



Ministerio de Agricultura, Pesca y Alimentación

Secretaría General de Pesca

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

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

Commission Delegated Decision (EU) 2021/1167 of 27 April 2021

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

Commission Implementing Decision (EU) 2021/1168 of 27 April 2021

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

Commission Implementing Decision (EU) 2022/39 of 12 January 2022

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

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

2025-2027

Version [8] – 2025

Madrid, 06-11-2025

CONTENTS.

SECTION 1: GENERAL INFORMATION 9

Data collection framework at national level 9

Text Box 1a: Test studies description 10

REGION: NORTH SEA AND EASTERN ARCTIC. (EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27)), NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)), MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37), OUTERMOST REGIONS, OTHER REGIONS, 10

TEST STUDY: CFP SOCIAL DIMENSION 10

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)) 11

TEST STUDY: GENETICS 11

TEST STUDY: BAY OF BISCAY AND IBERIAN WATERS COMMON DOLPHIN (DELPHINUS DELPHIS) CASE STUDY 12

TEST STUDY: DIADROMOUS SPECIES DATA COLLECTION 13

TEST STUDY: NORTH SEA BASS (DICENTRARCHUS LABRAX) STOCK MARINE RECREATIONAL FISHERIES SAMPLING 14

TEST STUDY: HABITATS 15

TEST STUDY: GENETICS CKMR 16

TEST STUDY: ISUNEP25 17

TEST STUDY: ON-SHORE ELECTRONIC MONITORING 18

TEST STUDY: RAJA UNDULATA CENTINEL FISHERY 19

REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 19

TEST STUDY: EGG AND MESO-ZOOPLANKTON SAMPLING IN MEDIAS 19

Text Box 1b: Other data collection activities 20

REGION: NORTH SEA AND EASTERN ARCTIC. (EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27)), NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)), MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37), OUTERMOST REGIONS, OTHER REGIONS, 20

ACTIVITY: RCGS SECRETARIAT 20

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)) 21

ACTIVITY: REGIONAL DATA BASE AND ESTIMATION SYSTEM (RDBES) 21

ACTIVITY: REGIONAL COORDINATION TAKING PLACE IN INTER SESSIONAL SUBGROUPS (ISSGS) AND PAN REGIONAL COOPERATION BETWEEN RCGS. 22

ACTIVITY: SMART DOTS. 23

ACTIVITY: CATCH, EFFORT AND SAMPLING OVERVIEWS FOR RCG TECHNICAL MEETING. 24

ACTIVITY: FEMP-AND-04 25

ACTIVITY: FEMP-AND-05 26

ACTIVITY: FEMP-AND-07 26

REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 27

ACTIVITY: MED&BS REGIONAL DATA BASE (RDBFIS) 27

ACTIVITY: REGIONAL COORDINATION TAKING PLACE IN ISSGS AND PAN REGIONAL COOPERATION BETWEEN RCGS 28

ACTIVITY: FEMP-AND-01 28

ACTIVITY: FEMP-AND-02 29

ACTIVITY: FEMP-AND-09 30

REGION: REGION: OTHER REGIONS. (EASTERN CENTRAL ATLANTIC (FAO AREA 34). CECAF) 31
ACTIVITY: DATOS CECAF-BIOEXT 31
SECTION 2: BIOLOGICAL DATA 32
Text Box 2.3: Data collection for diadromous species in freshwater 32
REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)) 32
REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 35
Text Box 2.4: Recreational fisheries 36
REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)) 36
REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 38
Text Box 2.5: Sampling plan description for biological data 39
REGION: NORTH SEA AND EASTERN ARCTIC. (EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27)) 39
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA 39
SAMPLING SCHEME IDENTIFIER: ESP_AZTI_ATSEA_CATCH&ETP_ICES 39
REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)) 40
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA 40
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ATSEA 40
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ONSHORE 40
SAMPLING SCHEME IDENTIFIER: ESP_AZTI_ATSEA_CATCH&ETP_ICES 41
SAMPLING SCHEME IDENTIFIER: ESP-AZTI_ON SHORE_ICES 41
REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 41
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ATSEA 41
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ONSHORE 42
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_STOCKSPECIFIC_ATSEA 42
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_STOCKSPECIFIC_ONSHORE 42
REGION: THE OUTERMOST REGIONS. (EU WATERS AROUND CANARY ISLANDS (FAO AREA 34.1.2)) 43
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P3_ATSEA_CANARIAS 43
SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE_STOCK SPECIFIC 43
REGION: OTHER REGIONS. (NORTH-WEST ATLANTIC (FAO AREA 21). NAFO) 43
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA 43
REGION: OTHER REGIONS. (EASTERN CENTRAL ATLANTIC (FAO AREA 34). CECAF) 44
SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ATSEA_AFRICA 44
SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE 44
SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE_STOCK SPECIFIC 45
REGION: OTHER REGIONS. (ATLANTIC OCEAN AND ADJACENT SEAS (FAO AREAS 21, 27, 31, 37, 41, 47, 34, 48). ICCAT) 45
SAMPLING SCHEME IDENTIFIER: TUNA SAMPLING ON SHORE SCHEME 45
SAMPLING SCHEME IDENTIFIER: OBSERVE SCHEME 45
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL 46
SAMPLING SCHEME IDENTIFIER: ESP-IEO_P4_ONSHORE_ALL 46
REGION: OTHER REGIONS. (INDIAN OCEAN (FAO AREA 51 AND 57). IOTC) 46

SAMPLING SCHEME IDENTIFIER: TUNA SAMPLING ON SHORE SCHEME 46
SAMPLING SCHEME IDENTIFIER: OBSERVE SCHEME 47
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL 47
REGION: OTHER REGIONS. (WESTERN CENTRAL PACIFIC (FAO AREA 71). WCPFC) 47
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL 47
REGION: OTHER REGIONS. (EASTERN CENTRAL PACIFIC (FAO AREA 77 AND 87). IATTC) 48
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL 48
REGION: OTHER REGIONS. (ANTARCTIC AND SOUTHERN INDIAN OCEAN (FAO AREA 48, 58 AND 88). CCAMLR) 48
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA_CCAMLR 48
Text Box 2.6: Research surveys at sea 48
REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)) 48
RESEARCH SURVEY: INTERNATIONAL BLUE WHITING SPAWNING SURVEY (IBWSS) 48
RESEARCH SURVEY: WESTERN IBTS 4TH QUARTER (INCLUDING PORCUPINE SURVEY) 50
RESEARCH SURVEY: INTERNATIONAL MACKEREL AND HORSE MACKEREL EGG SURVEY (MEGS) 52
RESEARCH SURVEY: SARDINE, ANCHOVY HORSE MACKEREL ACOUSTIC SURVEY (SAHMAS). 53
RESEARCH SURVEY: SARDINE DEPM TRIENNIAL(SDEPM). 55
RESEARCH SURVEY: NEPHROPS UWTV SURVEY (UWTV 30). 56
RESEARCH SURVEY: BIOMASS OF ANCHOVY (BIOMAN). 57
RESEARCH SURVEY: ACOUSTIC SURVEY FOR JUVENILE ANCHOVY IN THE BAY OF BISCAY (JUVENA_ESP). 58
RESEARCH SURVEY: DEEPWATER LONGLINE SURVEY (PALPRO_ESP). 59
RESEARCH SURVEY: WESTERN IBTS 1ST QUARTER. 60
RESEARCH SURVEY: ACOUSTIC SURVEY ON SARDINE AND ANCHOVY-RECRUITS. 61
RESEARCH SURVEY: ACOUSTIC INDEX FOR JUVENILE BLUEFIN TUNA IN THE BAY OF BISCAY 63
RESEARCH SURVEY: ACOUSTIC SURVEY FOR JUVENILE ANCHOVY SARDINE IN THE WESTERN IBERIA-IBERAS 64
REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 65
RESEARCH SURVEY: PAN-MEDITERRANEAN ACOUSTIC SURVEY (MEDIAS). 65
RESEARCH SURVEY: INTERNATIONAL BOTTOM TRAWL SURVEY IN THE MEDITERRANEAN (MEDITS). 66
RESEARCH SURVEY: BLUEFIN TUNA LARVAL SURVEY. 67
REGION: THE OUTERMOST REGIONS. (EU WATERS AROUND CANARY ISLANDS (FAO AREA 34.1.2)) 69
ACOUSTIC SURVEY FOR SMALL PELAGIC FISH WITH COMMERCIAL INTEREST IN THE CANARY ISLANDS 69
REGION: OTHER REGIONS. (NORTH-WEST ATLANTIC (FAO AREA 21). NAFO) 70
RESEARCH SURVEY: FLEMISH CAP GROUNDFISH SURVEY 70
RESEARCH SURVEY: 3LNO GROUNDFISH SURVEY. (1ST PART -3NO) 71
RESEARCH SURVEY: 3LNO GROUNDFISH SURVEY. (2ND PART -3L) 72
SECTION 3: FISHING ACTIVITY DATA 74
Text Box 3.1: Fishing activity variables data collection strategy 74
Text Box 3.2: Fishing activity variables data collection strategy (for inland eel commercial fisheries) 74
SECTION 4: IMPACT OF FISHERIES ON MARINE BIOLOGICAL RESOURCES 76
Text Box 4.2: Incidental catches of sensitive species 76

REGION: NORTH SEA AND EASTERN ARCTIC. EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27) 76

REGION: NORTH-EAST ATLANTIC.NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27) 77

REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 83

REGION: THE OUTERMOST REGIONS. EU WATERS AROUND CANARY ISLANDS (FAO AREA 34.1.2) 85

REGION: OTHER REGIONS. NORTH-WEST ATLANTIC (FAO AREA 21). NAFO 85

REGION: OTHER REGIONS. EASTERN CENTRAL ATLANTIC (FAO AREA 34). CECAF 87

REGION: OTHER REGIONS. ATLANTIC OCEAN AND ADJACENT SEAS (FAO AREAS 21, 27, 31, 37, 41, 47, 34, 48). ICCAT 88

REGION: OTHER REGIONS. INDIAN OCEAN (FAO AREA 51 AND 57). IOTC 89

REGION: OTHER REGIONS. WESTERN CENTRAL PACIFIC (FAO AREA 71). WCPFC 90

REGION: OTHER REGIONS. EASTERN CENTRAL PACIFIC (FAO AREA 77 AND 87). IATTC 91

REGION: OTHER REGIONS. ANTARCTIC AND SOUTHERN INDIAN OCEAN (FAO AREA 48, 58 AND 88). CCAMLR 92

Text Box 4.3: Fisheries impact on marine habitats 93

REGION: NORTH-EAST ATLANTIC.NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27) 93

