abundance estimates. Beam trawl hauls were not conducted in 2021 due the gear was not available for the date of the survey.  (max 450 words per survey) |

Text Box 1G: List of research surveys at sea

BLUE WHITING

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
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| BLUE WHITING  Introduction  For first time Spain (IEO) has joined the International Blue Whiting Spring Survey in 2018. In 2019 at the IBWSS post-meeting cruise held in Galway (April 2019) it was decided that WHB estimates from this survey be included in the final WHB estimates from IBWSS and used for assessment purposes.  For next year (2020) and intercalibration exercise between R/V Tridens and Miguel Oliver was planned.  Survey plan are included at the IPS withing SIPS no 9.  **1. Objectives of the survey**   * Biomass estimation by means of echointegration of the main pelagic fish population present in the surveyed area. * Physical, chemical and biological characterisation of the pelagic ecosystem.   **2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  Systematic grid with random start, tracks 30 nmi apart in the southern part, 20nmi in the northern part, 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”  Acoustic echosounder EK-60 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 with plankton nets).  Figure 23  **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**  The survey is coordinated by the ICES Working Group on International Pelagic Surveys (WGIPS) and performed in collaboration with research vessels from Ireland, Faroe Islands, Russia, and Norway  The blue whiting spawning stock estimate is used as a tuning index by ICES WGWIDE to determine the size of the population. The survey data (hydrographic, biological, & acoustic) are stored in the PGNAPES database.  Results from 2019 survey indicated that the area covered by R/V Miguel Oliver is a potential spawning area for blue whiting. Therefore this should be taken into account for assessment purposes.  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  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.  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| BLUE WHITING  **6.*Graphical representation (map) showing the positions (locations) of the realized samples***  https://lh3.googleusercontent.com/8FBKQol7WGE0i1x_zHqDY4vSktxfskeDppLjE11qophBYB5ZVEycSfJrPA8vk7NC5xB8JMHTmEH85-VlADGqU-2sH7yoa70N6-DRYeJ5WCaqDQ49kONjpFyRWV6kAg  Fig.23.1: Woking area of the Spanish IBWSS 2021 with the fishing and CTD stations.  https://lh3.googleusercontent.com/b0QDj9rYrocclfbnESvjWRYBbxVIO9tCKxOPzFJHpXdmsnFYrmMKXbChWLiXmY9Vbd1oDs9z-fAoTnsyPSL5bv1NdJQ19SxLsY05l3M3USILF9UcUytuJdXbeqm9mg  Fig.23.2 Blue whiting sA values in Porcupine Seabight IBWSS-0321.  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination***  The Working Group on International Pelagic Surveys (WGIPS) coordinates this survey. The hyperlink to the latest meeting report is:  <https://doi.org/10.17895/ices.pub.8055>  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  This suvey is giving a quantitative index off-core blue whiting spawning area and is also used for assessment purposes.  During the survey, effort was refined and adjusted by the survey coordinator (Norway) using real time observations.The mean results are biomass, abundance by length classes and ages classes indexes.  ***9.Extended comments.***  (max 450 words per survey) |

Text Box 1G: List of research surveys at sea

Tuna index in Balearic Sea (TUNIBAL)

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| *General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which reseach surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.* |
| *General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.* |
| Tuna index in Balearic Sea (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 * Calculate a fishery-independent abundance index for other tuna species in the Balearic Sea * Deepening knowledge about growth, trophic ecology (interactions predator prey) 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 methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)**  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.  Figure 24  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 and the relevant international group in charge of planning the survey**  The survey is coordinated by IEO (Patricia Reglero and Raul Laiz). Scientists from SOCIB (Spain), NOAA (USA) and University of Miami (USA) took part in some of the surveys and will be invited to participate. It is being discuss the possibility of conducting acoustic sampling of spawners in collaboration with ICCAT.  **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**  Not applicable  **5. Explain where thresholds apply**  Not applicable  *(max 450 words per survey)* |
| Tuna index in Balearic Sea (TUNIBAL)  This survey could not be conducted in 2021 because no vessel was available for the time of the survey.  **6.*Graphical representation (map) showing the positions (locations) of the realized samples.***  -  ***7.For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group***  -  ***8.List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).***  -  ***9.Extended comments.***  In the spring-summer of 2021 the oceanographic vessel used to conduct the larval survey was requested by the Spanish government for a special mission considered urgent. IEO tried to get another vessel to cover the sampling for the index with no success. Therefore, the TUNIBAL survey was not conducted during the spawning season of BFT and this will generate a data gap for 2021.  (max 450 words per survey) |

# Section 2: Fishing Activity Data

Text Box 2A: Fishing activity variables data collection strategy

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| *General comment: This box fulfills paragraph 4 of Chapter III of the multiannual Union programme and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of the Decision (EU) 2016/1701. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under Regulation (EU) No 1224/2009 or where data collected under Regulation (EU) No 1224/2009 are not at the right aggregation level for the intended scientific use.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the data collection of fishing activity variables of Member States.* |
| **1. Description of methodologies used to cross-validate the different sources of data.**  Fishing activity variables are collected under control regulation. The sources of data are: Fleet register, logboook, sales notes and VMS. All this information is integrated into the centralized database of the SGP and can be found with precision levels settled by the regulation.  Improvements are being made in the centralized database in order to develop consistency filters and query with data matching in order to detect errors or inconsistencies as established by Community law and as approved by the European Commission.  **Capacity**: The data regarding capacity are obtained from Operating Spanish Fleet Register which is part of Community vessel Register, in which all vessels included.  From a software application, the parameters of the vessels according to the disaggregation level required by the Regulations can be checked. In this sense, regarding gear data, they are obtained from national census where vessels are included or, alternatively, from data of fishing licences issued.  Automatic filters are being implemented in the database to check possible inconsistencies.  These census are updated any time a change occurs, so that the annual update of the data is guaranteed. This gives a total coverage of Spanish fleet vessels, including those less than 10 m.  **Effort:**   * for vessels of more than 10 meters, data come from Fleet Register, logbooks and positions provided by the VMS data (vessels exceeding 15 m.) * for vessels of up to 10 and 15m data are obtained from the logbooks. * For vessels less than 10 meters, the data for fleet segments and fishing gear are obtained from Fleet register and those derived from sale notes given that each note corresponds to a day of fishing in the fishing ground to which the vessel´s been operating.   The fleet census is updated any time a change occurs, so that the yearly update of the data is guaranteed. This gives a total coverage of the Spanish fleet vessels, including those less than 10 m length.  Sales notes are collected daily on all auctions by the autonomous regions authorities that process and integrate them into their databases so that there is a full coverage. Whith established frequency, the sales notes are forwarded to the SGP that incorporate the information into its central database, which guarantee the full coverage in all national territory.  Improvements are being made in the centralized database in order to develop consistency filters and query with data matching in order to detect errors or inconsistencies, as established by Community law and as approved by the European Commission.  **Landing:** Information on landings by vessels over 10 meters comes from the landing declarations.  In 2012 it began the gradual implementation of the system of "electronic logbook". With this system, incorporating data on catches and landing declarations to the database is immediate, thus speeding up the incorporoation of information. This system has been a major advance over manual recording of data done in ports. This manual recording has been relegated to those vessels that are not required to have this electronic logbook, although a logbook in paper format is mandatory.  These recordings represent just 5% of the total catches of the Spanish fleet.  For vessels less than 10 meters, these data are collected from sales notes.  The latter information, if necessary, can be obtained through the crossings of sales notes against the tables of fleet census where the fishing mode is recorded for each vessel.  The precision and disaggregation levels under the Regulation have been reached, however, the information of disaggregation level required by the regulations concerning the value of species landed obtained from surveys to collect economic data. These surveys are processed in the year following their collection and also the data obtained are not yet integrated into the SGP central database, so it cannot be done automatically with a cross-checking like other parameters required for this module.  **2. Description of methodologies used to estimate the value of landings.**  As explained above.  **3. Description of methodologies used to estimate the average price (it is recommended to use weighted averages, trip by trip)**  Sales notes provide this data.  **4. Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)**  Not applicable. All variables are covered by the methodology as explained.  *(max 900 words per Region)* |
| In Table 2A, two columns (“Variable Group” and “Variable”) have been added, as required in Guidelines (Commission implementing Decision (EU) 1283/2018). While in WP only the column “variable group” is required, in AR a new column “variable” have to be inserted to split the groups into their different variables.  ***5.Deviations from WP methodology used to cross-validate the different sources of data***  No deviations from the WP in 2021.  ***Actions to avoid deviations***  Not applicable  ***6.* *Deviations from WP methodologies used to estimate the value of landings***  No deviations from the WP in 2021.  ***Actions to avoid deviations***  Not applicable  ***7.Deviations from WP methodology used to estimate the average price (it is recommended to use weighted averages, trip by trip.***  No deviations from the WP in 2021.  ***Actions to avoid deviations***  Not applicable  ***8.Deviations from WP methodology used to plan collection of the complementary da***  No complementary data is collected.  ***Actions to avoid deviations***  Not applicable  *(max 900 words per Region)* |