REGION: MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37) 94

SECTION 5: ECONOMIC AND SOCIAL DATA IN FISHERIES 95

Text Box 5.2: Economic and social variables for fisheries data collection 95

SECTION 6: ECONOMIC AND SOCIAL DATA IN AQUACULTURE 97

Text Box 6.1: Economic and social variables for aquaculture data collection 97

SECTION 7: ECONOMIC AND SOCIAL DATA IN FISH PROCESSING 100

Text Box 7.1: Economic and social variables for fish processing data collection 100

ANNEX 1.1 - QUALITY REPORT FOR BIOLOGICAL DATA SAMPLING SCHEME 100

RELATED TO TABLE 2.5, 2.2 AND TEXT BOX 2.5, 4.2 (COMMERCIAL FISHERIES DATA COLLECTION) 100

SAMPLING SCHEME IDENTIFIER: TUNASAMPLINGONSHORE 100

SAMPLING SCHEME IDENTIFIER: OBSERVE SCHEME 104

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ATSEA 107

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ONSHORE 110

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_BIOLOGICAL_SPECIFIC 113

SAMPLING SCHEME IDENTIFIER: ESP_AZTI_ATSEA_CATCH&ETP_ICES. 120

SAMPLING SCHEME IDENTIFIER: ESP-AZTI_ONSHORE_ICES. 124

SAMPLING SCHEME IDENTIFIER: ESP-AZTI_BIOLOGICAL_SPECIFIC 127

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ATSEA 130

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ONSHORE 133

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_STOCKSPECIFIC 136

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_BIOLOGICAL_SPECIFIC_ATSEA 139

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_BIOLOGICAL_SPECIFIC_ONSHORE 142

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ATSEA_AFRICA 147

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ATSEA_CANARIAS 150

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE 153

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE_STOCK SPECIFIC 156

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_BIOSPEC 159

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL 162
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ONSHORE_ALL 167
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA 171
SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA-CCAMLR 176
SAMPLING SCHEME IDENTIFIER: ESP_SGP_PET_ATSEA 181
RELATED TO TABLE 2.6, 2.2 AND TEXT BOX 2.6 (BIOLOGICAL SPECIFIC DATA COLLECTION) 184
SAMPLING SCHEME IDENTIFIER: IBWSS 184
SAMPLING SCHEME IDENTIFIER: IBTS_Q4 188
SAMPLING SCHEME IDENTIFIER: MEGS 191
SAMPLING SCHEME IDENTIFIER: SAHMAS 195
SAMPLING SCHEME IDENTIFIER: SDEPM 198
SAMPLING SCHEME IDENTIFIER: UWTV30 202
SAMPLING SCHEME IDENTIFIER: FCGS 206
SAMPLING SCHEME IDENTIFIER: PLATUXA_ESP 212
SAMPLING SCHEME IDENTIFIER: BIOMAN 218
SAMPLING SCHEME IDENTIFIER: JUVENA_ESP 222
SAMPLING SCHEME IDENTIFIER: PALPRO_ESP 225
SAMPLING SCHEME IDENTIFIER: MEDIAS 228
SAMPLING SCHEME IDENTIFIER: MEDITS 232
SAMPLING SCHEME IDENTIFIER: IBTS_Q1 236
SAMPLING SCHEME IDENTIFIER: ECOCADIZ-RECLUTAS 239
SAMPLING SCHEME IDENTIFIER: BFT-INDEX 245
SAMPLING SCHEME IDENTIFIER: IBERAS 249
SAMPLING SCHEME IDENTIFIER: PECAN 252
SAMPLING SCHEME IDENTIFIER: TUNIBAL 254
RELATED TO TABLE 2.4 AND TEXT BOX 2.4 (RECREATIONAL FISHERIES DATA COLLECTION 259
SAMPLING SCHEME IDENTIFIER: ESP-AZTI_ONSITESURVEYSRECREATIONAL. 259
SAMPLING SCHEME IDENTIFIER: ESP_SGP_SELFONSHORE_RECREATIONAL (OFF SITE SURVEYS). 262
RELATED TO TABLE 2.3 AND TEXT BOX 2.3 (DIADROMOUS DATA COLLECTION 264
SAMPLING SCHEME IDENTIFIER: ANG_ANDA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 264
SAMPLING SCHEME IDENTIFIER: ANG_ASTU_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL) 267
SAMPLING SCHEME IDENTIFIER: ANG_ASTU_SCIOBS WATER BODY_DIADROMOUS (MARKET) 269
SAMPLING SCHEME IDENTIFIER: ANG_ASTU_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 271
SAMPLING SCHEME IDENTIFIER: ANG_ BASQ_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 274
SAMPLING SCHEME IDENTIFIER: ANG_CANT_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL) 276
SAMPLING SCHEME IDENTIFIER: ANG_CANT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 278
SAMPLING SCHEME IDENTIFIER: ANG_CANT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC-SUDOANG) 280
SAMPLING SCHEME IDENTIFIER: ANG_ CAT_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL)_GE_RWL 282
SAMPLING SCHEME IDENTIFIER: ANG_ CAT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)_GE_RWL 284

SAMPLING SCHEME IDENTIFIER: ANG_ CAT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)_S_EWL 286

SAMPLING SCHEME IDENTIFIER: ANG_ CAT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)_Y_SWL 288

SAMPLING SCHEME IDENTIFIER: ANG_GALI_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL) 290

SAMPLING SCHEME IDENTIFIER: ANG_GALI_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 292

SAMPLING SCHEME IDENTIFIER: ANG_MURC_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 294

SAMPLING SCHEME IDENTIFIER: ANG_MURC_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL) 296

SAMPLING SCHEME IDENTIFIER: ANG_MURC_SELFATSHORE_DIADROMOUS (COMMERCIAL) 298

SAMPLING SCHEME IDENTIFIER: ANG_NAVA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 300

SAMPLING SCHEME IDENTIFIER: ANG_VALE_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL) 302

SAMPLING SCHEME IDENTIFIER: SEATROUT_NAVA_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL) 304

SAMPLING SCHEME IDENTIFIER: SEATROUT_NAVA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 306

SAMPLING SCHEME IDENTIFIER: SEATROUT_GALI_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 308

SAMPLING SCHEME IDENTIFIER: SALMON_ASTU_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 310

SAMPLING SCHEME IDENTIFIER: SALMON_BASQ_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 312

SAMPLING SCHEME IDENTIFIER: SALMON_CANT_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL) 314

SAMPLING SCHEME IDENTIFIER: SALMON_CANT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 315

SAMPLING SCHEME IDENTIFIER: SALMON_GALI_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL) 317

SAMPLING SCHEME IDENTIFIER: SALMON_GALI_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 319

SAMPLING SCHEME IDENTIFIER: SALMON_NAVA_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL) 321

SAMPLING SCHEME IDENTIFIER: SALMON_NAVA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC) 323

ANNEX 1.2 - QUALITY REPORT FOR SOCIOECONOMIC DATA SAMPLING SCHEME 326

REGIONAL WORK PLAN ECON 326

SAMPLING SCHEME IDENTIFIER: FISHERIES. PROBABILITY SAMPLE SURVEY 327

SAMPLING SCHEME IDENTIFIER: FISHERIES. CENSUS 334

SAMPLING SCHEME IDENTIFIER: AQUACULTURE. PROBABILITY SAMPLE SURVEY 336

SAMPLING SCHEME IDENTIFIER: AQUACULTURE. CENSUS 343

SAMPLING SCHEME IDENTIFIER: PROCESSING. PROBABILITY SAMPLE SURVEY 346

GREEN: New from RWP

BLUE: New (national)

RED: Removed

SECTION 1: GENERAL INFORMATION

Data collection framework at national level

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

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

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

E-mail: sgprotec@mapa.es

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

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

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

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

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

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

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

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

The participants Institutes are:

Spanish Institute of Oceanography (IEO-CSIC):

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

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

http://www.ieo.es/es_ES/web/ieo/pndb

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

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

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

COMMENT ON GUIDELINES COMPLIANCE

Table 2.2:

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

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

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

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

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

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

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

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

Research surveys ECOCADIZ_ESP and BOCADEVA has been removed from the WP.

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

Although the 9th anchovy benchmark report is not yet been complete, the work of the working group so far, has been along the lines of using the PELACUS (only for the western component), PELAGO and ECOCADIZ RECLUTAS surveys as independent indices of the fishery, and leaving the BOCADEVA and ECOCADIZ index out of the models, which would no longer be requested in the data calls.

In any case, the evaluation model in SS3 will be designed in such a way that, from 2024, neither the ECOCADIZ survey nor the BOCADEVA survey will be considered.

Moreover, BOCADEVA is not a mandatory survey and with the disappearance of ECOCADIZ, there would be no synchronous survey to provide it with adult samples.

For these reasons, the surveys are not included in the WP from 2025 onwards.

(max. 1000 words)

Text Box 1a: Test studies description

REGION: NORTH SEA AND EASTERN ARCTIC. (EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27)), NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)), MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37), OUTERMOST REGIONS, OTHER REGIONS,

TEST STUDY: CFP SOCIAL DIMENSION

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

Name of the national test study: CFP SOCIAL DIMENSION

1. Aim of the test study

The capability to measure the fisheries' social dimension is pivotal to achieving the European Union's goals stated in the Common Fisheries Policy (art.2). This entails understanding and assessing human behaviour, the consequences of human behaviour and the human dependence and/or dependence and/or interlink with the ecosystem. Following the recommendations from the STECF EWG 24-05 on "Social data" and RSCECON-ISSG meeting "Exploring options for data collection for new social variables" this test study aims to explore the feasibility and opportunity of informing social indicators by including new variables in the DCF. Indicators aim to improve the evidence base for policy-making, acting as a bridge between science and policy. The study focuses on the twelve indicators aligned with the four main priorities defined by DG-MARE, Member States and other stakeholders: state of play, dependency, generational renewal and assessment of management measures. The aim is to generate social data and further methodological developments.

2. Duration of the test study

2025-2026-2027

3. Methodology and expected outcomes of the test study

- Identification of social information already available and potentially usable for the social indicators
  - Indicators/variables: 12 indicators proposed by the STECF- EWG on Social data and additional variables identified through the implementation of the test study as available.
  - Data sources: administrative data from databases and registers and/or survey based on questionnaire forms.
- Determine what information is not yet available under administrative sources but needs to be obtained.
- Explore de feasibility, opportunity, added value and implications of adding questions to existing surveys/developing a survey to cover the information needs.
- Analyse the use of alternative CFP Social dimension analytical toolbox (National Fisheries Profiles, Community Profiles, others) and procedures for systematic data collection.