# Section 3: Economic and Social Data

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

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| *General comment: This box fulfils paragraph 5 points (a) and (b) of Chapter III of the multiannual Union programme and Article 2, Article 4 paragraphs (1), (2) and (5) and Article 5 paragraph (2) of the Decision (EU) 2016/1701. It is intended to specify data to be collected under Tables 5(A) and 6 of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the fleet socio-economic data collection of Member States.* |
| **1. Description of methodologies used to choose the different sources of data**  The statistic operation Marine Fisheries Economic Survey includes pollsters who gather information directly in questionnaires designed ad hoc.  Due to the considerable population size, performing an annual census would be too expensive and is not considered appropriate. Therefore, stratified random sampling will be performed, using economic profitability of the statistical unit as main variable, and size (measured by GT) as auxiliary variable.  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.  **2. Description of methodologies used to choose the different types of data collection**  The data collection method is based on a stratified random sampling through a representative sample of the total population.  Data are collected by personal direct interview to the informers, including:   * daily contact between provincial and general coordinators * training agents in their province * preparation of materials * designing surveying routes * receiving filled-in questionnaires * inspection * submitting weekly to central offices all interviews conducted   The different phases of the work are listed below:   1. Sending covering letter 2. Location of phone numbers to make the first contact 3. First contact with companies 4. Conducting interviews 5. Detection of incidents   The survey questionnaire contains the following:   1. Identification of vessel’s owner - name, address, etc. 2. Detailed information of the vessel’s owner to set the economic and financial situation ashore of companies in the sector. 3. Vessel information. 4. Vessel’s Income Statement Account.   **3. Description of methodologies used to choose sampling frame and allocation scheme**  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 Regulation 199/2008, of the Council.  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.  **4. Description of methodologies used for estimation procedures**  Target variables will be estimated using the stratified random sampling method. From data included in questionnaires, variables with those population values which may be of interest will be built.  **5. Description of methodologies used on data quality**  Refer to table 5B for a detailed description of these methodologies.  If a survey unit is considered “Impossible to include in the survey”, the reason for not having that information available will be noted in order to improve the design phase of future surveys, and they will affect the frame of this survey in the corresponding percentage.  *(max 900 words per Region)* |
| ***6. Deviations from WP methodology for selection of data source***  Previously, stratified random sampling was carried out, using the economic profitability of the statistical unit as the main variable and the size (measured by GT) as an auxiliary variable.  Currently, stratified random sampling is carried out, using the economic profitability of the statistical unit as the main variable and for the calculation of the sample size, a combined or double-allocation method is used, between the minimum variance allocation of the GTs (75%) and the proportional allocation. (25%).  This type of sampling has been carried out because after analyzing the correlation of the results with the selected samples; it is better adjusted using a double allocation method than a simple allocation method.  ***Actions to avoid deviations***  *-*  ***7. Deviations from WP methodology to choose type of data collection***  No deviations.  ***Actions to avoid deviations***  Not applicable  ***8.Deviations from WP methodology to choose sampling frame and allocation scheme***  Stratified random sampling. The main variable of this survey is the economic profitability of the vessel, and the variables used for the stratification are the Supra-region, the fishing technique and the length.  Stratification: the surveyed population was divided into strata, according to the Supra-region variables, the fishing technique and the length, with the aim of obtaining groups of vessels as homogeneous as possible within the stratum and with the greatest possible heterogeneity among the different strata, in relation to the profitability of the vessels.  In addition to the abovementioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Decision 2019/910, (COMMISSION DELEGATED DECISION (EU) 2019/910 of 13 March 2019).  Strata cannot contain less than 10 elements: the strata not meeting this condition are grouped with others (Confidentiality reasons).  Sample size: for the calculation of the sample size, a combined or double allocation method is used, between the minimum variance allocation of the GT (75%) and the proportional allocation (25%), with an expected error of less than 5 %, that is, and for a 95% confidence level.  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 vessels 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.  ***Actions to avoid deviations***  -  ***9. Deviations from WP methodology used for estimation procedures***  No deviations  ***Actions to avoid deviations***  Not applicable  ***10.Quality assurance***  ***10.1 Sound methodology***  Quality guarantee  The statistics of the Ministry of Agriculture, Fisheries and Food are governed by principles that seek to ensure the quality and credibility of the data. These principles are included in the Code of Good Practice of European Statistics (CBP) and refer, among other aspects, to professional independence, protection of confidentiality, reliability of results, accuracy, timeliness, accessibility, clarity, comparability and coherence.  In this work, both in the process of collecting information and in the subsequent processes of data processing, there are established quality controls in continuous improvement.  There are several procedures to ensure the quality of the data transmitted.  • Controls made during the data loading process  • Controls carried out after the loading procedure  ***10.2. Accuracy and reliability***  Response rate and Achieved sample rate are provided in Table 3A.  Quality evaluation  The different processes executed are aimed at eliminating or reducing as much as possible the errors, both in the information collection phase and in the processing phase.  The processing of survey information coincides temporarily with field work and it is developed in parallel with the collection of information. Due to this coincidence in the time, a first cleaning of the information is carried out when analyzing the possible errors committed at the time of collection, which are corrected immediately so that they do not affect the rest of data collected.  Subsequently, after the recording of the information, a second cleaning of the information by establishing a series of control standards to guarantee a quality level of the data collected and recorded.  Before the tabulation of the results, the joint results and the consistency of them are analyzed.  The collected data is debugged by correcting possible inconsistencies of the same, once they are received and after having recorded them, it is again observed whether there are possible deviations from values at a global level and inconsistencies are corrected.  During the final debugging process, the detection and debugging of inconsistencies is carried out in the identification variables of the units, as well as the detection of content errors.  Considering the type of variables, in some cases, procedures are carried out data imputation to correct errors  ***10.3. Accessibility and Clarity***  *Indicate Yes or No*  *• Are methodological documents publicly available? \_\_*Yes*\_\_\_*  *• Are data stored in databases? \_\_*Yes*\_\_\_*  *• Where can methodological and other documentation be found? \_\_\_\_*  [http://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx](http://www.mapama.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx)  ***11. Additional explanation***  All possible strata have been included in the AR 2021, even those without elements from Spanish fleet.  (max 1000 words) |

# Section 3: Economic and Social Data

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

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| *General comment: This box fulfills paragraph 5 point (b) and paragraph 6 point (b) of Chapter III of the multiannual Union programme and Article 2 and Article 3 paragraph (3) point (c) of the Decision (EU) 2016/1701.It is intended to specify data to be collected under Table 6 of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).* |
| **Methodology and results obtained from the study**  The information on the social variables has been collected for previous years and no significant problems have been observed in the response of the respondents. In future exercises it is assumed that the same lack of problems will continue.  The data from the pilot study are collected together with the rest of the economic variables following the same sampling methodology. This methodology has been adapted to what was indicated by the different interlocutors, in relation to the intervals of the variables.  The variables included in the pilot study on social information are: employment by age, employment by level of education, employment by nationality and employment by employment status.  • **Employment by age**: information on the number of jobs by age and sex is collected, considering the following intervals:   * 16-24 * 25-39 * 40-64 * >= 65   • **Employment by level of education**: information on the number of jobs by level of education and sex is collected, considering the following categories:   1. Low (Level 0-2) 2. Medium (Level 3-4) 3. High (Level 5-7) 4. Unknown   • **Employment by nationality**: information on the number of jobs by nationality and sex is collected, the following categories are considered:   1. NAC. National 2. R.UE Rest of the EU 3. F.UE Outside the EU 4. Unknown   • **Employment by employment status**: information on the number of jobs by employment status and sex is collected, the following intervals are considered:   1. Employees Includes Employees, Family Aid and Cooperative members. 2. Owners: Includes Employers and Self-Employed Workers. 3. Unknown.   *(max 900 words)* |
| ***1. Achievement of the original expected outcomes of pilot study and justification if this was not the case***  The aim of this pilot study has been achieved as the information on social variables was collected with no significant problems in the response of the respondents during the period of the pilot study.  For this reason, in 2021 the data from the pilot study is collected together with the rest of the economic variables following the same sampling methodology. This methodology has been adapted to what was indicated by the different interlocutors, in relation to the intervals of the variables.  The variables included in the pilot study on social information are employment by age, employment by level of education, employment by nationality and employment by employment status.  ***2. Incorporation of results from pilot study into regular sampling by the MS***  In 2021 the data of these variables has been collected in a routine way together with the rest of the economic variables following the same sampling methodology.  *(max 900 words)* |

# Section 3: Economic and Social Data

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

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| *General comment: This box fulfills paragraph 6 points (a) and (b) of Chapter III of the multiannual Union programme and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of the Decision (EU) 2016/1701.It is intended to specify data to be collected under Tables 6 and 7 of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.* |
| **1. Description of methodologies used to choose the different sources of data**  The statistic operation Aquaculture Economic Survey includes pollers gathering information directly in questionnaires designed *ad hoc*.  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.  **2. Description of methodologies used to choose the different types of data collection**  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.  Data are collected by direct personal interview to informers, by:   * daily contact between provincial and general coordinators * training agents in their province * preparation of materials * designing surveying routes * receiving filled-in questionnaires * inspection * submitting weekly to central offices all interviews conducted   The different phases of the work are listed below:   1. Sending covering letter 2. Location of phone numbers to make the first contact 3. First contact with companies 4. Conducting interviews 5. Detection of incidents   The survey questionnaire contains the following:   1. Identification of the legal form of the establishment’s owner and the number of establishments under his ownership. 2. Description of the establishments 3. Income Statement Account of the establishments   **3. Description of methodologies used to choose sampling frame and allocation scheme**  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.  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.  Strata have been surveyed by census 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.  **4. Description of methodologies used for estimation procedures**  In the exhaustive survey there is an imputation method for those cases in which mandatory questions do not get a response within partially completed questionnaires.  **5. Description of methodologies used on data quality**  Refer to table 5B for a detailed description of these methodologies.  *(max 1000 words)* |
| Final stratification depends on activity undertook by aquaculture enterprises during 2021 and the number of them within each stratum. To comply with statistical confidentiality, some strata have been merged  ***6. Deviations from WP methodology for selection of data source***  No deviations  ***Actions to avoid deviations***  Not applicable  ***7. Deviations from WP methodology to choose type of data collection***  Stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Decision 2019/1910, (COMMISSION DELEGATED DECISION (EU) 2019/910 of 13 March 2019).  ***Actions to avoid deviations***  Not applicable  ***8.Deviations from WP methodology to choose sampling frame and allocation scheme***  No deviations  ***Actions to avoid deviations***  Not applicable  ***9. Deviations from WP methodology used for estimation procedures***  No deviations  ***Actions to avoid deviations***  Not applicable  ***10.Quality assurance***  ***10.1. Sound methodology***  Quality guarantee  The statistics of the Ministry of Agriculture, Fisheries and Food are governed by principles that seek to ensure the quality and credibility of the data. These principles are included in the Code of Good Practice of European Statistics (CBP) and refer, among other aspects, to professional independence, protection of confidentiality, reliability of results, accuracy, timeliness, timeliness, accessibility , clarity, comparability and coherence.  In this work, both in the process of collecting information and in the subsequent processes of data processing, there are established quality controls in continuous improvement.  There are several procedures to ensure the quality of the data transmitted.  • Controls made during the data loading process  • Controls carried out after the loading procedure.  ***10.2. Accuracy and reliability***  Quality evaluation  The different processes executed are aimed at eliminating or reducing as much as possible the errors, both in the information collection phase and in the processing phase.  The processing of survey information coincides temporarily with field work and it is developed in parallel with the collection of information. Due to this coincidence in the time, a first cleaning of the information is carried out when analyzing the possible errors committed at the time of collection, which are corrected immediately so that they do not affect the rest of data collected.  Subsequently, after the recording of the information, a second cleaning of the information by establishing a series of control standards to guarantee a quality level of the data collected and recorded.  Before the tabulation of the results, the joint results and the consistency of them are analyzed.  The collected data is debugged by correcting possible inconsistencies of the same, once they are received and after having recorded them, it is again observed whether there are posible deviations from values at a global level and inconsistencies are corrected.  During the final debugging process, the detection and debugging of inconsistencies is carried out in the identification variables of the units, as well as the detection of content errors.  Considering the type of variables, in some cases, procedures are carried out data imputation to correct errors.  ***10.3. Accessibility and Clarity***  *Indicate Yes or No*  *• Are methodological documents publicly available? \_\_*Yes*\_\_\_*  *• Are data stored in databases? \_\_*Yes*\_\_\_*  *• Where can methodological and other documentation be found? \_\_\_*  [https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/encuesta-economica-acuicultura/default.aspx](http://www.mapama.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/)  *(max 1000 words)* |

# Section 3: Economic and Social Data

Pilot Study 4: Environmental data on aquaculture

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| *General comment: This box fulfills paragraph 6 point (c) of Chapter III of the multiannual Union programme and Article 2 and Article 4 paragraph (3) point (d) of the Decision (EU) 2016/1701. It is intended to specify data to be collected under Table 8 of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).* |
| *1. Aim of pilot study*  No pilot study planned  The collection of this data is made by the competent authorities in the subject, which in the case of Spain are the Regional Authorities since it deals with Animal and Public Health. Besides, it is considered that no pilot should be carried out. It is mandatory to collect them by the legislation on the matters mentioned, and therefore, since it falls on domains which exceed the competence of the CFP, no specific recommendations from the Fisheries authorities should be made. Also, it is worthy to remind that one the legislative body is a Directive, which entails to the Member States the best possible way to incorporate to its own legislative corp  *2. Duration of pilot study*  *3. Methodology and expected outcomes of pilot study*  *(max 900 words)* |
| ***4. Achievement of the original expected outcomes of pilot study and justification if this was not the case.***  No pilot Study was planned for 2021.  ***5. Incorporation of results from pilot study into regular sampling by the Member State.***  The collection of this data is made by the competent authorities in the subject, which in the case of Spain are the Regional Authorities since it deals with Animal and Public Health. Besides, it is considered that no pilot should be carried out because it is mandatory to collect them by the legislation on the matters mentioned, and therefore, since it falls on domains which exceed the competence of the CFP, no specific recommendations from the Fisheries authorities should be made. Also, it is worthy to remind that one the legislative body is a Directive, which entails to the Member States the best possible way to incorporate to its own legislative corp.  *(max 900 words)* |