The expected outcomes include:

- Methodology on social data collection for the 12 indicators.
- List of data sources and -if applicable- survey sampling strategies and techniques.
- Quality check and analysis of data gathered.
- Provide a better understanding of the variables explaining generational renewal, dependency, state of play, and measurement of socioeconomic impacts of policy measures.
- Support operationalization of social variables and cross-comparison across EU countries to inform national, regional and EU policy-making.

(max 900 words per study)

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27))

TEST STUDY: GENETICS

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex.

Name of the regional test study: 1 Genetics

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the test study

Incorporation of the different genetic approaches that can be applied to fisheries/ecosystems assessment and monitoring.

2. Duration of the test study
2025-2027

3. Methodology and expected outcomes of the test study
Three main areas are identified concerning the application of genetics to fisheries assessment and which are distinguished by the aim they pursue and by the sample type they require. A preamble to data collection on these fields listed below is to identify clearly the cost estimates and end-user needs.

1. The genetic analyses of collected stomachs contents. This discussion is now included as part of the work of the Stomach sampling ISSG, where several presentations have been made. AZTI has also an EU Map funded test study, whose aim is to "Set the basics of a routine food-web monitoring program through genetic analyses of stomach contents".
2. The analysis of environmental DNA, that is, that DNA collected by filtering water samples, and which contain traces of the organisms inhabiting the water column, including large ones such as fish and elasmobranchs. This approach, being considered a biodiversity monitoring approach, could be included as part of the Electronic Monitoring Technologies ISSG.
3. The sampling of fish tissue with the purpose of doing stock delimitation and identification studies, close-kin mark-recapture (CKMR) projects for biomass estimation or epigenetic analyses for age determination. It was discussed that this tissue sampling for genetic analyses could be integrated into the Surveys ISSG.

Agreement reached in RCG 2023: No specific ISSG set-up for 2023/24

Agreement and commitment on the inclusion of genetics in data collection programs

MS involved: ALL

- Agreement to collaborate more in the use of genetics in the different fields of data collection

Recommendation that ISSG on stomach sampling, ISSG on Electronic Monitoring Technologies and ISSG on Surveys include a term of reference on the use of genetics in their intersessional work, including clear identification of user needs.

TEST STUDY: BAY OF BISCAY AND IBERIAN WATERS COMMON DOLPHIN (DELPHINUS DELPHIS) CASE STUDY

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex.

Name of the regional test study: 3 Bay of Biscay and Iberian waters common dolphin (*Delphinus delphis*) case study

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the test study
Bycatch of common dolphins in the Bay of Biscay (BoB) has been identified as a major problem by the European Commission. In connection with ICES/WGBYC and ICES/WKPETSAMP, the objective of this case study is to identify which fisheries have the greatest impact. This identification of fisheries should be done at the highest possible resolution. Once the fisheries have been identified, the Member States to which these fisheries belong are detailed, and based on the effort exerted, the importance of each one of them. With this information, the objective is to improve the sampling of these fisheries at the regional level.

2. Duration of the test study
Not expected to be implemented before 2024-2025.

3. Methodology and expected outcomes of the test study
To be developed

Agreement and commitment on common dolphin case study in the BoB and IW

MS involved: ESP, FRA, BEL

MS involved in the Bay of Biscay fisheries to work towards

- Identification and characterization of fisheries/metiers at the right resolution considering bycatch impact.
- Evaluate the sampling coverage of these fisheries/metiers
- Align observers' protocols between countries
- Standardize effort calculation methodologies and identify relevant variables needed to collect under the transversal data to improve bycatch estimates (e.g., number of nets, soak time etc. in the case of passive gears)

- Identify minimum sampling coverage per fishery/metier.
- Ensure minimum sampling coverage for fisheries that currently have no/low coverage.
- Methodologies to collect bycatch data considering different fleet segments.
    - Scientific observers
    - New technologies (e.g., CCTV)
    - Fishermen collaboration

TEST STUDY: DIADROMOUS SPECIES DATA COLLECTION

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex.

Name of the regional test study: 4 Diadromous species data collection

NANSEA_RWP_2025-2027_TEXT_2024.08.23

The regional coordination of data collection of diadromous species is under development in the RCG ISSG on Diadromous fish species in collaboration with relevant ICES expert groups. The work intends to improve regional coordination and harmonization of sampling methodologies for a best possible end-user need and facilitate the use of central databases to host their specific datasets.

The newly accepted project DIASPARA (DIAdromous Species: moving towards new PARadigms to achieve holistic scientific Advice) will also have major implications on the development of datacollection on Diadromous fish species.

1. Aim of the test study

The recently accepted EMFAF project proposal DIASPARA aims at better aligning data needs and data collection and is set to contribute to the objectives of the DCF and the CFP, which shall bring valuable insights for the future Regional Workplans

2. Duration of the test study

DIASPARA project: 24 months between 2024-2027

3. Methodology and expected outcomes of the test study

DIASPARA will address pre-identified shortcomings in the scientific advice to better support a regionalized and holistic Ecosystem-bases approach to fisheries management of eel and salmon, putting spatial scales and diversity of human impacts at its core. Moreover, DIASPARA aims at aligning collection of biological and anthropogenic impact data with models to "optimise the collection and use of samples and collected scientific data under the Data Collection Framework", and to "improve methodological aspects of the design, collection and/or management of the data collected".

By explicitly accounting for the complex spatial structure of the species and providing more holistic advice, DIASPARA has the ambition of improving the regionalised management and as such, to contribute to the future Regional Workplans. Based on the expected results, and in collaboration with the ISSG Diadromous subgroup, DIASPARA aims to better align data needs and data collection, contribute to the objectives of the DCF and the CFP, and thus bring valuable insights for the future Regional Workplans.

While DIASPARA primarily targets eel and salmon, many of the outcomes of the project (databases, impact of dams and weirs, methodological developments) will also contribute to the advice and management of other species, including other diadromous species.

DCF-Data collection for Diadromous Species (Eel, Salmon, Sea Trout)

Salmon (WGNAS)

WGNAS are already working at a regional scale, hence forming RWPs for further improvements in harmonization and regionalization is recommended and needs to be agreed on.

Eel (WGEEL)

Currently the international assessment by WGEEL is based on recruitment data, collected across the entire distribution area. The DIASPARA Project aims at a more holistic advice by explicitly accounting for the complex spatial structure of the species. As a result, DIASPARA has the ambition of improving the regionalised management and as such, to contribute to the future Regional Workplans in near future. According to the WKFEA roadmap, the aim is to have a first benchmark in 2027.

In the meantime, data on recruitment series collected for the international assessment should take into account following guidelines:

- Recruitment series should, whenever possible, continue existing series.

- The series should have the longest record possible, data from the 1960-1980 period will be of great value.

If data collection is started at a new recruitment site, these guidelines should be followed:

- The site location should be as close to the sea as possible
- The series should not be biased by local factors (gate operation, glass eel fishery, etc).
- The series should not be biased by glass eel translocation (restocking).
- The whole recruitment season should be sampled.
- The series should be representative of annual recruitment variation at the site.
- The series can be a trap, partial or total sampling, a scientific monitoring, a fishery-based index.

Each series should describe:

- The name of site, the unit (number or kg), the life stage (either glass eel, or a mixture of glass and yellow eel corresponding to glass eel having recruited the same year, or yellow eel in areas where glass eel recruits are not available), the code of the Eel Management Unit and the ICES subdivision (FAO code of sea region at the division level) of the river or sampling location, the longitude and latitude (in format EPSG:4326), the distance to the sea from the sampling site (the river path), the method of sampling.
- In addition, when possible, the series description should also include the effort in terms of number of fishing trips/day, a precise description of the method used and possible biases, a precise description of the site, including the sea where the river is flowing to, possible comments on the change in data collection (upgrade of the fishway, change in methods, change in local conditions, etc).
- Annual data should be provided, along with year, effort, comments on the annual data, comments on the quality of the series.
- Ideally, series should be accompanied with a set of biological descriptors relative to the annual sampling including, for sites comprising glass eel, the average length of glass eel with at least one sampling per month during the whole migration season (at least 4 to 5 months), based on individual samples of 50 glass eel (no preservation with formalin) measured to the nearest mm, weighted (after removing excess water) to the nearest 0.1 g, the pigmentation stage of the glass eel (to check for stages having resumed their growth).
- Whenever possible, the samples of glass eel should be collected in the estuary downstream from the trap (since there is a delay before the ascent of glass eel trap). For sites comprising a mixture of glass eel and yellow eels, in addition to the described individual sampling, group metrics should indicate the proportion of glass eel in the mixture (reported as weight, if the series is weight based, and as numbers if the series is made of counts).
- For sites comprising yellow eels, group metrics of the average size and weight (and if possible, age) of ascending yellow eels, as well as individual samples of yellow eel size and weights.

Agreements and commitments on the coordination of diadromous species data collection

MS involved: ALL

MS agreed that the following activities should be evaluated and developed further to be part of the RWP:

- Ensure comparable methods between regions (e.g., in sampling methodologies such as recruitment data series, electrofishing protocols or comparability of effort data).
- Enable usage of Regional Data Base and Estimation System (RDBES) for partial data storage (landings).
- Meetings and/or email exchanges between ISSG Diadromous fish species and Assessment Working Groups will be maintained to ensure alignment between data collection and data use

TEST STUDY: NORTH SEA BASS (DICENTRARCHUS LABRAX) STOCK MARINE RECREATIONAL FISHERIES SAMPLING

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex.

Name of the regional test study: 5 North Sea bass (*Dicentrarchus labrax*) stock marine recreational fisheries sampling

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the test study

The North Sea seabass stocks were identified by the ISSG Marine Recreational Fisheries as a candidate for a regional sampling plan, because it is a stock that involves several Member States (MS) including a non-EU MS (UK).

2. Duration of the test study
2025-2027.

3. Methodology and expected outcomes of the test study
As a first approximation, the importance in terms of catches of this stock by MS has been reviewed. In addition, a first review of the available data (historical data series, etc.), methodologies used for data collection, etc. has also been carried out. With this information, the possible coordination of sampling by MS is being discussed, with the aim of being able to incorporate this information into the assessment groups.

Agreement and commitment on the development of North Sea bass marine recreational fisheries sampling

MS involved: ALL

MS agreed to continue the work to provide assessment working groups with recreational catches of North Sea bass using the agreed methodology.

TEST STUDY: HABITATS

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

Name of the national test study: HABITATS

1. Aim of the test study

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

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

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

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

2. Duration of the test study

5-year pilot study (2022-2026)

3. Methodology and expected outcomes of the test study

- Identification and characterisation of fishing gears with potential impact on the seabed.
- Identification and description of methodologies for the characterization and identification of the potential impacts of fishing gear on the seafloor and seabed habitats and species.
- Definition of a survey strategy: adopting the Basque Country as case study, validate the proposed characterization methodologies and the potential impacts identified.
    - Identification and delimitation of fishing grounds for each fishing gear. Estimation of fishing effort based onVessel Monitoring System (VMS) and Automatic Identification System (AIS) data.

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

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

4. Expected outcomes

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

(max 900 words per study)

TEST STUDY: GENETICS CKMR

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

Name of the national test study: GENETICS CKMR

1. Aim of the test study

- To collect enough genetic data for application of a Close Kin Mark Recapture model for spawning stock biomass estimation of European Hake.
- CKMR (Close Kin Mark Recapture) is a method to estimate the scale of the population (absolute global index for Spawning Stock Biomass), which can also provide information about connectivity between different stock units and parameters such as natural mortality. The method, which is fishery independent, is based on the fact that the more kins you find in a sample of a given size, the smaller is the population and vice versa. The method considers different parameters of the species (fecundity, longevity, …) and requires tissue samples from a high number of individuals. The tissue samples are then genotyped (genetic analyses) for assessing the kinship of each pair of samples. The number of pairs found is then compared with the number of pairs expected in order to optimize the estimation of the population size. After an initial evaluation, it has been found that hake is a suitable species for the application of this method and could benefit from it. Moreover, this collection of genetic material would not only be suitable for CKMR, but also for further assessing connectivity between and within hake stocks. In this line, WGBIE has forwarded several recommendations regarding the collection of genetic material (see: https://doi.org/10.17895/ices.pub.25908130). Using previous projects, a genotyping tool that allows easy and cost-effective genetic analyses has been developed and the initial the CKMR model has been formulated. Considering the large number of samples required for CKMR (close to 10,000/year), a pilot study on genetics can be the perfect framework to formalize the sample collection for a CKMR application of hake.

2. Duration of the test study

Three years (2025-2026-2027).

3. Methodology and expected outcomes of the test study

Work Package 1: Sampling Protocol

- Task 1.1: Several sampling strategies and kits will be tested so that the most suitable option considering cost-effectiveness is selected.
- Task 1.2: A sampling protocol will be agreed between geneticists and sample collectors so that the best sample quality at the least effort is obtained
- Task 1.3: The minimum required metadata to be collected will be defined as well as a format in which this needs to be provided
- OUTCOME 1: Standard Operating Procedure for tissue sampling and metadata registering.

Work Package 2: Sample collection

- Task 2.1: Collection of samples of required location and age strata
- Task 2.2: Metadata recording of collected samples
- OUTCOME 2: Collection of samples and associated metadata available

(max 900 words per study)

TEST STUDY: ISUNEP25

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

Name of the national test study: ISUNEP25

1.- Aim of the test study:

Estimate abundance of Nephrops norvegicus each year in Functional Unit 25 North Galicia using underwater videos transects (ISUNEP25 Survey)

2.- Duration of the test study:

ISUNEP25 survey was carried out in the whole area of FU 25 in June 2023. In September 2024 is expected to cover the whole area again. In order to have at least a 5 years' time series of results to consolidate the methodology, it would be necessary at least 3 yearly more surveys (2025-2027). Thereafter, the Nephrops norvegicus stock assessment should be yearly assessed using this methodology (underwater TV surveys, UWTV), since it is the International Council for the Exploration of the Seas (ICES) standard method to assess Nephrops stocks. The duration of the ISUNEP25 survey is thirteen days.

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

Methodology:

Nephrops total allowable catch (TAC) in FU 25 is zero since 2017, only data from commercial fleet discards and from the Demersales (SPGFS-WIBTS-Q4, G2784) bottom trawl survey are available. With these data, the stock assessment is carried out using the stochastic Surplus Production model in Continuous Time (SPiCT). But commercial data (e.g. Nephrops discards weight) could vary due to changes in legislation (TACs, quotas, minimum conservation reference sizes, effort regime, etc.), changes in the market, etc. that affect the commercial fleet activity and its target species. However, in the Nephrops UWTV surveys the active (active in contrast to collapsed) Nephrops burrows are counted and it is assumed from dive studies that there is one Nephrops individual in each Nephrops burrow. Those data are not influenced by the aforementioned factors.

More than twenty Nephrops stocks of the North East Atlantic are assessed with the information provided by Nephrops UWTV surveys under the supervision of (ICES). Members of the ISUNEP25 survey team attended the ICES Working Group on Nephrops Surveys (WGNEPS) in 2022 and 2023 for training in the UWTV methodology. So, the methodology used in the ISUNEP25 survey follows the protocols and standards provided by the ICES WGNEPS.

The Nephrops survey area in FU 25, estimated with the positions of 2942 hauls with Nephrops catch from 1977 to 2023, is 5876 km2. There are 13 days available in a research vessel each year in order to conduct this survey. 80 video transects isometrically distributed in the area are planned in each ISUNEP25 survey. The distance between transects is 4.7 nautical miles. A sled with main and auxiliary cameras and headlights is sliding in the seabed in order to obtain 8 minutes of seabed video in each transect. The width of the video vision is 80 cm. The distance covered in each video transect is around 160 m and the area 120m2. Three persons count separately the number of burrows in each video and contrast their results.

Expected outcomes:

- *Nephrops* density by transect: number of burrows/m^2.

- FU 25 Nephrops stock density: average of the transects densities (burrows/m2 = number of Nephrops/m2).
- FU 25 Nephrops *stock abundance: stock density x m2 of the stock*
- FU 25 Nephrops stock biomass: FU 25 Nephrops stock abundance x Nephrops individuals mean weight.
- FU 25 Nephrops stock harvest rate: number of individuals caught by the commercial fleet divided by Nephrops stock abundance.
- Time series of yearly FU 25 *Nephrops* stock densities.

Other expected outcomes of the ISUNEP25 survey:

1.- Obtain information about the current limits of the FU 25 *Nephrops* stock area (historical data suggest that could have been a stock area contraction around 70%).

2.- Obtain information about the carrying capacity (K) of the FU 25 *Nephrops* stock.

3.- Biological sampling of FU 25 *Nephrops* stock individuals caught in the beam trawl hauls (reproductive and morphometric variables).

4.- FU 25 *Nephrops* stock genetic samples collection (from beam trawl hauls) in order to obtain information about the stock identification and endogamy using microsatellites.

5.- FU 25 stock *Nephrops* individuals stomach collection (from beam trawl hauls) in order to obtain information about the preys and food of *Nephrops*.

6.- FU 25 *Nephrops* stock area sediment granulometric analysis (box-corer dredge stations) and its relation with *Nephrops* density (includes total organic matter content, grain size, etc.)

7.- FU 25 *Nephrops* stock area pollutants (box-corer dredge stations).

8.- First geomorphological characterization of North Galicia area: Bathymetry and reflectivity (multibeam echo sounder), sedimentary structure (parametric echo sounder) and water sound velocity profilers (ASVP).

9.- North Galicia benthic and necto-benthic communities characterization (biodiversity, number, weight and length of the species caught in beam trawl hauls).

10.- North Galicia benthic and demersal megafauna and macrofauna density (biodiversity in videos)

11.- quantification, identification and weight of marine litter in North Galicia.

(max 900 words per study)

TEST STUDY: ON-SHORE ELECTRONIC MONITORING

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

Name of the national test study: On-shore Electronic Monitoring

1.- Aim of the test study:

Exploration of analysis using artificial intelligence (AI) of images of landings at the fish market in order to obtain taxonomic and biometric data for scientific use. In this way, it is expected to be able to recover data from ports that currently do not allow access to scientific sampling of their landings due to the automation of their auction process. Most of these ports have established electronic monitoring systems for fish boxes using closed circuit television (CCTV). Therefore, the objective of our pilot program is to explore the reuse of these commercial images in order to obtain scientific parameters that expand the coverage of current in-person scientific sampling

2.- Duration of the test study:

2025-2026-2027

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

The pilot project for reusing images of commercial landings for scientific objectives will be structured in three stages, one per year:

- First year (2025): Identification of target auctions/markets, selecting those where CCTV have been fully implemented and that are open to collaboration in this first phase. Technical evaluation of each auction to size the technology and work protocols to be implemented. Training of the Artificial Intelligence system to, through images, identify the captured species, as well as obtain biometric data of the main species.
- Second year (2026): Implementation of the pilot program.

- Third year (2027): consolidation of the taxonomic and biometric data obtained. Statistical analysis of these new data, as well as their integration into the structural data from the current on-shore sampling program (in person) with the aim of confirming the absence of possible sources of bias. In case of obtaining positive results from the pilot program, the final task of the year will be to design a mixed program of in-person sampling and electronic monitoring in the fish market that can be implemented in the Work Plan of the next triennium (2028-2030).

(max 900 words per study)

TEST STUDY: RAJA UNDULATA CENTINEL FISHERY

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

Name of the national test study: Raja undulata centinel fishery

1.- Aim of the test study:

The main objective of this study is to improve knowledge about the populations of rays in the Cantabrian Sea (ICES division 8c), in particular the undulate ray (*Raja undulata*). both from the biological and fishing point of view to contribute to improve its management.

Specific objectives:

- Estimation of landings by fishing port and fishing gear.

- Estimation of fishing effort on target species.

- Knowledge of the spatio-temporal distribution pattern.

- Improvement of knowledge about the biology of the target species in the study area.

- Expansion of the involvement and commitment of the fishing sector in the management of fishing resources.

2.- Duration of the test study:

The study depends on the granting of a scientific quota by the EU. A priori, the duration of the study will be one year.

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

Methodology:

To achieve the objectives, it is necessary to place scientific observers on board commercial vessels to collect the following information: catches, fishing effort, biometric data of the target species and taking muscle samples for genetic analysis. In the case of vessels that cannot take observers on board, the skipper will get in charge or compromise to provide this information. Basically, the amount of total catch in kg (both species retained and discarded), fishing effort (gear characteristics, number of hooks or nets deployed, location and soaking time) and, if possible, additional biometric data (size and sex) of the undulata ray caught.

Expected outcomes:

- Species-specific landings by fishing port and gear.

- Estimates of catch per unit effort (CPUE) in some fishing ports (sampled).

- Estimates of population size (length distributions and sex).

- Spatial distribution of the catches.

- Collection of genetic samples in order to obtain information about the stock identification.