# Section 3: Economic and Social Data

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

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| *General comment: This box fulfils footnote 6 of paragraph 1.1(d) of Chapter III of the multiannual Union programme, Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of Decision (EU) 2016/1701. It is intended to specify data to be collected under Table 11 of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.* |
| **1. Description of methodologies used to choose the different sources of data**  Accomodation to EU legislation.  Two main aspects must be highlighted:   1. The survey is vertebrated following a multiple units model, in which, and according to EU legislation, the companies assume the main role. 2. With the purpose to adapt to European nomenclature of economic activities (NACE rev.2), the “*Industrial Companies Survey*” is articulated referring to sectorization, stratification and statistical infraestructe on the basis of the “*National Clasification of Economic Activities 2009*”   Approach to obtain the primary data.  The primary data are oriented to the informing unit, trying to compile the features or variables they may provide, either because they know them or because they are accessible in their documentation.  All of the above aim to:   * Adapt the main variables of the questionnaire to the criteria and guidelines of the new “General Account Plan”. * Utilisation of the different models of questionnaires depending on the size of the company and the different types of economic-finantial operations… all of them aspects that may hinder the homogeneous treatment of these units from the statistical point of view. To adjust the requested data (and according to its level of especification) to the intrinsic characteristics of each unit, different models of questionnaires have been designed depending on the features of each reporting company.   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.   **2. Description of methodologies used to choose the different types of data collection**  **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.   **3. Description of methodologies used to choose sampling frame and allocation scheme**  **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).  **4. Description of methodologies used for estimation procedures**  Unbiased expansion estimators have been utilised in the stratified sample.  **5. Description of methodologies used on data quality**  **IT processing of the sample file:** carried out by IT application that ensures the organization, continuous collection supervision, filtering and efficient control of the process since the beginning of the survery, with the detection of systematic mistakes of fullfillement and interpretation of the questionnaries during the initial phase, making it easier to correct them afterwards.  **Information processing**: carried out in a paralell to data collection itself; focusing on the continuous update process; refinement of the questionnaire content, integrated in the recording and treatment of the inter provincial management of the company (in particular, for companies located in different provinces).  *(max 1000 words)* |
| ***6. Deviations from WP methodology for selection of data source***  No deviations  ***Actions to avoid deviations***  Not applicable  ***7. Deviations from WP methodology to choose type of data collection***  No deviations  ***Actions to avoid deviations***  Not applicable  ***8.Deviations from WP methodology to choose sampling frame and allocation scheme***  No deviations  ***Actions to avoid deviations***  Not applicable  ***9. Deviations from WP methodology used for estimation procedures***  No deviations  ***Actions to avoid deviations***  Not applicable  ***10.Quality assurance***  ***10.1. Sound methodology***  The methodology of the Industrial survey can be found on the INE website.  The methodology published on the MAPA website is standardized with the different data sources in which the standards and good practice guidelines are documented.  The quality assurance framework for INE statistics is based on the ESSCoP, the Code of Good Practice of EUROSTAT European Statistics. The ESSCoP consists of 15 principles, grouped into three areas: Institutional Environment, Processes and Products. Each principle has associated a series of indicators that allow its measurement. To assess quality, different tools provided by EUROSTAT are used: the indicators already mentioned, the Self-assessment inspired by the DESAP model, the Peer Review, the user satisfaction surveys, and other evaluation procedures.  The methodology follows EU standards in relation to industrial surveys.  Based on the regulations 275/2010 of the Commission and 295/2008 of the European Parliament and the Council, the European Commission (EUROSTAT) assesses the quality of the data transmitted and publishes reports on the quality of European statistics.  ***10.2. Accuracy and reliability***  The sample design tries to minimize the sampling errors and the different processes of the survey are aimed at eliminating or reducing as much as possible the errors of the same, both in the collection phase (response rate and debugging control) and in the subsequent editing and imputation.  The collection procedure, coverage control, debugging of errors and imputation of the lack of response allows obtaining a high degree of reliability of the statistics.  Sampling errors of the main variables are calculated.  ***10.3. Accessibility and Clarity***  *Indicate Yes or No*  *• Are methodological documents publicly available? \_\_Yes\_\_\_*  *• Are data stored in databases? \_\_Yes\_\_\_*  *• Where can methodological and other documentation be found? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*  <http://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736143952&menu=ultiDatos&idp=1254735576715>  *(max 1000 words)* |

# Section 4: Sampling Strategy for Biological Data from Commercial Fisheries

Text Box 4A: Sampling plan description for biological data

North Sea (ICES IIIa, IV and VIId areas) and Eastern Arctic (ICES areas I, II)

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| *General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Decision (EU) 2016/1701 and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.* |
| **North Sea and Eastern Arctic**  Spain has only fisheries in Eastern Acrtic. All the sampling will be performed on commercial unsorted catches at sea by observers on board of fishing vessels that operate in international waters.  ***1. Sampling design***  There are two types of fisheries and the target population is stratified into two fleets:bottom trawlers targeted Cod (OTB\_DEF\_> = 120\_0\_0) and midwater trawlers targeted redfish (OTM\_DEF\_100-119\_0\_0).  Target population: is the total number of trips in a year carried out by the Spanish fleet targeting the stocks selected for sampling. The trips lasted from few days to 3 months and all vessels are over 40 m.  Sampling frame: is the list of vessels with license to fish in each fishery.  Primary Sampling Units (PSUs): are the individual fishing trip in a fishery. In a single trip one vessel can cover two o more fisheries and even different Areas and/or Regions.  Method of PSU selection: is a systematic non-random sampling (rotation) 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 license. The refusal rate in the last years is zero because the license is linked to the acceptance of scientific observer on board.  Sampling effort: is allocated according to the scientific experience gained from the study of fisheries in the area. The number of fishing trips and the number of individuals planned to be sampled were calculated based on data from previous years in order to keep the coverage from previous years and to cpmply the requirements of the end users.  Sampling procedures: the method to collect the length 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 on board collect data on unsorted catches and discards by species, efforts and positions The biological parameters (Weight, Age, Maturity) come from a sampling design stratified by length class. The Sex-ratio index is achieved at the same time of sampling of length which are randomly collected and not stratified.  ***2.Estimation procedures***  Estimation of discards and catches structure are carried out from data collected by observers on board. The data 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..  ***3.Data quality evaluation***  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 (outliers, trends, range of variables, dispersion).  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.  Quality controls like the following are 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.   Data storage: Sampling data are stored into own and SIRENO database: (Seguimiento Informático de los Recursos Naturales Oceánicos) which is managed by the IEO.  Documentation are currently at the preparation stage.A document compiled, about Sampling Design, Quality Checks and Processes to evaluate Data Accuracy will be ready and published in the period 2020-2021.  *(max 900 words per region)* |
| ***4. Deviations from Work Plan***  No deviations  ***5. Action to avoid deviations***  Not applicable.  *(max. 1000 words per region OR fishing ground)* |

# Section 4: Sampling Strategy for Biological Data from Commercial Fisheries

Text Box 4A: Sampling plan description for biological data

North Atlantic

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| *General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Decision (EU) 2016/1701 and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.* |
| **North Atlantic (ICES areas 12, 14 and NAFO areas)**  All the sampling will be performed on commercial unsorted catches at sea by observers on board of fishing vessels that operate in international waters.  ***1.Sampling design***  In ICES Subareas 12, 14 there are two types of fisheries and the target population is stratified into two fleets: Bottom trawlers targeting deep-sea species in ICES Division XIIb and VIb-Hatton Bank (OTB\_DWS\_100-129\_0\_0) and Midwater trawlers targeting Redfish and Grenadiers in ICES Subareas XII and XIV-Irminger Sea-(OTM\_DEF\_100-119\_0\_0). In ICES Subarea VI a new metier (OTM\_DEF\_32-69\_0\_0) targeting Blue Whiting has been included in the NWP 2020-2021.  In NAFO Regulatory Area (NRA), Spanish fleet carry out different fisheries characterized by different mesh size, target species, depth and fishing area:   * Botton trawlers targeting Greenland halibut in Div 3LMNO (OTB\_MDD\_130-219\_0\_0). * Botton trawlers targeting Skates in Div 3LNO (OTB\_MDD\_>=220\_0\_0). * Botton trawlers targeting Northern Shrimp in Div 3LMNO (OTB\_CRU\_40-59). 3LNO fishery is currently closed. 3M fishery will reopened in 2020. * Midwater trawlers targeting Alfonsino in Div 6G (OTM\_DEF\_130-135\_0\_0). Reason for change: see table 4C (column comments) * Bottom trawlers targeting Cephalopodos in Div 3O (OTB\_MOL\_60-89\_0\_0). New métier included in NWP 2020-2021   Target population, Sampling frame, Primary sampling units (PSUs), Method of PSU selection, Sampling effort, Sampling procedures (see NS&EA)  ***2.Estimation procedures (see NS&EA)***  ***3.Data quality evaluation (see NS&EA)***  **North Atlantic (ICES areas 6-9)**  ***1,2,3. Sampling design, Estimation procedures and Data quality evaluation***  **Sampling onshore (at market)**  Purpose: Estimate landings at length for all stocks  Target population: All fish landed in Spain by the Spanish fleet. This target population is divided in two subpopulations:   * IEO is in charge of all the landings performed in Spain excepting the Basque Country * AZTI is in charge of all the landings performed in the Basque Country   Stratification: The target population is stratified into 24 strata which are defined by mutually exclusive list of vessels (Table 4B). The temporal strata is the quarter, although equal monthly coverage is aimed.  Sampling frame, Primary sampling units (PSUs), Secondary sampling units (SSU), terciary sampling units (TSU) and protocol for the selection of samples: explained in table 4A for each strata  Distribution of sampling effort: Sampling effort is allocated according to information on fishing effort and catches in the previous year.  Implementation:  -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  **Sampling onboard**  Target population: All fish discarded by Spanish fleet. This target population is divided in two subpopulations:   * IEO is in charge of all the discards performed by Spanish vessels excepting the Basque Country * AZTI is in charge of all the discards performed by Basque vessels   Stratification: The target population is stratified into 11 strata which are defined by mutually exclusive list of vessels (Table 4B). The temporal strata is the quarter, although equal monthly coverage is aimed.  Sampling frame, Primary sampling units (PSUs), Secondary sampling units (SSU), and protocol for the selection of samples: explained in table 4A for each strata  Distribution of sampling effort: Sampling effort is allocated according to information on fishing effort and catches in the previous year.  Implementation:  -Refusals are recorded  -Expected difficulties: Refusal rate in PTB.  **General**  All data are stored in the IEO data base (SIRENO) and AZTI database.  Quality Assurance: Refusals are recorded. Automatic quality checks are applied when entering the data in the DataBase. Outliers are checked.  Documentation of raising/weighting procedure for national estimates: Sampling data is extrapolated to the whole population in each domain (usually stock\*metier\*quarter).   * For length distributions of the landings, the landed weight is used as raising factor and empty cells are filled using the nearest neibourgh criteria. * For catch (retained and discarded) estimates , the total effort by metiers is used as raising factor.   *(max 900 words per region)* |
| **North Atlantic (ICES areas XII, XIV and NAFO areas)**  ***4. Deviations from Work Plan***  Results lower than planning:  ID code: L2 (33% achievement, 1 trip out of 3 planned). The reason for this deviation was the lack of effort in pelagic fisheries of ICES Subareas 12, 14 & 6.  ID code: L3 (89% achievement, 8 trips out of 9 planned). The reason for this deviation was the lack of effort in ICES Division XIIb and VIb-Hatton Bank (OTB\_DWS\_100-129\_0\_0).  ID code: L4 (0 % achievement, 0 trips out of 1 planned). The reason for this deviation was the ban on fishing force in NAFO Div. 6G.  ***5.Actions to avoid deviations***  Although the behavior of the fleet is unpredictable and impossible to change, IEO will continue in improving coordination with the sectors involved: owners and administration authorities.  **North Atlantic ICES VI, VII (excl. VIId), VIII, IX**  ***4. Deviations from Work Plan***  Results **lower** than planning: all deviations explained in Table 4A.  IEO: The deviations from the work plan was the number of on-shore and at-sea PSU sampled due to the decline in the gillnets GNS\_DEF\_>=100\_0\_0 targeting anglerfish and hake in North Iberian waters (Divison VIIIc and North of IXa), and the increase of refusals in the Gulf of Cádiz.  AZTI: All deviations are explained in Table 4A. In general, when the planned sampling effort could not be completed for a fleet, we tried to redirect the effort to other fleets  ***5. Action to avoid deviations***  IEO: Actions to avoid deviations include the rules to adapt the sampling when fisheries dynamics, new regulations or problems appear (fishing closures, etc) and then redistribute the effort within the specific temporal-technical stratification. Only when this is not possible, sampling team redirect the sampling effort to another stratum to avoid the lost of resources allocated for sampling. These actions, which are understood as a positive action under the quality assurance framework in place, avoid a perfect match of final results with original planning.  Limited space available on board in some fleets it is also a recurrent issue with a difficult solution.  For some fleets it difficult to know in advance the date of arrival and this makes the implementation of the sampling plan more difficult.  Work to try to minimize refusals is in place. At the moment refusals are recorded to assess bias.  AZTI: the sampling effort which could not be apliied to certain fleets because of implementation issues, was redirected to other fleets. Work is in progress since a long time to try to minimize refusals, but for some fleets it is hard to achieve improvements. At the moment refusals are recorded to assess bias. Limited space available on board in some fleets it is also a recurrent issue with a difficult solution. In addition, this year we needed to increase the sampling at sea for the pair trawlers, in order to reach a better sampling of PETs in this fleet, as a consequence, the sampling at sea of other fleets needed to be adjusted.  *(max. 1000 words per region OR fishing ground)* |