- Biological sampling to obtain life history parameters such as first maturity length, reproductive season.

- Knowledge of bycatch species (retained and discarded).).

(max 900 words per study)

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

TEST STUDY: EGG AND MESO-ZOOPLANKTON SAMPLING IN MEDIAS

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

Name of the national test study: Egg and meso-zooplankton sampling in MEDIAS

1.- Aim of the test study:

Given the importance of the plankton community in the dynamic, survival and distribution of small pelagic populations, the annual monitoring of the ichthyo- and zooplankton community using different sampling systems (CUFES, plankton nets, etc.) has been established as a new objective within the framework of MEDIAS.

2.- Duration of the test study:

2025-2026-2027

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

A proper number of stations (depending on transect length) could be performed along dedicated transects in order to collect information on meso-zooplankton and eggs with an appropriate resolution.

The reasons for this proposal are numerous.

- First, sampling of plankton scattering layers using plankton nets could facilitate echogram interpretation by providing a ground truth of some targets in the acoustic data, so that, during the acoustic processing, these targets could be discarded with a higher degree of certainty, while separating the small pelagic fish echoes from unwanted plankton echoes. The accuracy of this process could be further enhanced through the knowledge of the kind of planktonic organisms that are prevalent in a certain area.
- Plankton and eggs sampling are also important because of the potential relationships between acoustic surveys and anchovy stock assessments based on the daily egg production method.
- Finally, by knowing plankton abundance it is possible to have an index of productivity, and thus prey availability, that is important in the study of small pelagic fish abundance over the years and of their spatial distribution; this ecosystem indicator could also be important in the Marine Strategy Framework Directive.

(max 900 words per study)

Text Box 1b: Other data collection activities

REGION: NORTH SEA AND EASTERN ARCTIC. (EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27)), NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)), MEDITERRANEAN SEA AND BLACK SEA (GFCM GSA 1-29, FAO AREA 37), OUTERMOST REGIONS, OTHER REGIONS,

ACTIVITY: RCGS SECRETARIAT

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

Name of the regional activity: RCGs Secretariat

NANSEA_RWP_2025-2027_TEXT_2024.08.23

MedBS_RWP_2025-2027_text_2024.08.30

LARGE_PELAGIC_RWP_2025-27_Text_

1. Aim of the data collection activity
Support the operation and functioning of the RCGs Secretariat underpinning fluent regional coordination of data collection activities as stipulated by Article 9 of the DCF Regulation (EU) 2017/1004.

2. Duration of the data collection activity
2025-2027.

3. Methodology and expected outcomes of the data collection activity

The Secretariat´s organizational structure has been set up and pilot tested throughout the SecWeb project (MARE/2020/08 grant). The key functions of the RCG´s Secretariat have been determined in close collaboration with all RCGs, in particular with RCG and Intersessional Subgroups (ISSGs) chairs. A business model has been developed. In addition, good practices in communication within and among the RCGs have been promoted and installed. The overall capacity to reach out to a wider public and increase the visibility of the work and output of the RCGs has been boosted with the development of a dedicated website and the consolidation of a visual identity.

RCG chairs and the RCG´s network (including participants and stakeholders) have readily acknowledged the added value of having an RCG´s Secretariat to support and improve data collection coordination activities.

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

Overall expected outcomes:

1. A full-time dedicated Secretariat support service for the RCGs enables a consistent approach to administer RCG activities, facilitating communication, and enhancing the intersessional work, and also supporting the work of RCG sub-groups.
2. A dynamic and permanently updated website (https://www.fisheries-rcg.eu/) will be kept available including as features:
    - Repository – one-stop location and reference location for reports, various agreements covering regional coordination, RCG protocols and working procedures
    - Integration – allowing seamless synchronization with third-party information needs and requests;
    - Responsive display – to serve content across multiple devices, screens, and browsers;
    - User experience- maintaining a satisfactory user experience throughout the website sections;
    - Accessibility – To any interested visitor in a user-friendly way across the website sections;
    - Retention- keeping visitors coming back to the website;
    - Links to relevant restricted access sites and virtual environments.
3. The visibility and understanding of the work carried out by the RCGs is increasingly consolidated for everyone, from data collectors to stakeholders.
4. A regularly updated Stakeholders' database improves the communication function among the RCGs' experts and the stakeholders' community.
5. Internal communication protocols and help-desk make it easier for any new comer to efficiently join, adopt responsibilities, and contribute to the RCGs objectives and work commitments.
6. The public description of the secretariat functions, operational working protocols and commitments will build trust and enhance the whole network transparency and accountability.

Agreements and commitments are as follows:

Agreement and commitment on RCGs secretariat

MS involved: ALL

At the 2022 RCG Decision meeting, all MS agreed on the principle of the implementation of a long-term secretariat in support of the work of all RCGs. This agreement led to continued support beyond the deadline of the SecWeb project. Based on the experience gained, the extended support for regional coordination activities and the aim to secure a long-term, uninterrupted support, the agreement on the principle remains in place for 2025-2027.

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27))

ACTIVITY: REGIONAL DATA BASE AND ESTIMATION SYSTEM (RDBES)

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

Name of the regional activity: 2 - Regional data base and estimation System (RDBES)

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the data collection activity
To contribute to the development and operation of the Regional Database and Estimation System (RDBES)

2. Duration of the data collection activity
2025 – 2027

3. Methodology and expected outcomes of the data collection activity
The RDBES is a fundamental tool for regional coordination. The RDBES gathers in a single data base catch, effort and sampling data for biological variables and Protected, Endangered and Threatened Species (PETS) together with information on the sampling design. The RDBES is planned to replace both the existing ICES InterCatch and RDB database systems and has an important part to play in increasing transparency and improving the quality of stock assessment within ICES.

This transition to RDBES requires an important effort by countries:

- To adapt their internal processes to store and provide data in the RDBES data model;
- To calculate required estimates (discard weight, landed weight of species which are landed together, number at length, number at age) using the RDBES data model;
- To reproduce the data management which used to be done in InterCatch, using the estimates coming from the RDBES;
- To take advantage of the WK designed to give countries support in the transition
- To participate in the development of the RDBES through the core group and the different ICES WG and ISSGs giving feedback about different data types and end user needs (including catch and effort data, Small Scale Fisheries data, biological variables, Marine Recreational Fisheries (MRF), PETS, …)

The RDBES developments planned for different data types, such as SSF, MRF and PETS are embedded in the respective textboxes.

Several ISSGs under the RCGs were established to use the data in the RDBES. These ISSG develop tools and (Shiny)apps to enhance the use of the RDBES by the RCGs. If ICES Assessment Working Groups, Workshops and other Working Groups want to use the developed tools & apps, ICES would need to take the responsibility to make them available, as well to support their use. This approach would be similar as it was the case with the RDBES & SmartDots.

Agreements reached at RCG 2023:

- ICES to check data quality in relation to ICES work/stock assessment, also including non-EU countries
- All MS ensure to be engaged in a workshop to set up the RDBES Data confidentiality and license. It is reminded that third countries need to be involved in this. Work planned to be finalized by the end of 2023.

Agreements and commitments on RDBES

MS involved: ALL

- RCGs to check data quality in relation to RCG work,
- All MS ensure to allocate experts to the relevant RDBES training sessions, workshops and working groups related to RCG work, in order to have the RDBES roadmap implemented.

ACTIVITY: REGIONAL COORDINATION TAKING PLACE IN INTER SESSIONAL SUBGROUPS (ISSGS) AND PAN REGIONAL COOPERATION BETWEEN RCGS.

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

Name of the regional activity: 3 - Regional Coordination taking place in Inter Sessional SubGroups (ISSGs) and pan regional cooperation between RCGs

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the data collection activity
To develop and propose coordinated actions in dedicated thematic areas during the Intersessional year for the RCG NANSEA

2. Duration of the data collection activity
2025 – 2027

3. Methodology and expected outcomes of the data collection activity

Regional cooperation is meant to improve the efficiency of data collection through sharing of expertise, data, best practices, knowledge and collaborative tasks. The RCGs bring together several Member States to coordinate planning and implementation of data collection. Their workplan across the year, from one round of the annual technical meetings to the next, is supported with the setup of the Intersessional Subgroups.

In these subgroups the experts concentrate on specific Thematic Focus Areas, and sometimes they are pan-regional. During the relevant RCG's technical meetings, the different ISSGs present progress and hurdles encountered across the period and propose the update of their Terms of Reference with the tasks and targets for the new intersessional period for approval. The work performed by ISSG is essential for RCG technical meeting preparation and meeting discussions and Member States are requested to name experts in the different ISSG relevant to them and these experts should allocate a significant amount of time (on average 40 hours per ISSG) for carrying the work during the intersessional year.

The ISSG may change over the years as task are completed and new needs are coming up. An updated list of the ISSG operating every year under the umbrella of the RCG NANSEA can be found here: https://www.fisheries-rcg.eu/rcg-nansea//

A non-exhaustive list of the ISSG is presented below:

- ISSG End-user and RCG interaction
- ISSG RDB catch, effort and sampling overviews
- ISSG Metier and transversal variable issues
- ISSG Data Quality
- ISSG Electronic Monitoring Technologies
- ISSG Diadromous Fishes
- ISSG Surveys
- ISSG Optimized and Operational Regional Sampling Plans
- ISSG Optimisation of PETS bycatch sampling
- ISSG Evaluation of the data collected for the Small-Scale Fisheries at EU level
- ISSG Regionally coordinated stomach sampling
- ISSG Recreational fishery
- ISSG Development of Draft Regional Work Plan
- ISSG National Correspondents

Agreements and commitments on ISSGs and pan regional coordination

MS involved: ALL

- Member States agreed to name experts in the different ISSG relevant to them.
- The only ISSG requiring the presence of all MS is the ISSG on National Correspondents.
- Experts participating in an ISSG should allocate a significant amount of time (on average 40 hours per ISSG) for carrying the work during the intersessional year.

ACTIVITY: SMART DOTS.

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

Name of the regional activity: 4- Smart Dots

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the data collection activity
The SmartDots platform (https://www.ices.dk/data/tools/Pages/smartdots.aspx) facilitates exchanges, workshops and training events for calibration of age readings, maturity staging and ichthyoplankton analyses between labs based on images.

2. Duration of the data collection activity
2025 – 2027

3. Methodology and expected outcomes of the data collection activity
A set of software tools supports the user in managing all data of ICES workshops and exchanges on age reading, maturity staging and fish larvae identification. The workshop or exchange manager can manage the meta data related to workshops and exchanges, and the biological readers can carry out readings by annotating images provided by the workshop managers. All registered data are available in the connected reporting environment.