# Section 4: Sampling Strategy for Biological Data from Commercial Fisheries

Text Box 4A: Sampling plan description for biological data

Medierranean and Black Sea

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| *General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Decision (EU) 2016/1701 and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.* |
| **Mediterranean and Black Sea**  Spain has no fisheries in Black Sea  The length of the coast of the Spanish Mediterranean, including Majorca and Menorca (Balearic Islands) is about 2200 km. There are 2578 vessels distributed in 71 ports. Most of them (60 ports) have regular auctions. Sampling staff are dispersed at several locations around the coast to reduce travelling time. In general the different fisheries (otter trawls, purse seines, artisanal fleet...) are widely distributed along the coast. There is a complete vessel registry and census data for landings, effort, gear, etc. as required by EU logbooks and sales notes.  ***1,2,3. Sampling design, Estimation procedures and Data quality evaluation***  The sampling design in the Spanish Mediterranean is done at the métier level (level 5), for those métiers selected by the ranking system, as state in the GFCM-DCRF Regulation. This ranking system is performed for each Geographical Sub-Area. 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). For the proposed sampling schemes, it is possible to calculate estimates of the precision of the estimators of the population parameters.  Both for at-sea sampling and on-shore sampling, four different strata area 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 (both predisposition and adequate facilities) . Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.  The new survey design has the following features:  **At-sea sampling:**  The sampling frame is the list of vessel for each GSA, métier and selected ports, with vessel as primary sampling unit (PSU).   * The sampling effort (number of trips to sample) is distributed across strata (GSA, métier and ports) based on the fishing effort in the previous years (days at sea = trips). * The list of vessel which operated in each GSA, métier and ports in the previous year would be available. * The list of vessels will be randomly ordered in each sampling period (month/quarter) 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.   **On-shore sampling:**  **a-. GSAs 1, 6 and 7.** For these GSAs, the primary sampling unit (PSU) is the combination port\*vessel:   * The sampling effort (number of trips to sample) is distributed across strata (GSA, métier and selected ports) based on the fishing effort in the previous years (days at sea = trips). * 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…). * Results of the contact (vessel sampled, refusal and reasons for refusals) will be tracked. * All catches landed will be concurrently sampled.   **b-. GSA 5**. For this GSA, the PSU is vessel:  In Mallorca, catches from all ports are sent to a unique market in the capital (Palma de Mallorca). The sampling frame is the list of vessels from the island which worked in the selected métier during that fishing trip. The vessel/s to sample would be randomly selected. No refusals are expected in this case. If necessary, samples can be post-stratified.  **For the collection of individual information in order to estimate age, maturity, sex ratio and weigth of the main species will be selected a number of individuals by length class every period (month, quarter or year).**  The estimation of the biological parameters and their uncertainties will 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.  *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*  *(max 900 words per region)* |
| ***4. Deviations from Work Plan***  In some cases there are big differences between the “Average number of PSU during the reference years” and the “Total number of PSU in the sampling year”. These are due to a change in the calculation method. In the WP the number of PSU was calculated taking into account the sampling ports. In the AR we have calculated the number of PSU using all ports of the area.  Results **lower** than planning:  In some cases, it was not possible to reach the number of trips planned to sample during 2021 due to the decission of fishermen to change the target species of the trip (Strata M9-C and M28-C) (see AR comments in Table 4A).  Further, two Strata (M21-S and M27-S) was poor sampled as a result of scarcy of landings of purse seines targeting small pelagic species in Catalonia and set longlines targeting hake in the GSA07 respectively. On the other hand, in the Stratum M17-C the sampling was reduced but the results were sufficient to estimate the volume and length of the catches (see AR comments in Table 4A). The remaining strata, with more than 80% of the planned sampling, are considered enough covered.  Finally, observers often find difficulties to get on board in the GSA07 (see AR comments in Table 4A).  Results **higher** than planning:  More samplings than planned were performed in some métiers with the purpose of achieving higher quality in the calculation of length distributions of the main species, ID codes M2-S, M4-C, M8-S, M14-S and M23-S (see AR comments in Table 4A). On the other hand, the Stratum M10-C was favored by the decission of fishermen to change the target species of some trips in the last minute (see AR comments in Table 4A).  The improving of length data will be used in the assessment of *Aristeus antennatus* of GSA02 and GSA05, and in the assessment of *M. merluccius* in the GSA01 and GSA06.  ***5. Action to avoid deviations***  Work is in progress to try to minimize refusals, but sometimes it is hard to achieve colaboration. Limited space available on board in some fleets it is also an issue with difficult solution.  When unexpected problems appear (temporal fishing closures, fisherman’s decisions, bad weather, etc.) sampling team redistribute the sampling effort. On the other hand, sampling effort is increased when the quality of length distributions is considered not as good as it should be.  *(max. 1000 words per region OR fishing ground)* |

# Section 4: Sampling Strategy for Biological Data from Commercial Fisheries

Text Box 4A: Sampling plan description for biological data

CECAF

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| *General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Decision (EU) 2016/1701 and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.* |
| **Fishing ground: Canary (EU waters)**  ***1,2,3.Sampling design, Estimation procedures and Data quality evaluation***  - - PS\_SPF\_10\_0\_0: Artisanal purse seiners targeting small pelagics. Daily fishing trips at night. Monthly samplings at markets are carried out in the main landing ports in Tenerife, where landings account for around 44% of the total in the Canaries. Primary sampling units or PSUs (vessel x trip) are selected ad-hoc from the boats that cooperate (around 60% of the total target population in Tenerife), covering representative boats (see Table 4B): Sampling frame code C6-S for concurrent at sea in Tenerife and C6-ss for stock specific in the Canary Islands carried out at markets for the four small pelagics target species..  - MIS\_DES\_0\_0\_0: Artisanal polyvalent and multi-specific fleet targeting demersal species with small gears (traps, hooks, nets). Daily fishing trips. Ports in Tenerife represent 11% of landings but cover around 30% in number of boats and 27% in effort. Samplings are carried out on a monthly basis, at sea (code C7-S), in Tenerife and at markets in the Canaries (code C7-ss) for stock specific samplings of *Sparisoma cretense* (main target species). PSUs at sea were selected ad-hoc covering representative “type vessels” operating in the island from those that cooperate (around 15% of the total target population in Tenerife). Main difficulties are related to the high number of vessels, landing places, gears and target species of this fleet. Random selection of PSU from the collaborative boats are planned to be considered in the upcoming years.  **Fishing ground: "West Africa" (non EU waters in West Africa) (**called before "From Morocco to Guinea Bissau". Renamed in RCG\_LDF\_2018)**.**  ***1,2,3.Sampling design, Estimation procedures and Data quality evaluation***  These are EU fisheries carried out under bilateral Sustainable Fishing Partnership Agreements (SFPAs) between the EU and West African coastal states. In addition, there are other fisheries developed in the area, under direct authorizations  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 2020-2021 would not be adequately achieved or some new métiers to be sampled could be added in the future.  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.)  All data (Canarian and NW African fishing grounds), are stored in the IEO data base SIRENO (Table 5A), 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.  Sampling schemes are different from one métier to another and are designed to collect the best data and information need for the assessment purposes required by CECAF:  - PS\_SPF\_0\_0\_0: Artisanal purse seiners targeting small pelagics in North Morocco (SFPA UE-Morocco). Mainly daily fishing trips. Samplings are carried out in the only Spanish fishing port where landings take place (Barbate), and thus covering 100% of the landing ports (Table 4B). Sampling frame code C1-M is used for monthly concurrent samplings and code C1-ss for biweekly stock specific sampling of *Engraulis encrasicolus*, (traditionally the target species). PSUs (vessels per trip) for both types of samplings are selected randomly. Main difficulties are related to the discontinuous activity of this fleet in Morocco that also operates in the Spanish waters of the Gulf of Cadiz. 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 in Morocco. The last FPA Morocco-UE expired in July 2018. A new SFPA has been signed EU fisheries have been re-opened last July 2019.  - OTB\_CRU\_>=40\_0\_0: Bottom shrimper trawlers operating in NW Africa under SFPAs. Fishing trips of 1-3 months duration. Sampling is carried out at sea (code C-2). An Observer on board’s program has been implemented since 2010, allowing to sample retained catch, discards and incidental by-catch. PSU (vessel per fishing trip) are selected by the ship-owners association, trying to follow a rotation system (one vessel per fishing trip), allowing 100% coverage of the target population.The last protocol of the SFPA EU-Guinea-Bissau expired in November 2017 and the new one was signed in June 2019, this involving the re-opening of the fishery.  - OTB\_DEF\_>=70\_0\_0: Mainly Bottom fresh trawlers targeting black hake in NW Africa under SPFAs. Weekly fishing trips landing in ports of the coastal States. All landings are transported by trucks to the Cadiz (Spain) fish market, where they are commercialized. Two sampling schemes are followed: a) samplings at sea (code C3-S), planned on an annual basis and considering commercial and discarded species. PSU (vessel x trip) are selected opportunistically, depending on the fishing sector cooperation and boat habitability; b) market stock specific sampling of the target species (*Merluccius* spp.) (code C3-ss), conducted on a monthly basis in the Port of Cádiz (100% of sampling coverage). PSU (vessel x trip) are selected randomly, all vessels collaborating. . In the last years, from 2014 to 2019, the Spanish industrial fleet of freezer trawlers (OTB\_MCF\_>=70\_0\_0, below) has targeted intermittently black hake in West Africa (OTB\_DEF\_>=70\_0\_0), alternating different fishing grounds. A sampling scheme at sea (C3-S) has been followed when possible, since the unpredictable behavior of this fleet when targeting black hake makes difficult to follow a continuous sampling rate.  - OTB\_MCF\_>=70\_0\_0: Industrial fleet of freezer trawlers targeting mix cephalopods and finfish in West Africa, under SFPAs (currently Guinea-Bissau), conducting fishing trips of around one month. Sampling is carried out at sea (code C4). The sampled PSU are assigned by the ship-owners association, trying to cover all vessels. Main difficulties are related to the options of random selection of PSU.The last protocol of the SFPA EU-Guinea-Bissau expired in November 2017 and the new one was signed in June 2019, this involving the re-opening of the fishery.  - LLS\_DEF\_0\_0\_0: Bottom longliners targeting Atlantic pomfret (*Brama brama*) in NW Africa under SPFAs. Weekly fishing trips landing in ports of the coastal States. All landings are transported by trucks to the Vigo fish market (Spain), where they are commercialized. The sampling scheme to follow from 2020 will be at market for target species (code C8-M); a total of 1200 individuals will be measured annually, throughout biweekly samplings.  *(max 900 words per region)* |
| ***4. Deviations from Work Plan***  **Fishing ground: "West Africa"** (non EU waters in West Africa)  The fisheries in West Africa are highly dependent on the SFPAs (bilateral Sustainable Fishing Partnership Agreements) between the EU and the third countries). Some deviations to the plan could be due both to a lack of fishing activity when no Protocol of the SFPA is active, together with fishing activity changes itself in the area. These can involve alterations in the fisheries conditions, accessibility, closure of certain fisheries or introduction of new fisheries to be sampled. Although fishing activity in NW Africa has been performed regularly during 2021, sampling actions have been hindered by different issues, depending on the fishing ground or métier. Within these circumstances, only some métiers/stocks could be sampled at low levels.  ID codes **C1-M & C1-ss**: deviations are due to the activity of the fleet itself (discontinuous activity of this fleet in Morocco that also operates in the Spanish waters of the Gulf of Cadiz). The purse seine fleet activity was limited to a few months in the period from January to September. This caused a low achievement in sampling.  ID code **C2**: deviations are due to the logistic issues (lack of space, refusals, travel difficulties, etc.) of the on-board observer program that allowed sampling of only 3 out of 4 trips.  ID code **C3-S**: deviations are due to aerial transport shortcomings still related to covid-19 protocols. Since several weeks have to be used for a single 7 days survey in the fresh fleet in Mauritania (main fishing ground), the achieved on-board samplings were reduced from 12 to 5. Also, for these reasons, no observations were possible on-board the freezer fleet while targeting hake during the sampling year.  ID code **C4**: deviations are due both to logistical difficulties (lack of space, refusals, travel difficulties, etc.) inherent to the on-board observer program and to the decrease in fleet activity in this fishery for the 4th quarter.  ID code **C8**: deviations are due to variability of the fleet activity (landings) in the reference port.  **Fishing ground: “Canary”** (EU waters)  ID codes **C6-S, C6-ss & C7-S**: deviations are due to the start of sampling in the eastern region of the archipelago. This increase in sampling will be included in the Spain Work Plan from 2023 onwards.  ID code **C7-ss**: deviations are due to the difficulty in predicting the number trips to be sampled which is very dependent on the abundance of the target species in the catches.  ***5. Action to avoid deviations***  **Fishing ground: "West Africa"** (non EU waters in West Africa)  Deviations due to SFPAs are difficult to solve as they cannot be attributed to sampling intensity and/or methods used for collecting data, therefore it is not feasible to establish actions to avoid deviations.  **Fishing ground: Canary** (EU waters)  Deviations existing are difficult to solve as they cannot be attributed to sampling intensity and/or methods used for collecting data, therefore it is not feasible to establish actions to avoid deviations. Consequently the more feasible action could be to modify this issue in the Spain Working Plans and not planning a fixed number to sample in the case of strata dedicated to stock specific sampling as they are highly dependent on the species catches.  *(max. 1000 words per region OR fishing ground)* |

# Section 4: Sampling Strategy for Biological Data from Commercial Fisheries

Text Box 4A: Sampling plan description for biological data

ICCAT, IOTC, IATTC, WCPFC

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| *General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Decision (EU) 2016/1701 and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.* |
| *General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.* |
| **Large pelagic fisheries**  ***1,2,3. Sampling design, Estimation procedures and Data quality evaluation***  The sampling designs of the different types of large pelagic fisheries are described in the tuna RFMOs manuals. All large pelagic metiers are selected for sampling at level 7 (identifying the target species).  There are two types of sampling scheme:  **Sampling on shore.**  In this scheme the following fisheries are involved:   * longlines (LLD\_LPF\_0\_0\_0 (ALB), LLD\_LPF\_0\_0\_0 (BFT), LLD\_LPF\_0\_0\_0 (SWO)) purse seine (PS\_LPF\_14\_0\_0) and trap (FPN\_LPF\_0\_0\_0) fisheries in the Mediterranean Sea. * baitboats (LHP\_LPF\_0\_0\_0 (ALB), LHP\_LPF\_0\_0\_0 (BFT), LHP\_LPF\_0\_0\_0 (MSP), LHP\_LPF\_0\_0\_0 (TROP)), hand lines (LHM\_LPF\_0\_0\_0 (BFT)), longline (LLD\_LPF\_0\_0\_0 (SWO)), purse seines (PS\_LPF\_0\_0\_0 (TROP)), traps (FPN\_LPF\_0\_0\_0 (BFT)) and trolling lines LTL\_LPF\_0\_0\_0 (ALB)) fisheries in the Atlantic ocean. * purse seine (PS\_LPF\_0\_0\_0 (TROP)) fisheries in the Indian ocean.   Sampling frame: is the list of vessels with license to fish for each fishery on annual basis.  Landing locations: the vessels of the strata T2, T3 and T4 (see table 4B) land in the main Mediterranean ports of Spain; the vessels of the strata T8, T9, T10, T11, T12, T13, T14 and T15 land in the main Spanish Atlantic and Bay of Biscay fishing ports; Port of Dakar (Senegal) for the vessels of the stratum T16; ports of Abidjan (Ivory Coast) and Dakar (Senegal) for the vessels of the stratum T17; and the vessels of the stratum T18 landing in the port of Victoria (Seychelles).  The primary sampling units (PSU) is the fishing trip and the number of trips planned to be sampled at national level are randomly selected according to spatial and temporal strata. In the baitboat metiers (T15 and T16) and on purse seines fisheries (T17 and T18) the data collected suppose nearly a 100% of the total catches landed.  Sampling effort: the number of trips to be sampled by métier, time, area, and port. The number of individuals planned to be measured at national level were calculated based on the fishing effort of the previous years.  The methodology for collecting length data and other biological variables (age, maturity, sex ratio and weight) follows the RFMOs manuals. In the case of strata T16, T17 and T18 the sampling procedure is the selection of wells considering zone, quarter and type of banc. Sampling follows a two-steps (time of landing) simple random scheme focusing on those wells holding less strata variability. In the case of T16 stratum, the whole capture is considered as a unique well.  Execution difficulties:   * Sampling accessibility: in some cases the landing ports are variable and distant from each other, so it would be really difficult to establish sampling staff in each port. In many cases, it was necessary the purchase of specimens to carry out the sampling. * In the case of baitboat fisheries (LHP\_LPF\_0\_0\_0 (TROP)) the tracking of ‘faux-poisson’ weight in the port of Dakar (Senegal) (multiple transport media and absence of control).   The data are stored into specific databases designed according to different strata of fleet and into SIRENO database which is managed by the IEO.  **Sampling at sea.**  In this scheme the following fisheries are involved:   * longlines (LLD\_LPF\_0\_0\_0 (ALB), LLD\_LPF\_0\_0\_0 (BFT), LLD\_LPF\_0\_0\_0 (SWO)) fisheries in the Mediterranean Sea. * longline (LLD\_LPF\_0\_0\_0 (SWO)), purse seine (PS\_LPF\_0\_0\_0 (TROP)) fisheries in the Atlantic, Indian and Pacific oceans.   Sampling frame: is the list of vessels with license to fish for each fishery.  The primary sampling unit (PSU) is the trip and the number of trips planned to be sampled at national level are randomly selected. Purse seine fisheries comprise a coverage of 10% of the total trips for both Atlantic and Indian Oceans uniformly distributed along the year. For the IATTC Area the coverage of purse seine fisheries is 100% of annual primary sampling units (50% by IATTC observers and 50% by national observers).  The observers on board collect data of catches (target and bycatch species) and also biological variables (length, sex, maturity and weight) from commercial fisheries. In the case of tropical purse seines, the observers on board collects the bycatch and the discard data for all fishing set.  Sampling effort: the number of fishing trips and the number of individuals planned to be measured at national level were calculated based on data from previous years in order to keep the coverage from previous experience.  Execution difficulties:   * It is challenging to cover trips in specific areas in specific time periods and selection depends on a combination of factors such as vessel access, and other logistics factors. * In some cases refusal to embark observers. * Priortity to ‘good practices’ when releasing bycatch species in Atlantic ocean's purse seine fisheries and Indian ocean's purse seine fisheries.   The observers on board data are stored into specific databases designed according to different strata of fleet and into SIRENO database which is managed by the IEO.  The 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.  *(max 900 words per region)* |
| ***4. Deviations from Work Plan***  Results lower than planning:  The at-Sea sampling program (**T1**) has achieved only a 39% of the planned number of PSU in part due to COVID 19 restrictions to access to the Vessels. We have compensated for this lack of information increases the onshore sampling program (**T4**), achieving a 240% over the planned number of PSU.  The **T2** sampling coverage achieved the 68% of the planned PSU. This circumstance is due to the reduction of the active Mediterranean Spanish traps in the last two years. So the total number of PSU in 2021 was only 90, in contrast to the average number of PSU in reference years (166). Taking into account these data, we have increased a 10% the coverage of this Stratum.  ID code **T6** and **T17** sampling coverage achieved the 86 and 70% of the planned PSU respectively. This circunstance was due to many causes as were the collateral effect of COVID and the reduction of the activity of Spanish purse seiners because of a vessels move from the Atlantic toward other ocean.  ID code **T16** a significant reduction of the activity occurred last year. The number of vessels with activity in this metier was reduced from 7 to 3.  ID code **T7** There was no scientific observers on board purse seiners in the Paciifc ocean in 2021 because of the collateral effect of COVID as for instance that the crew have been infected with covid and it was impossible put an observer on board or that many Pacific ports are still closed,…  ID code **T18** sampling coverage achieved the 83% of the planned PSU. This circunstance was due to some vessels stopped the activity to not pass over its quota (TAC).  Results higher than planned:  ID code **T10**, **T11**: sampling coverage was over 100% due to the ICCAT requirements for species under recovery plans, in this case the BFT recovery Plan.  ID code **T4** sampling coverage was over 100% to compensate for the **T1** undersampling. In addition, we increased the sampling coverage due to the ICCAT requirements under the recovery plan for Mediterranean swordfish.  ***5. Action to avoid deviations***  We hope by 2022 to increase the coverage of the **T1** sampling program due to the improvement of the COVID 19 status.  *(max. 1000 words per region OR fishing ground)* |

# Section 5: Data quality

Text Box 5A: Quality assurance framework for biological data

North Sea (ICES IIIa, IV and VIId areas) and Eastern Arctic (ICES areas I, II)