The SmartDots biological reading platform is an opensource solution originally developed by ILVO (Flanders Research Institute for Agriculture, Fisheries and Food). All source code is publicly accessible.

The development of SmartDots within ICES is guided by the working group on SmartDots Governance (WGSMART).

Agreements and commitments on Smart Dots

MS involved: ALL

- All MS ensure to be engaged in exchanges and workshops using SmartDots for the different biological variables
- All MS ensure that national experts are trained to use SmartDots. Tutorials are available on https://www.youtube.com/channel/UCa4bjXo-eBDfW0cm1oElWeQ/playlists

ACTIVITY: CATCH, EFFORT AND SAMPLING OVERVIEWS FOR RCG TECHNICAL MEETING.

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

Name of the regional activity: 5 - Catch, effort and sampling overviews for RCG Technical Meeting

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Aim of the data collection activity
Using the RDBES to develop baseline tools to be used internal by RCGs and to further developed in an RCG. The overviews should give living support to specific issues that are raised and discussed within RCGs, and for which decisions need to be taken (e.g. ISSG PETS request on the sampled metiers). It will be important that the specific needs of the RCGs are presented to this ISSG in order to be able to produce the overviews accordingly.

In order to enhance the RWP work, aggregated graphs (static) should be developed, as for example total landings in a region (all countries together), or number of fishes sampled per length or number of species sampled. This can give input to look into the regional re-distribution (and agreements) for biological sampling.

2. Duration of the data collection activity
2025-2027

3. Methodology and expected outcomes of the data collection activity

- Production of baseline tools (R-scripts/shiny R) on an annual basis to support the RWP and RCG work. Using hereby the data from RDBES (awaiting the data confidentiality and license final outcome end of 2023)
- Production of graphs to establish regional sampling.

Agreements and commitments on Fisheries overviews

MS involved: ALL

- All MS ensure to upload the data in the RDBES to ensure that fisheries overviews for the relevant regions are as complete as possible.

ACTIVITY: FEMP-AND-04

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

Name of the national activity: FEMP-AND-04

Monitoring and analysis of the wedge clam (*Donax trunculus*) fishery in the Gulf of Cádiz

1. Aim of the data collection activity

To obtain data for the estimation of density, biomass, recruitment and yield of shellfish resources (wedge clam: *Donax trunculus*) for the sustainable exploitation in the intertidal area of the littoral of Huelva (SW Spain).

2. Duration of the data collection activity

From 2025 to 2027. It started in 2017.

3. Methodology and expected outcomes of the data collection activity

FEMP-AND-04 surveys were carried out on a monthly basis in 4 equidistant stations (4 km) on Doñana beach. Survey samplings are conducted during spring tides (semidiurnal tides) at 0.5 m of water depth and under similar tidal coeffcient. Samples are collected from the lower part of the intertidal area using two hand-dredges similar to those used by local bivalve harvesters (experimental and commercial). These hand-dredges have an iron structure with a 44.5 cm wide opening that digs deeply into the sediment (upper 15 cm), using an experimental mesh size (3 × 3 mm) to allow for the collection of the smallest individuals and juveniles, and a commercial mesh size (7 ×7 mm). At each sampling station, the hand-dredge was towed diagonally to the shoreline for 5 minutes, with each transect being geo-referenced by means of a GPS. In the laboratory, all species are identified, counted and weighted. The number of retained individuals was recorded to estimate population density (ind m^{-2}) and biomass (g m^{-2}) from experimental samples, and the yield (kg per 3 h of fishing trip) from commercial samples. The shell length (SL) was measured to the nearest 0.1 mm with a digital vernier caliper to produce monthly length-frequency distributions from experimental samples.

At each station monthly monitoring of environmental variables of the water column is also recorded using an YSI professional probe (sea surface temperature, sea surface salinity, dissolved oxygen, turbidity) and total chlorophyll concentration is determined by spectrofluorometry. Sediment samples are also collected and granulometric analysis performed.

From 2017 to 2022, sampling on Isla Canela (Ayamonte) were performed quarterly by IEO. From 2023, sampling on Isla Canela (Ayamonte) are performed monthly by "Agencia de Gestión Agraria y Pesquera de Andalucía (AGAPA)". AGAPA regularly sends us data on yield, size and recruitment from its samples.

The expected outcomes includes:

- Composition of catches (Doñana beach)
- Population density, biomass and recruitment (Doñana and Isla Canela beaches)
- Size structure of the stock
- Biological parameters (growth, reproduction, L50)
- By-catch and discard (Doñana beach)
- Implementation on an integrated stock assessment

The results obtained are used to assess the Regional Government of Andalucía in order to achieve a sustainable management of the wedge clam fishery in the Gulf of Cádiz.

(max 900 words per activity)

ACTIVITY: FEMP-AND-05

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

Name of the national activity: FEMP-AND-05

Monitoring and analysis of the striped venus (*Chamelea gallina*) fishery in the Gulf of Cádiz

1. Aim of the data collection activity

To obtain data for the estimation of density, biomass, recruitment and yield of striped venus resources (striped venus: *Chamelea gallina*) for the sustainable exploitation in soft and shallow waters of the littoral of Huelva (Gulf of Cadiz, SW Spain).

2. Duration of the data collection activity

From 2025 to 2027. It started in 2017.

3. Methodology and expected outcomes of the data collection activity

The data comes from two sources of information, catch, effort and commercials yield data from the commercial fleet and fishery-independent data from research surveys. The information of commercial hydraulic dredge fleet is obtained by means on-board observers, with six sample by month during all year including the close season established in May and June. In each onboard, monthly length-frequency distributions of commercial and population fractions, catch, effort, yield and discard are obtained in order to know the evolution of striped venus population in the Gulf of Cádiz. Also, an annual research survey of 23 days, using commercial hydraulic dredge, is carried out in order to get biomass estimation of different fractions of the population in all production zones. The production zones, located between the mouths of the Guadalquivir River and the Guadiana River, were divided into 1 square nautical mile grids and a systematic sampling was applied. The starting point of fishing operations was located in the centroid of each cell and the duration of the haul was established in 10 minutes. About 100 cells of a total of 200 cells are sampled with presence of the target species, not having been caught in the remaining 100. The biomass estimates are obtained by the swept area method using a GPS to measure the distance covered by the gear in each haul.

With all this information, including de catch and effort data correspond to official data collected primarily by the Directorate General for Fisheries of the Junta de Andalucía, is carried out the assessment of the resource. The results obtained are used to advice the Regional Government of Andalucía in order to achieve a sustainable management of the striped venus fisheries in the Gulf of Cádiz.

The expected outcomes includes:

- To obtain the size structure of the different fractions of the stock.
- To calculate indices of abundance, relative biomass and recruitment (ind./minute and kg/minute).
- To obtain average commercial yields (kg/minute)
- To estimate total abundance and biomass
- To obtain by-catch and discard
- To describe the evolution of the status of natural stocks of striped venus.
- To implement on an integrated stock assessment

(max 900 words per activity)

ACTIVITY: FEMP-AND-07

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like

marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.

Name of the national activity: FEMP-AND-07

Study of the artisanal octopus' fishery in the Gulf of Cadiz (Spain)

1. Aim of the data collection activity

To obtain the complementary data to data collection sampling for increase the knowledge of growth, fecundity, feeding and predator-prey relationships of *Octopus vulgaris*, for the sustainable exploitation of these resources in the gulf of Cadiz (southern Spain, Atlantic XIa ICES).

2. Duration of the data collection activity

From 2025 to 2027.

3. Methodology and expected outcomes of the data collection activity

The data comes from two sources of information, catch and effort data from the commercial fleet and scientific observation program.

Catch and effort data correspond to official data collected primarily by the Directorate General for Fisheries of the Junta de Andalucía. This information, together with information from on-board observers on catch size frequencies, is used to obtain assessment of the different stocks. The information necessary to determine the biological parameters of octopus is obtained by means of on-board observers and sampling in the fish market. During the time that the fishing activity is closed (biological rest), commercial survey will be done to collect this information.

(max 900 words per activity)

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

ACTIVITY: MED&BS REGIONAL DATA BASE (RDBFIS)

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

Name of the regional activity: Med&BS Regional data base (RDBFIS)

MedBS_RWP_2025-2027_text_2024.08.30

1. Aim of the data collection activity

To contribute to the development and operation of the Med&BS Regional Database (RDBFIS)

2. Duration of the data collection activity

2025-2027.

3. Methodology and expected outcomes of the data collection activity

The RDBFIS is a fundamental tool for regional coordination. The RDBFIS gathers in a single data base catch, effort and sampling data for biological variables and PETs together with information on the sampling design. The RDBFIS is planned to integrate national databases and has an important part to play in increasing transparency and improving the quality of stock assessment within GFCM and STECF.

The temporary hosting and further development of the RDBFIS is currently supported by the specific contract RDBFIS II (CINEA/EMFAF/2021/3.1.2/03/SC04/SI2.881222) funded under the EU Framework Contract EASME/2020/OP/0021. In addition, the Steering Committee for the Med&BS Regional Database, established under the umbrella of the RCG Med&BS, will support and cooperate with this initiative

This transition to RDBFIS requires an important effort by countries:

- To adapt their internal processes to store and provide data in the RDBFIS data model;
- To participate in the development of the RDBFIS through the RDB SC and ISSGs giving feedback about different data types and end user needs (including catch ad effort data, SSF data, biological variables, MRF, PETs, SSF…)

ACTIVITY: REGIONAL COORDINATION TAKING PLACE IN ISSGS AND PAN REGIONAL COOPERATION BETWEEN RCGS

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

Name of the regional activity: Regional Coordination taking place in ISSGs and pan regional cooperation between RCGs

MedBS_RWP_2025-2027_text_2024.08.30

1. Aim of the data collection activity

To develop and propose coordinated actions in dedicated thematic areas during the Intersessional year for the RCG Med&BS.

2. Duration of the data collection activity

2025-2027.

3. Methodology and expected outcomes of the data collection activity

Regional cooperation is meant to improve the efficiency of data collection through sharing of expertise, data, best practices, knowledge and collaborative tasks. The RCGs bring together several Member States to coordinate planning and implementation of data collection. Their workplan across the year, from one round of the annual technical meetings to the next, is supported with the setup of the Intersessional Subgroups.

In these subgroups, the experts concentrate on specific Thematic Focus Areas, and sometimes they are pan-regional. During the relevant RCG meetings, the different ISSGs present progress and hurdles encountered across the period and propose the update of their Terms of Reference with the tasks and targets for the new intersessional period for approval. The work performed by ISSGs is essential for RCG technical meeting preparation and meeting discussions and Member States are requested to name experts in the different ISSGs relevant to them and these experts should allocate a significant amount of time for carrying the work during the intersessional year.