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| *General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.Use this box to provide additional information on Table 5A.* |
| Spain has fisheries only in **Eastern Arctic (ICES areas I and II)**  More detailed information of quality assurance can be found in the Spain WP 2022-2027 Annex 1.1 Quality Report for Biological Data Sampling Schemes. [Spain\_WP\_2022-2027\_text\_annex.pdf](https://datacollection.jrc.ec.europa.eu/wp/2022-2027?p_p_id=110_INSTANCE_73ztp5DgN0HT&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&_110_INSTANCE_73ztp5DgN0HT_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_73ztp5DgN0HT_redirect=https%3A%2F%2Fdatacollection.jrc.ec.europa.eu%2Fwp%2F2022-2027%2F-%2Fdocument_library_display%2F73ztp5DgN0HT%2Fview%2F1430907%3F_110_INSTANCE_73ztp5DgN0HT_keywords%3D%26_110_INSTANCE_73ztp5DgN0HT_topLink%3Dhome%26_110_INSTANCE_73ztp5DgN0HT_advancedSearch%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_cur2%3D3%26_110_INSTANCE_73ztp5DgN0HT_delta2%3D20%26p_r_p_564233524_resetCur%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_andOperator%3Dtrue&_110_INSTANCE_73ztp5DgN0HT_fileEntryId=1438420)   * ESP\_IEO\_P5\_AtSea pp. 61-64   ***1. Evidence of data quality assurance***  For all sampling schemes, documentation about quality assurance framework in place is being continuously improved during the last years.  Quality controls like the following are 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.   ***2. Sampling design***  Target population, Sampling frame, PSUs, Method of PSU selection are described in the Working Plan.  The sampling effort is allocated according to the scientific experience gained from the study of fisheries in the area. The number of fishing trips and the number of individuals planned to be sampled were calculated based on data from previous years in order to keep the coverage from previous years and to comply the requirements of the end users.  ***3. Sampling implementation***  The method to collect the length 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 on board collect data on unsorted catches and discards by species, efforts and positions.  The biological parameters (Weight, Age, Maturity) come from a sampling design stratified by length class. The Sex-ratio index is achieved at the same time of length sampling which are randomly collected and not stratified.  More details about sampling protocol in IEO Observer´s Manual:<http://www.repositorio.ieo.es/e-ieo/bitstream/handle/10508/528/MANUAL%20DEL%20OBSERVADOR%20repositorioIEO%20sep%202012.pdf?sequence=7>  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.*  ***4. Data capture***  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 (outliers, trends, range of variables, dispersion).  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.  ***5. Data Storage***  Sampling data are stored into own and SIRENO database: (Seguimiento Informático de los Recursos Naturales Oceánicos) which is managed by the IEO.  ***6. Data processing***  Data sets are explored and checked by IEO scientific staff. Quality checking’s for data processing includes:   * Outliers detection. * Elaboration of internal QA reports which are reviewed by the institute before delivering the data * Review of the number of samples against commercial landings and effort by strata.   *(max. 900 words per Region/RFMO/RFO/IO OR sampling scheme)* |

# Section 5: Data quality

Text Box 5A: Quality assurance framework for biological data

North Atlantic

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| *General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.Use this box to provide additional information on Table 5A.* |
| **North Atlantic ICES XII-XIV and NAFO areas**  See North Sea (ICES IIIa, IV and VIId areas) and Eastern Arctic (ICES areas I, II).  The fleet, the fisheries, target species, gears are very similar to the ones described in Eastern Arctic as is the same Spanish fleet that operates in both areas. Also, the monitoring is performed by the same team of IEO using the same sampling methodologies, implementation and data processing, so the information related with the quality in NAFO areas and ICES areas XII and XIV was already described under the section of North Sea and Eastern Arctic.  **ICES areas VI, VII (excl. VIId), VIII, IX**  More detailed information of quality assurance can be found in the Spain WP 2022-2027 Annex 1.1 Quality Report for Biological Data Sampling Schemes. [Spain\_WP\_2022-2027\_text\_annex.pdf](https://datacollection.jrc.ec.europa.eu/wp/2022-2027?p_p_id=110_INSTANCE_73ztp5DgN0HT&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&_110_INSTANCE_73ztp5DgN0HT_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_73ztp5DgN0HT_redirect=https%3A%2F%2Fdatacollection.jrc.ec.europa.eu%2Fwp%2F2022-2027%2F-%2Fdocument_library_display%2F73ztp5DgN0HT%2Fview%2F1430907%3F_110_INSTANCE_73ztp5DgN0HT_keywords%3D%26_110_INSTANCE_73ztp5DgN0HT_topLink%3Dhome%26_110_INSTANCE_73ztp5DgN0HT_advancedSearch%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_cur2%3D3%26_110_INSTANCE_73ztp5DgN0HT_delta2%3D20%26p_r_p_564233524_resetCur%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_andOperator%3Dtrue&_110_INSTANCE_73ztp5DgN0HT_fileEntryId=1438420)   * ESP\_IEO\_P1\_AtSea pp. 4-5 * ESP\_IEO\_P1\_OnShore pp. 6-7 * ESP-AZTI\_AtSea\_ICES pp. 14-16 * ESP-AZTI\_AtSea\_PET\_ICES pp. 17-18 * ESP-AZTI\_OnShore\_ICES pp. 19-21 * ESP\_IEO\_P1\_Biological\_Specific pp. 8-13 * ESP\_AZTI\_Biological\_Specific pp. 22-24   ***1. Evidence of data quality assurance***  LENGTH:  For both IEO and AZTI quality assurance framework in place is being continuously improved during the last years. Current quality assurance framework includes complete data monitoring from the moment data is taken. For market sampling this framework includes weekly communication and monthly visits to samplers in ports and monthly reports to allow a better reaction in case fishery or ports dynamics affects the sampling. Data base checking’s have been enlarged with R checking scripts to ensure monitoring of quality data. This is incorporating format control and outliers detection. In the IEO, validation of length distributions has been changed through the use of Cook’s distance to detect outliers, both for market and for on board length distributions also. Cross-checking of sampled trips with logbook data allows a better assignation of spatial fishing distribution.  More and more elements around the data collection in fisheries are being susceptible to be included in a quality assurance framework. Main actions performed in the quality assurance are detailed in the sections 2-6 below.  AGE, WEIGHT, SEX-RATIO, MATURITY, FECUNDITY:  The tool INBIO 2.0\* developed by the IEO in R has been used to check the quality of biological parameters. Models and fit adopted are:   * Growth (vs. Length&Weight): von Bertalanffy. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Maturity (Length&Age): GLM. Logistic function. Binomial errors w. maximum log-likelihood fit. * Length–Weight Relationship: Standard. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Sex-ratio (Length&Age): No Model. Percentage by length and age. Cubic spline to plot   \*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.  In addition, several quality controls are performed.   * As established by OWNER in 2011, some actions are being performing: accuracy analysis of readings inter and intra readers; measurement of the distances from each annual ring to the core; identification of the edge of each bony part observed; development of annual collections of images that help the correct interpretation of the bony parts; use of a numerical scale to estimate the degree of confidence that the reader assigned to each one of their readings. * The institutes responsible for data collection are part of the "The European Age Readers Forum" (EARF) (http://groupnet.ices.dk/AgeForum/default.aspx) whose purpose is to establish a "one-stop shop" or "single window" for all teams who are involved in the interpretation of age. The EARF provides a resource for training new readers (ie, collection of reference images) as well as the opportunity to share and discuss current allocation protocols ages, establish standard operating procedures and standardize methods of preparation and interpretation of bony parts. * Participation in International Exchanges and Workshop of age determination like: Anchovy Workshop (WKARA3); Mackerel Otolith exchange; *Trachurus* sp.Otolith exchange, Megrim Otolith exchange (see ICES 2021 WGBIOP)   IEO   * Applying a sampling protocol for each species where the methodologies used are described (sampling, storage and processing of data, processing and observation of skeletal parts (EP) for age allocation   <http://www.repositorio.ieo.es/e-ieo/handle/10508/1755>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/10536>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/9859>   * Standardization of the common criteria in assigning age of each species, in order to improve the accuracy in readings.   <http://www.repositorio.ieo.es/e-ieo/handle/10508/10162>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/11122>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/10176>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/10177>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/10163>  <http://www.repositorio.ieo.es/e-ieo/handle/10508/10178>  AZTI:  [](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1) [[D:\Usuarios\angeles\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\D24CBD52.tmpBiological sampling](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1)](https://azti.sharepoint.com/:f:/s/Proyectos/DatosPesqueriasAZTI/Et5BVas7fLlEq8P4SW8BPNEBAZ4rxP9GmgWu60CEiGgohw)  [ D:\Usuarios\angeles\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\30BBD930.tmp](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1) [[OnShore sampling](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1)](https://azti.sharepoint.com/:f:/s/Proyectos/DatosPesqueriasAZTI/Ep9FepREGoNFne6KrKyE994BMkKT-OMBby1k6Sp9wyBxkQ?e=E57hL7)  [](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1) [[D:\Usuarios\angeles\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\39AB217C.tmpAtSea PET sampling](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1)](https://azti.sharepoint.com/:f:/s/Proyectos/DatosPesqueriasAZTI/EpNgjymS_aRBkiFcGBod11gBe7iI4tH4uenD8XHQpdN48A?e=mBkNUf)  [ D:\Usuarios\angeles\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\93B10EA.tmp](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1) [[AtSea sampling](https://azti.sharepoint.com/sites/Proyectos/DatosPesqueriasAZTI/Documentos%20compartidos/Forms/AllItems.aspx?id=%2Fsites%2FProyectos%2FDatosPesqueriasAZTI%2FDocumentos%20compartidos%2FRecreational%20Fisheries%20Sampling&p=true&ga=1)](https://azti.sharepoint.com/:f:/s/Proyectos/DatosPesqueriasAZTI/EnTbkVaE-YNLtMqMPmolXkYBr8sJ7YxVOrAzerT8KArLpg?e=ch0T5L)  ***2. Sampling design***  LENGTH:  The sampling implementation of last year was analyzed and minor changes were incorporated to the sampling design in order to improve some deviations. Changes follow the best practices recommended for statistically sound sampling designs, making them compatible with practical issues (samplers’ contract, economic limitations, port or fleets dynamics, etc.).  Table 4B was used to accommodate extra information concerning the design that can help end users to understand the sampling design and the coverage of the fisheries. Also work compiled trough WGCATCH during the last years.  AGE, WEIGHT, SEX-RATIO, MATURITY:  The biological sampling is carried out according to 2 differentiated sampling designs, 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.   ***3. Sampling implementation***  Full register of non-responses and refusals.  ***4. Data capture***  Data are captured by the observers using recording forms with unambiguous data fields. Forms are also revised by the researchers to identify potential bias due to misinterpretation by the observer.  The data base used by IEO and AZTI have some build-in quality checkings, such as:   * Compulsory fields ensuring that no crucial data is missing * Indication of whether sampling weights are estimated or measured * Limited list of values for ports, metiers, species, vessels, areas, etc   After uploaded, the quality process entails review of the data uploaded previous to final consolidation of the sampling information. This includes data base’s own tools or R scripts to check for outliers, lengths ranges, correct dates, etc.  Validation of lengths distributions done through Cook’s distance)  Difficulty to communicate in a single document which aspects of the quality checks are done and how are done.  ***5. Data Storage***  All data stored in the database.  ***6. Data processing***  Lack of clear guidelines to understand what kind of documentation is needed. A kind of “checking list” would be very useful.  Quality checking’s for data processing includes:   * Outliers detection. * Validation of length distributions using COST package. * Elaboration of internal QA reports which are reviewed by the institute before delivering the data * Cross-checking of sampled trips with logbook/sales notes: analysis of bias in trips sampled. * Cross-checking of logbooks and first sales notes. * Review of the number of samples against commercial landings and effort by strata.   *(max. 900 words per Region/RFMO/RFO/IO OR sampling scheme)* |

# Section 5: Data quality

Text Box 5A: Quality assurance framework for biological data

Medierranean and Black Sea

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| *General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.Use this box to provide additional information on Table 5A.* |
| Spain has fisheries only in **Mediterranean Sea**  More detailed information of quality assurance can be found in the Spain WP 2022-2027 Annex 1.1 Quality Report for Biological Data Sampling Schemes. [Spain\_WP\_2022-2027\_text\_annex.pdf](https://datacollection.jrc.ec.europa.eu/wp/2022-2027?p_p_id=110_INSTANCE_73ztp5DgN0HT&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&_110_INSTANCE_73ztp5DgN0HT_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_73ztp5DgN0HT_redirect=https%3A%2F%2Fdatacollection.jrc.ec.europa.eu%2Fwp%2F2022-2027%2F-%2Fdocument_library_display%2F73ztp5DgN0HT%2Fview%2F1430907%3F_110_INSTANCE_73ztp5DgN0HT_keywords%3D%26_110_INSTANCE_73ztp5DgN0HT_topLink%3Dhome%26_110_INSTANCE_73ztp5DgN0HT_advancedSearch%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_cur2%3D3%26_110_INSTANCE_73ztp5DgN0HT_delta2%3D20%26p_r_p_564233524_resetCur%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_andOperator%3Dtrue&_110_INSTANCE_73ztp5DgN0HT_fileEntryId=1438420)   * ESP\_IEO\_P2\_AtSea pp.25-27 * ESP\_IEO\_P2\_OnShore pp. 28-30 * ESP\_IEO\_P2\_StockSpecific pp. 31-33 * ESP\_IEO\_P2\_Biological\_Specific pp.34-37   ***1. Evidence of data quality assurance***  LENGTH  Following the GFCM-DCRF manual, length is collected for the especies of the groups 1, 2 and 3 in a concurrent way. The species are sampled until the mode is obtained.  AGE, WEIGHT, SEX-RATIO, MATURITY, FECUNDITY:  For the collection of individual information in order to estimate age, maturity, sex ratio and weigth of the main species, a number of individuals by length class every period (month, quarter or year) are selected.  The tool INBIO 2.0\* developed by the IEO in R has been used to check the quality of biological parameters. Models and fit adopted are:   * Growth (vs. Length&Weight): von Bertalanffy. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Maturity (Length&Age): GLM. Logistic function. Binomial errors w. maximum log-likelihood fit. * Length–Weight Relationship: Standard. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Sex-ratio (Length&Age): No Model. Percentage by length and age. Cubic spline to plot   *\*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.*  ***2. Sampling design***  The sampling design and protocols followed the outcomes of GFCM\_DCRF rules and recommendations, and the agreements carried out in the RCGMed&BS.  In the RCGMed& BS, the Mediterranean countries have reached the following agreements:   * 1.Maintenance the list of metiers for the Mediterranean and Black Sea done in 2009. * 2.The sampling of the length distribution of species in the catches (both landings and discards) and the volume of the discards will be carried out by métier. * 3.Member States have to follow the discard sampling program as recommended by RCMMed&BS 2010, and strictly follow the outputs of the proposed table in order to sample métier for discards. * 4.The selection of metier to sample will be done through a ranking system. * 5.The LIST of STOCKS to be sampled would be a combination of species included for sampling by the DC-MAP (refer to Tables 1A, 1B and 1C of Commission Implementing Decision (EU) 2016/1251) plus species required for sampling by GFCM. * 6.The Planned Sampling for biological variables will be based in the GFCM-DCRF: The species will be classified in Group 1, 2 and 3 as in the adopted GFCM-Data Collection Reference Framework, 2016. For the species in Group 1 the biological parameters length, sex, age, maturity and weight should be reported every year. For the species in Group 2 the biological parameters should be reported every three years. And for the species in Group 3 only length should be reported every three years. * 7.For the Sampling Intensity for biological variables, MS are encouraged to calculate the number of individuals to be sampled for biological data using a tool developed by the MARE/2014/19 Med&BS project.   The tool developed by the MARE/2014/19 Med&BS project allows to calculate an “optimal” number of individuals to sample disaggregated over strata (like quarters and metiers). The methodology used to search the optimal number of samples is the calculation of the CV curves through the resampling method (bootstrap approach). The procedure is based in the availability of large datasets. STREAM project has continued the development of this tool.  On the other hand, the Spanish experts follow the recommendations of the different ICES and STECF workshops on standardization of otholits reading and maturity stages.  ***3. Sampling implementation***  Two methodologies have been applied to collect the biological variables:   * -For the biological variables related to fisheries, that should be delivered at métier level (length and volume of discards), a concurrent sampling has been carried out, on board commercial vessels or at the market. * -The biological variables related to the population, that should be delivered at stock level (age, sex-ratio, maturity, individual weight), have been obtained from biological sampling from commercial vessels (from market samples or on board samples) and/or scientific surveys. The sampling is directed, and a fixed number of individuals by length class are sampled every month, quarter or year.   ***4. Data capture***  -.Biological variables related to fisheries. Whether the data is collected on board or in the market, the data 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. Weight of length samples are taken with an electronic dynamometer. Length measurements of fish and cephalopods are taken with ichthyometers, while calipers are used for crustaceans.  - Biological variables related to the population. For most of the stocks, data from samplings are taken 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 ichthyometers, while calipers are used for crustaceans. Maturity scales follow the agreements and recommendations of related workshops  ***5. Data Storage***  All data stored in database. The data base used by IEO named SIRENO have some build-in quality checkings, such as:   * Compulsory fields ensuring that no crucial data is missing * Indication of whether sampling weigths are estimated or measured * Limited list of values for ports, metiers, species, vessels, areas, etc.   ***6. Data processing***  Quality checking’s for data processing includes:   * Outliers detection. * Cross-checking of sampled trips with logbook/sales notes: analysis of bias in trips sampled. * Review of the number of samples against commercial landings and effort by strata.   *(max. 900 words per Region/RFMO/RFO/IO OR sampling scheme)* |

# Section 5: Data quality

Text Box 5A: Quality assurance framework for biological data

CECAF

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| *General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.Use this box to provide additional information on Table 5A.* |
| More detailed information of quality assurance can be found in the Spain WP 2022-2027 Annex 1.1 Quality Report for Biological Data Sampling Schemes. [Spain\_WP\_2022-2027\_text\_annex.pdf](https://datacollection.jrc.ec.europa.eu/wp/2022-2027?p_p_id=110_INSTANCE_73ztp5DgN0HT&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&_110_INSTANCE_73ztp5DgN0HT_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_73ztp5DgN0HT_redirect=https%3A%2F%2Fdatacollection.jrc.ec.europa.eu%2Fwp%2F2022-2027%2F-%2Fdocument_library_display%2F73ztp5DgN0HT%2Fview%2F1430907%3F_110_INSTANCE_73ztp5DgN0HT_keywords%3D%26_110_INSTANCE_73ztp5DgN0HT_topLink%3Dhome%26_110_INSTANCE_73ztp5DgN0HT_advancedSearch%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_cur2%3D3%26_110_INSTANCE_73ztp5DgN0HT_delta2%3D20%26p_r_p_564233524_resetCur%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_andOperator%3Dtrue&_110_INSTANCE_73ztp5DgN0HT_fileEntryId=1438420)   * ESP-IEO\_P3\_AtSea\_Africa pp. 38-39 * ESP-IEO\_P3\_AtSea\_Canarias pp. 41-42 * ESP-IEO\_P3\_OnShore pp.43-44 * ESP-IEO\_P3\_OnShore\_stock specific pp.45-47 * ESP-IEO\_P3\_BioSpec pp.48-50   ***1. Evidence of data quality assurance***  Quality assurance framework in CECAF includes data monitoring from sampling to end-users in assorted métiers. Sampling schemes are different from one métier to another and are designed to collect the best data and information needed for assessment.  Biological data are collected from commercial vessels at sea and onshore, checked at IEO in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in *ad hoc* data bases.  For market sampling, monthly visits to samplers in ports are carried out to assure the quality of samplings. The information collected is checked on a monthly basis to allow a better reaction in case fishery or ports dynamics affects the sampling.  Biological data are collected onboard for West Africa fisheries, as well as retained and discarded species length data. Biolgical data from Canarian stocks are taken from samples bougth in markets.  The tool INBIO 2.0\* developed by the IEO in R (*Sampedro et al., 2005*) has been used to check the quality of biological parameters. Models and fit adopted are:   * Growth (vs. Length&Weight): von Bertalanffy. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Maturity (Length&Age): GLM. Logistic function. Binomial errors w. maximum log-likelihood fit. * Length–Weight Relationship: Standard. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Sex-ratio (Length&Age): No Model. Percentage by length and age. Cubic spline to plot   Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technichal reports).  ***2. Sampling design***  Sampling coverage in these areas highly depends on the varying circumstances of the Protocols of the SFPAs between 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.  Sampling plans for obtaining biological data includes sampling at sea and/or or at markets, detailed by metier in Text Box 4A. For both, sampling at sea or at markets, the target population is the total number of trips in a year carried out by the metier. The sampling frame is the list of vessels with license by metier. The sampling effort is the number of fishing trips and the number of individuals to be sampled are planned in order to comply the requirements of the end users.  Sampling programs for observers onboard Spanish vessels in West African waters are documented in specific manuals for the three fleets with observers programs that were produced for the "Study on improvement for the analysis and exploitation of observer reports in EU fisheries from NW African waters". EASME/EMFF/2016/008 Specific Contract No.12 and available in DGMARE as the Milestones MS 3.02, MS 3.03 and MS 3.04 of this project:  - Manuel à l’usage des observateurs scientifiques à bord des bateaux crevettiers dans les eaux d’Afrique occidentale (García-Isarch et al., 2020). MS 3.02. For observers onboard shrimper trawlers.  - Manuel à l’usage des observateurs scientifiques à bord des bateaux merluttières dans les eaux d’Afrique occidentale (Fernández-Peralta et al., 2020). MS 3.03. For observers on board black hake trawlers.  - Manuel à l’usage des observateurs scientifiques à bord des bateaux céphalopodiers dans les eaux d’Afrique occidentale (Perales-Raya et al., 2020). MS 3.04. For observers onboard cephalopod-finfish trawlers.  IEO has translated the manuals to Spanish for the use of Spanish observers.  ***3. Sampling implementation***  In all cases, difficulties related to the collaboration of the fishing sector with observers onboard are expected in sampling at sea schemes. The degree of collaboration has been unstable in the past, depending on the type of fleet and their specific circumstances, limited space onboard among others.  Generally, fleets have collaborated positively, allowing observers on-board regularly throughout recent years, with an increasing number of trips.  ***4. Data capture***  All data from samplings, at sea and at market, are recorded at the moment in custom-made sheets and adapted data bases.  ***5. Data Storage***  All data are stored in the IEO database SIRENO. In addition, catch and effort information since 2014 onwards has been uploaded to the Regional Database (RDB) managed by ICES, as required by the RCG-LDF since 2019 (Table 5A).  ***6. Data processing***  Estimation procedures:  Sampling data are extrapolated to the whole population in each domain (usually stock\*métier\*month/quarter).   * For length distributions of the landings, the landed weight is used as a raising factor and the empty cells are filled using the nearest neighbor criteria. * For catch (retained and discarded) estimates, the total effort by métier is used as a raising factor.   These processed are usually implemented in SIRENO. In addition, all data are explored and checked by IEO scientific staff. Indeed, aside analyses help improving SIRENO routines.  Biological parameters (length-weight relationship, sex-ratio and length at first maturity) are estimated based on bootstrap procedures and fitting models with the tool INBIO developed in R by the IEO (*Sampedro et al., 2005*). Models and fit adopted are described above.  For each fishery, these data sets are annually 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.  *(max. 900 words per Region/RFMO/RFO/IO OR sampling scheme)* |