- ISSG on RWPs;
- ISSG on Recreational Fisheries;
- ISSG on fish stomach content analysis;
- ISSG on PET's bycatch monitoring;
- ISSG on sampling design optimization;
- Steering Committee for the Med&BS Regional Database.

ACTIVITY: FEMP-AND-01

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

Name of the national activity: FEMP-AND-01

Monitoring of the management plan for the mechanised dredge fishery on the Mediterranean coast of Andalusia (SE Spain; GFCM GSA01

1. Aim of the data collection activity

To obtain data for the estimation of distribution, density, biomass and yield of shellfish resources (*Donax trunculus, Chamelea gallina, Callista chione* and *Acanthocardia tuberculata*) for the sustainable exploitation in the North Alboran Sea (SE Spain; GFCM GSA01).

2. Duration of the data collection activity

From 2025 to 2027. It started in 2017.

3. Methodology and expected outcomes of the data collection activity

The data comes from two sources of information, catch and effort data from the commercial fleet and fishery-independent data from research surveys.

Catch and effort data correspond to official data collected primarily by the Directorate General for Fisheries of the Junta de Andalucía. This information, together with information from on-board observers on catch size frequencies, is used to obtain assessment of the different stocks. The information necessary to determine the size of the bivalve species caught by the artisanal fleet is obtained by means of on-board observers and sampling in the fish market. In order to monitor the evolution of the size of the retained fraction, two monthly samples are taken per target species. At specific times of the year, fishing activity may be closed in certain fishing areas in response to technical measures established for the protection of the species (closures) or for an unspecified period of time for technical-sanitary reasons (biotoxins), which may make it difficult to obtain the size composition of the stock on a continuous basis.

The general objective of the surveys is the assessment of the stocks *C. gallina*, *C. chione* and *A. tuberculata* through the indicators of the state of the resources included in the following specific objectives:

- To locate the main natural shoals
- To obtain the size structure of the stocks
- To calculate indices of abundance and relative biomass (ind./m2 and g/m2).
- To establish average commercial yields (g/m2)
- To estimate total abundance and biomass
- To describe the evolution of the status of natural stocks of shelfish

The survey design is a systematic stratified sampling, in which the strata are defined by the total of the 11 existing production zones. The area of each production zone is divided into homogeneous 2×2 km grids (polygons), which are sampled systematically, using two dredges in each haul. Three samples are taken per polygon for C. gallina and two sets for C. chione and A. tuberculata in order to have a correct precision in the estimation of the study parameters. Sampling points are set up to a maximum bathymetric range of 10 m for C. gallina and 20 m for C. chione and A. tuberculata. At each station monitoring of environmental variables of the water column is also recorded using a CTD (temperature, salinity, dissolved oxygen, turbidity and chlorophyll concentration). Sediment samples are also collected and granulometric analysis performed.

(max 900 words per activity)

ACTIVITY: FEMP-AND-02

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

Name of the national activity: FEMP-AND-02

Complementary study of some biological aspects of Octopus vulgaris (common octopus) in the Mediterranean coast of Andalusia, Spain (North Alboran Sea, GSA01

1. Aim of the data collection activity

The current management of *Octopus vulgaris* fisheries in the Mediterranean coast of Andalusia is based on: (1) the establishment of a minimum legal size of catch (1 kg), (2) in the small-scale fishery, a limit number of fishing vessels authorized and (3) a closure period from 1 July to 30 September (main spawning season).

An understanding of the biology, particularly, the reproductive biology of any species is important for the purpose of an effective management and conservation of the species.

Therefore, it is necessary to have a deep knowledge of the life history traits of this species in the Mediterranean Sea, including spawning periods, maturity process, length of first maturity and fecundity estimates.

On the other hand, studies about habitat utilization and trophic relationships of common octopus will be addressed in order to improve the lack of knowledge.

To achieve these objectives this Project will improved the biological sampling scheme of the species to study some aspects not covered by the DCMAP: maturity process, microscopic analysis of gonads, fecundity estimates, predator-prey relationships and relationship between feeding and weight/growth in the North Alboran Sea (Western Mediterranean Sea).

2. Duration of the data collection activity

From 2025 to 2027.

3. Methodology and expected outcomes of the data collection activity

3.1 Reproductive biology

The sex and macroscopic maturity status will be assessed visually from the gonads. Only female gonads (i.e., ovaries) will kept for further histological analyses. The maturity stating of common octopus' gonads (macroscopic and microscopic) is essential to estimate the maturity ogive and the size at first maturity. The maturity classification of gonads and together with gonad index (GI) will permit to improve the knowledge of the spawning timing and areas (locations) and the collection of ovaries are needed to estimate the fecundity (number of oocytes /eggs). These parameters are needed to determine the productivity of the species that contribute to the recruitment of new individuals to the population and will help to understand the fluctuations in population dynamics, and hence, allow to better assess population resilience to both fishing activities and environmental changes.

3.2 Trophic ecology

The stomachs will be collected from a defined number of individuals per length class. Stomach content will be analysed visually following the trophometer methodology (*Olaso et al., 1998*[1]) to determine the main prey items consumed and their importance in the diet of common octopus in the area.

1] *Olaso, I., Velasco, F., & Pérez, N. (1998). Importance of discarded blue whiting (Micromesistius poutassou) in the diet of lesser spotted dogfish (Scyliorhinus canicula) in the Cantabrian Sea. Ices Journal of Marine Science, 55(3), 331-341. doi: 10.1006/jmsc.1997.0263*

(max 900 words per activity)

ACTIVITY: FEMP-AND-09

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

Name of the national activity: FEMP-AND-09

Study of the fishery for the common sand eel (*Gymnammodytes cicerelus*) along the North Alboran Sea (SE Spain)

1. Aim of the data collection activity

To obtain data for the estimation of distribution, density, biomass and yield of sand eel (*Gymnammodytes cicerelus*) resource for the establishment of a sustainable fishery in the North Alboran Sea (SE Spain; GFCM GSA01).

2. Duration of the data collection activity

From 2025 to 2027.

3. Methodology and expected outcomes of the data collection activity

The general objectives of the FEMP_AND_09 project is to obtain different information on target species (*Gymnammodytes cicerelus*), as biology, fishing, population dynamics and impact on the ecosystem.

The geographical area of the study covers a coastal strip belonging to the Alboran Sea about 14 kilometres (8.73 nm) long, in the east coast of Almeria (SW Alboran Sea) and up to 15 metres depth. The area is partially included in a Marine Protected Area (Cabo de Gata-Níjar). The fishing gear belongs to the group of boat seine.

Data are from on-board observers on specific surveys. Due to the possibility of visually identifying shoals of fish from the boat, survey planning is based on fishing specifically for the target species. Two or three consecutive sampling days in a monthly basis (except summer) are carry out on different vessels and from the same port (Carboneras)

Information on specific composition of the catches and bycatch, data on the fishing grounds, description of the gear, vessel and the fishing operation. The fishing grounds. The methodology of surveys

The results include the following topics:

Composition of the catches

- Biological parameters
- Size structure of the stocks.
- Description of the gear and the fishing operation.
- Fleet composition and characteristics.
- Geographical distribution of hauls and impact
- Selectivity of the fishing gear.
- By-catch.

In relation with biological parameters main results are to analyse the growth, longevity, mortality, reproduction period and size-at-first-maturity and also other factors that could be influencing the abundance as well as the qualitative and quantitative analysis of the discards produced.

(max 900 words per activity)

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

ACTIVITY: DATOS CECAF-BIOEXT

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

1. Aim of the data collection activity

The main objective of this activity is to obtain fishery-independent biological data to assess the status of demersal and benthic resources exploited by the Spanish fleet – mainly freezers – in fishing grounds of West Africa, in compliance with the commitments undertaken by Spain and the European Union under the Common Fisheries Policy (CFP). This data collection aims to provide robust scientific advice on the sustainability of fisheries conducted under Sustainable fisheries partnership agreements (SFPAs) or direct authorisations (SMEFF regulation). These data are essential to meet the needs of end users, particularly the European Commission and the CECAF working groups, which are responsible for stock assessment in the region.

The information generated will support the evaluation of key parameters such as abundance, biomass, spatial distribution, and demographic structure of target species (crustaceans, fish, and cephalopods), as well as the collection of information on bycatch and associated biodiversity. It will also allow for the incorporation of biological and oceanographic information that is currently scarce or unavailable in many areas, thereby significantly improving the quality of data available for fisheries management decision-making.

Given the international and dynamic nature of the Spanish fleet's activity, the data collection will focus on fishing grounds where there are active SFPAs or direct authorisations (such as in Mauritania, or in Guinea-Bissau and Angola, with which Memoranda of Understanding (MoUs) for scientific cooperation are in place), and may be extended to other CECAF countries depending on the evolution of fishing access arrangements.

2. Duration of the data collection activity

The data collection activity will take place over the course of 2026 and 2027 through embarkations on vessels engaged in the acquisition of biological and fishery-related parameters in the waters of West African coastal States. These embarkations are aimed at addressing the need for biological and ecological information to allow for a robust assessment of the status of resources exploited by the Spanish fleet under SFPAs or direct authorisations.

The activities will be implemented depending on access opportunities and cooperation frameworks in force at any given time. Currently, Memoranda of Understanding (MoUs) have been signed between the IEO-CSIC

and the national institutes of Angola (INIP) and Guinea-Bissau (CIPA), establishing a formal framework for scientific cooperation in the field of fisheries and marine research. Other bilateral cooperation agreements are under negotiation or in preparation, so the activity may be expanded to additional CECAF countries.

The duration and specific characteristics of each embarkation will depend on the fishing grounds, logistical availability, and coordination with local institutions. However, the activity is envisaged as a structured and continuous initiative within the international framework for fisheries monitoring in West Africa.

3. Methodology and expected outcomes of the data collection activity

The activity will be based on the application of direct standardized methods (standardized bottom trawl surveys) to assess the main populations of demersal and benthic resources within the Exclusive Economic Zone (EEZ) of third countries in West Africa. These sampling operations are designed to provide fishery-independent scientific data essential for stock assessment.

Sampling will be conducted using a stratified design based on depth and, where necessary, by geographic sectors, covering both continental shelf and slope areas (approximately between 20 and 1000 metres depth). Sampling units will be randomly distributed within each stratum, ensuring representative coverage of the study area and following internationally standardised protocols.