# Section 5: Data quality

Text Box 5A: Quality assurance framework for biological data

ICCAT, IOTC, IATTC, WCPFC

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| *General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.Use this box to provide additional information on Table 5A.* |
| Note: more information of sampling design, sampling implementation, data capture, data storage and data processing can be found in [Spain\_WP\_2022-2027\_text\_annex.pdf](https://datacollection.jrc.ec.europa.eu/wp/2022-2027?p_p_id=110_INSTANCE_73ztp5DgN0HT&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&_110_INSTANCE_73ztp5DgN0HT_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_73ztp5DgN0HT_redirect=https%3A%2F%2Fdatacollection.jrc.ec.europa.eu%2Fwp%2F2022-2027%2F-%2Fdocument_library_display%2F73ztp5DgN0HT%2Fview%2F1430907%3F_110_INSTANCE_73ztp5DgN0HT_keywords%3D%26_110_INSTANCE_73ztp5DgN0HT_topLink%3Dhome%26_110_INSTANCE_73ztp5DgN0HT_advancedSearch%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_cur2%3D3%26_110_INSTANCE_73ztp5DgN0HT_delta2%3D20%26p_r_p_564233524_resetCur%3Dfalse%26_110_INSTANCE_73ztp5DgN0HT_andOperator%3Dtrue&_110_INSTANCE_73ztp5DgN0HT_fileEntryId=1438420) on Annex 1.1 - Quality Report for biological data Sampling scheme:   * ESP\_IEO\_P4\_AtSea\_all pp. 51-54 * ESP\_IEO\_P4\_OnShore\_all pp. 55-57 * ESP\_IEO\_P4\_OnShore\_sp pp. 58-60   ***1. Evidence of data quality assurance***  In general, to check the quality and to carry out the estimation of the biological parameters and their uncertainties, the tool INBIO 2.0\* (“Estimation of biological parameters and their uncertainties through simulation techniques”), developed in R environment by the IEO, was used. 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.  Models and fit adopted were:   * Growth at age (vs. Length & Weight): von Bertalanffy. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Maturity (Length & Age): GLM. Logistic function. Binomial errors w. maximum log-likelihood fit. * Length – Weight Relationship: Standard. Non-linear estimation w. minimum least squares (Gauss-Newton estimation). * Sex-ratio (Length & Age): No Model. Percentage by length and age. Cubic spline to plot   *\*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.*  ***2. Sampling design***  The sampling design and protocols follow the RFMOs guidelines of sampling. Outliers and anomalous registrations have been detected using statistical techniques and routinely applications which avoid their input.  ***3. Sampling implementation***  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. Both samplings at market and at sea are analyzed in joint workshops with other scientific institutes using the same methodology (e.g., IRD, AZTI, CRODT, etc.). On ICCAT and IOTC, the sampling follows the methodology described in <https://www.iccat.int/en/ICCATManual.html>.  ***4. Data capture***  The main problems in large pelagic fisheries are the wide range of length distributions and the huge weight range of the individuals. There are trips with landings of few kg. and trips with landings of tons. The data quality of sampling is considered satisfactory.  For most of the species, the number of individuals is difficult to plan in advance. It will depend on the access to the samples. In the case of by-catch species (usually low prevalence), the number of individuals sampled at national level cannot be planned in advance.  ***5. Data Storage***  In Pacific Ocean (IATTC and WCPFC) the data from the observation on board EU purse seiners are stored in an IATTC\_IEO common database. The sampling by scientific observers follows a specific methodology that can be consulted in http://www.iattc.org/Downloads.htm. Data from all the member states are centralized at the IATTC Secretariat, where they are subject to routinely verification and validation protocols.  ***6. Data processing***  For 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, considering data from sampling at port. This methodology is common to IRD and IEO.  *(max. 900 words per Region/RFMO/RFO/IO OR sampling scheme)* |

# Section 5: Data quality

Text Box 5B: Quality assurance for socioeconomic data

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| *General comment: This box fulfills Article 5 paragraph (2) point (b) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 5(A), 6 and 7 of the multiannual Union programme. Use this box to provide additional information on Table 5B.* |
| ***1. Evidence of data quality assurance***  No change since WP was adopted.  ***2. Section P3 Impartiality and objectiveness***  Fishing  The data source is the owners of the fishing vessels and the data is collected through an individualized personal survey for each of the selected vessels in the sample  The data is checked and modified in case of error. Periodic error checks are made during collection, during and after recording and after obtaining results and publication.  Aquaculture  The source of data is the establishments with authorization and cultivation, which in the reference period are authorized to develop the aquaculture activity.  The data is checked and modified in case of error. Periodic error checks are made during collection, during and after recording and after obtaining results and publication.  Processing  This is a structural survey aimed at companies whose main activity is industrial, carried out by sampling and in whose questionnaires the data are collected in four fundamental sections: income, expenses, investment and information related to the industrial establishments that the companies own.  The data is checked and modified in case of error.  During the micro depuration process, the detection and debugging of errors and inconsistencies in the identification variables of each record are carried out, as well as the debugging of content errors. Likewise, the systematic errors detected in the studies and previous analyses made on the recorded data are corrected.  After the micro depuration phase, the calculation of the elevation factors is carried out to determine the estimations of the different variables. The last stage, before the tabulation and dissemination of the results, is the obtaining of analysis tables for, through macro depuration techniques.  ***3. Section P4 Confidentiality***  Fishing and Aquaculture  The necessary logical, physical and administrative measures are adopted so that the protection of confidential data is effective both from the data collection and until its publication, and in its storage.  The protocols are the same for any end user as for the DCF partners.  Law 12/1989 of the Public Statistical Function establishes that the MAPA establishes confidentiality protocols.  Processing  The INE (National Institute of Statistics) adopts the logical, physical and administrative measures necessary for the protection of confidential data to be effective, from the collection of data to its publication.  In the phases of information processing, the data that allows direct identification are only kept while they are strictly necessary to guarantee the quality of the processes.  In the publication of the results tables, the detail of the information is analysed to avoid that confidential data can be deduced from the statistical units. In cases where microdata files are disseminated, they are always anonymous.  In the tabulation plan, levels of disaggregation have been designed that are not affected by confidential data. In the customized requests, cell suppression is used to preserve statistical secrecy.  The protocols are the same for any end user as for the DCF partners.  Law 12/1989 of the Public Statistical Function establishes that the INE cannot disseminate, or make available in any way, individual or aggregated data that could lead to the identification of previously unknown data for a person or entity.  ***4. Section P5 Sound methodology***  Fishing and Aquaculture  The methodologies followed for the statistical operations sources of these works are published on the MAPA website.  The MAPA statistics are governed by principles that seek to ensure the quality and credibility of the data. These principles are included in the Code of Good Practice of European Statistics (CBP) and refer, among other aspects, to professional independence, protection of confidentiality, reliability of results, accuracy, timeliness, timeliness, accessibility , clarity, comparability and coherence.  Processing  The methodology of the Industrial survey can be found on the INE website.  The methodology follows EU standards in relation to industrial surveys.  Based on the regulations 275/2010 of the Commission and 295/2008 of the European Parliament and the Council, the European Commission (Eurostat) assesses the quality of the data transmitted and publishes reports on the quality of European statistics.  ***5. Section P6 Appropriate statistical procedures***  Fishing and Aquaculture  There is consistency between the administrative data and the statistical data since the population under study is determined from the administrative data of the Fleet Census as well as the administrative data of the activity of the vessels.  Both in the information collection process and in the subsequent data processing processes, there are established quality controls in continuous improvement.  No imputations are made, to ensure compliance with the statistical standards we opt for the increase of the samples.  There are documented reviews of the results.  Processing  There is consistency between the administrative data and the statistical data.  Regulation 275/2010 of the Commission establishes the procedures for evaluating the data sent by the different member states for the statistics of Annexes I to IX of the SBS Regulation (EC) No. 295/2008, based on the quality criteria listed in Article 12, paragraph 1, of Regulation (EC) No 223/2009 of the European Parliament and of the Council, namely: relevance, accuracy, timeliness, timeliness, accessibility, clarity, comparability and coherence.  Both in the information collection process and in the subsequent data processing processes, there are established quality controls in continuous improvement.  Automated imputations are made for the correction of errors found after data debugging.  There are documented reviews of the results  ***6. Section P7 Non-excessive burden on respondents***  Fishing and Aquaculture  According to the Public Statistical Function Law, the state and regional statistical services establish cooperation formulas that at any time may be more suitable to make the most of the available information. The statistical services of the State Administration and of the Autonomous Communities may enter into agreements relating to the development of statistical operations when it is convenient for their improvement and efficiency or to avoid duplicities and expenses.  Processing  In order to significantly reduce the load of reporting units, simplified questionnaire models have been designed for small businesses and the design and selection of the sample has been coordinated with other surveys, in order to reduce overload as much as possible of certain reporting units.  Cooperative formulas are established to make the most of available information and avoid unnecessary duplication of statistical operations. The size of the samples and the amplitude of the questionnaires are reduced to the minimum necessary. As for the collection of data, the completion of the Internet is enhanced as an agile and safe method for the informants, and which allows achieving better levels of information quality. In any case, the informants have other possible response channels available (questionnaire in paper by mail, fax, and electronic questionnaire)  ***7. Section P8 Cost effectiveness***  Fishing and Aquaculture  There are only automatic techniques for the validation of information. The collection and coding of it is done in a personalized way, there are no automatic collection techniques.  Processing  The data collection is done by maximizing the completion of the online questionnaire, which exceeds 80% of the total number of questionnaires collected. In any case, the informants have other response channels available (postal mail, fax, telephone or electronic questionnaires).  ***8. Section P9 Relevance***  Fishing and Aquaculture  Among the final users, it is worth mentioning: Public Organizations such as the General Fisheries Secretariat of the MAPA that uses the information gathered for its management function of the fishing sector, European Commission bodies such as DG MARE, Eurostat and JRC (Joint Research Center) that require data for the study of the fishing sector of Spain as a member of the EU, economic agents of the fishing sector such as fishing companies and associations, researchers and academic and scientific world such as Universities and Spanish Oceanographic Institute, media and individuals.  Processing  Within the INE, the main users of the information provided by this statistical operation are the National Accounts, Statistics of the ICT Sector, Statistics of Subsidiaries of Foreign Companies in Spain and the statistics of industrial conjuncture.  Among the external users of the survey are:  - Ministries and other public bodies.  - Territorial administrations (autonomous communities, town halls ...)  ***9. Section P10 Accuracy and reliability***  Fishing and Aquaculture  The data collected from the different sources is purified by correcting possible inconsistencies of the same, once they are received and after having recorded them, it is again observed if there are possible deviations of global values and the inconsistencies are corrected.  The calculation of the coefficients of variation of the study variables is carried out and documented in the Final Report of the statistical operation.  Processing  The sample design tries to minimize the sampling errors and the different processes of the survey are aimed at eliminating or reducing as much as possible the errors of the same, both in the collection phase (response rate and debugging control) and in the subsequent editing and imputation.  The collection procedure, coverage control, debugging of errors and imputation of the lack of response allows obtaining a high degree of reliability of the statistics.  Sampling errors of the main variables are calculated.  ***10.Section P11 Timeliness and punctuality***  Fishing and Aquaculture  There is a publication calendar of the different statistical operations visible on the MAPA website, which guarantees the execution of the work deadline  Processing  The dissemination of the data is done in accordance with the calendar of availability of the structural statistics that the INE produces and publishes for each year.  ***11.Section P12 coherence and comparability***  Fishing and Aquaculture  The use of the same national classification of economic activities makes it possible to contrast the information with other economic statistics on common variables, for example, of the National Accounts.  The internal coherence of statistics is a consequence of the application of the same methodological criteria and the same calculation method.  The data are comparable over the years, since the same variables are collected for a homogeneous stratification.  Processing  The use of the same national classification of economic activities allows the possibility of comparing the information of the survey with other economic statistics, such as industrial conjuncture surveys, and with the Central Directory of Companies (DIRCE).  It is comparable at the international level, covers the information needs demanded by the various users of statistics and is a useful tool for National Accounting.  The continuity in the methodology applied since the implementation of the survey allows its comparability over time.  ***12. Section P13 Accessibility and Clarity***  Fishing and Aquaculture  The methodology of the Economic Survey (main source of data) is published on the MAPA website.  The data is stored in databases, which are being worked on to make them public, always complying with the confidentiality precepts of the informants.  Processing  The methodology is available on the web page of the survey, the data is stored in Databases  *(max. 900 words per Region/RFMO/RFO/IO/NSB OR sector)* |