During the embarkations, detailed data will be collected on captured species: abundance, biomass, length structure, sex ratio, maturity stage, as well as basic ecological parameters. Reference samples will be taken for taxonomic identification and environmental variables (temperature, salinity, etc.) will be recorded to support interpretation of biological distributions in relation to the physical environment.

Expected outcomes include:

- Estimation of fishery-independent abundance and biomass indices for target and associated species.
- Biological information needed to support stock assessment models (e.g., yield per recruit or surplus production models).
- Identification of resource concentration areas and spatial distribution patterns.
- Generation of standardised time series for medium-term stock monitoring.
- Strengthening of scientific cooperation with research institutes in coastal countries.

All information will be used in the scientific advisory processes of CECAF and in the Scientific Follow-Up Committees of the fisheries agreements, and will be made available to end users such as the European Commission, FAO, or the third countries themselves.

(max 900 words per activity)

SECTION 2: BIOLOGICAL DATA

Text Box 2.3: Data collection for diadromous species in freshwater

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27))

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

Anguilla anguilla

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

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

- Electrofishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Recruitment and estimated escapement data can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

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

EMU_ES-Basque Country (ES-Bas)

The Basque Country has used the SUDOANG protocols to sample recruitment, standing stock and silvering eels.

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

1)The abundance of recruits will be estimated by:

a. Monthly samplings of the glass eel entrance in the estuary using sieve trawling during the maximum recruitment period (October-February). Sampling includes the measurement of length and weight.

b. Using the glass eel fishery catch and effort data compiled in the daily catches report.

c. Sampling daily the eel entrance in a fish trap located in the tidal limit of the Oria River during the migration period (May-October). Sampling includes the measurement of length and weight.

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

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

EMU_ES_Asturias (EMU_ES_Astu)

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

2) The length and weight of glass eel will be taken from 50 individual's samples from Nalon and Ribadesella fish market. The samples will be collected every month. As many samples are collected as fishing periods. Currently the glass eel fishing season (30 days maximum) is divided into four fishing periods, one per month from November to February.

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

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

EMU_ES_Galicia (EMU_ES_Gali)

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

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

EMU_ES_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 by 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. There is no professional Eel or Glass Eel fishing in Navarra.

1) The abundance of recruits won´t be estimated since Bidasoa River estuary is located below the limits of Navarra territory (between the Basque Country and France)

2) The abundance and length of the standing stock (yellow eel) will be determined by electrofishing surveys (11 sampling points) in October each year.

3) The number, length, weight and sex ratio of emigrating silver eels will be determined applying Durif et al. (2003; 2005) to the eels obtained in the electrofishing surveys in October each year. Measurements of eye diameter (vertical and horizontal), pelvic fin, weight and length will be taken from all eels larger than 30 cm captured in electric fishing samples.

EMU_ES_Andalucía (EMU_ES_Anda)

1) Abundance is estimated:

a. Sampling is carried out annually in the winter-spring months, between December and April. They begin after the first heavy winter rains and are only sampled when the intensity of lunar light does not exceed 60%.

b. Forty sampling points are sampled using eel and shrimp traps. Twenty pots (10 per shore alternating eel and shrimp traps) are placed approximately 20 meters apart. They are fixed with corrugated steel bars nailed to the bed with a hammer. Their location will be recorded with GPS when the satellite error is less than 6 meters.

c. The pots are collected after 48 hours and lifted in the same order in which they were placed (from the starting point to the end). The catches of each of the pots are processed independently on the shore.

d. Data are taken on length, weight, eye diameter, presence or absence of lateral line and pectoral fin coloration. Once the biometric data have been collected, the specimens are returned to the water as close as possible to the stretch where they were captured.

Salmo Salar

Navarra

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

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

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

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

Galicia

1) The abundance of parr will be derived from electrofishing surveys.

2) The abundance of smolts will be derived from numbers in the fish trap.

3) Abundance of adults will be estimated from recreational catch and fish trap numbers.

4) Biometry of adults will be derived from recreational catch and fish trap samples.

Cantabria

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

Basque Country

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

Asturias

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

Salmo trutta (sea trout)

Navarra

1)The number, biometric data (length, height and weigth), age (scales eading) and sex of all sea trout captured in the fish trap (Bera Salmonid Monitoring Station) during the upstream migration will be determined.

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

Galicia

1) An index of abundance will be derived from density in the lowest reach of rivers, obtained from electrofishing surveys

2) An index of abundance of adults will be estimated from recreational catch and fish trap numbers.

3) Biometry of adults will be derived from recreational catch and fish trap samples.

Cantabria

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

Asturias

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

Basque Country

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

(max 250 words per species and area)

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

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

Method selected for collecting data.

Anguilla anguilla

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

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

- Electrofishing data from the SUDOANG project are hosted at https://bit.ly/3ilgtrT.

- Recruitment and estimated escapement data can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

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

EMU_ES_Murcia (EMU_ES_Murc)

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

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

EMU_ES_Valencia (EMU_ES_Vale)

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

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

EMU_ES_Cataluña (EMU_ES_Cata)

1)The abundance of recruits (historical sampling):

a. Scientific based sampling. Monthly samplings of the glass eel entrance in the estuary using fyke nets with fine mesh during the maximum recruitment period (October-March). A subsampled keeped to obtain length and weight measures of 50 individuals.

b. Commercial based sampling. Using the glass eel fishery catch and effort data compiled in the daily catches report from 8 fishermen guilds. Commercial catches are allowed from October to March.

2) The length and weight of the glass eel stage (historical sampling):

a. Scientific based sampling. A subsampled of monthly sampling will be keeped to obtain length and weight measures of 50 individuals.

b. Commercial based sampling. Measuring 50 individuals from 4 sites, 3 times during the fishing season.

3) Yellow eel and siver eel stages (historical samplings):

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

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

EMU_ES_Andalucía (EMU_ES_Anda)

1) Abundance is estimated:

a. Sampling is carried out annually in the winter-spring months, between December and April. They begin after the first heavy winter rains and are only sampled when the intensity of lunar light does not exceed 60%.

b. Forty sampling points are sampled using eel and shrimp traps. Twenty pots (10 per shore alternating eel and shrimp traps) are placed approximately 20 meters apart. They are fixed with corrugated steel bars nailed to the bed with a hammer. Their location will be recorded with GPS when the satellite error is less than 6 meters.

c. The pots are collected after 48 hours and lifted in the same order in which they were placed (from the starting point to the end). The catches of each of the pots are processed independently on the shore.

d. Data are taken on length, weight, eye diameter, presence or absence of lateral line and pectoral fin coloration. Once the biometric data have been collected, the specimens are returned to the water as close as possible to the stretch where they were captured.

(max 250 words per species and area)

Text Box 2.4: Recreational fisheries

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27))

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

NANSEA_RWP_2025-2027_TEXT_2024.08.23

The regional coordination of data collection of recreational fisheries is under development in the RCG ISSG Recreational Fishery The work relates to the selection of species for the NANSEA region in addition to the mandatory species and the integration of the RDBES.

DCF mandatory species for catch data collection is limited to few species. However, based on the routine surveys carried out and on the pilot studies developed by several Member States under the DCF, it was identified that some of the target species for recreational fisheries are not the ones identified as mandatory.

The ICES Working Group on Recreational Fisheries Surveys (WGRFS) has recommended to carry out multispecies surveys under the routine sampling surveys, considering that the increase on the workload and cost implications are low. Under this scenario, the RCG asked the WGRFS to provide a priority list of species by ecoregion, to be incorporated into the national surveys in addition to the mandatory species.

A preliminary list of species by ecoregion was defined by the WGRFS. This list was developed following an approach similar to a Productivity Susceptibility Analysis (PSA) (e.g. McCully Phillips et al., 2015). The criteria considered under this methodology were: catchability, biological importance in marine recreational fisheries, existing regulations, and socio-economic relevance.

The list and the methodology used were agreed by ICES WGRFS. The aim of this list is to recommend Member States the inclusion of these species in the ecoregions identified in addition to the mandatory species, under the routine surveys.

There is no agreement yet on species list to be included in national sampling plan on top of the species listed in the EU-MAP Regulation. Work ongoing.

Agreements and commitments on the integration of recreational fisheries data into the RDBES

MS involved: ALL

MS agreed that recreational fisheries data should be integrated into the RDBES. The developments needed for this were also prioritized by ICES WGRDBESGOV. In 2023, an official data call was launched by the WGRFS, with the aim of realizing a first full test about the incorporation of this data following the templates developed with this objective.

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

National sampling schemes outside RWP

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

Sampling scheme identifier: ESP-AZTI_OnSiteSurveysRecreational

This sampling is a follow up of the test study carried out in 2022-23 and applies to the Marine Recreational Fisheries (MRF) in the Basque Country.

Sampling scheme identifier: ESP_SGP_SelfOnShore_recreational (off site surveys)

In the case of highly migratory species [ESP_SGP_SelfOnShore_recreational (off site surveys)], data are collected by declaration of fishermen on the basis of Article 10 of RD 347/2011 (https://www.boe.es/eli/es/rd/2011/03/11/347). Considering that reporting of all catches is mandatory, the entire population is covered (census). More information in Annex 1.1.

For other species see table 2.4 and Annex 1.1

(max 900 words per region)

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

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

MedBS_RWP_2025-2027_text_2024.08.30

For the description of the sampling scheme/survey please refer to Table 2.4 in the NWPs of the ten Med&BS Member States.

The regional work plan (RWP) on recreational fisheries (RFs) in the Mediterranean and Black Sea is minimum aimed at:

1. Estimating the population of recreational fishers by segment (fishing gear-technique; e.g., shore, boat, spear fishing, etc.) and sub-region*.

2. Identification of lists of priority species by sub-region*:

A) As a BINDING action, MS to apply multispecies approach and collect data from off-site surveys in order to propose list of priority species for the estimation of "catches" (a) and "releases" (b), and finalise the list by sub-region. Moreover, to propose a list of vulnerable species (c) incidentally caught in recreational fisheries and finalise the list by sub-region.

B) As a NON-BINDING action, MS to apply on-site samplings in order to: a) validate the estimations of the off-site survey (e.g. average kg/fisher), b) validate the species reported in the off-site survey (recreational fishermen use different common names in different areas), c) collect biological data (length and/or weight) in order to propose list of priority species for the estimation of biological data and finalise the list by sub-region, d) validate the vulnerable species reported in the off-site survey and propose a final list.

The list of priority species proposed by GFCM (Report of the Working Group on Recreational Fisheries (WGRF) | General Fisheries Commission for the Mediterranean (GFCM) | Food and Agriculture Organization of the United Nations (fao.org)), as well as the work done under the RCG Med&BS umbrella (Please see the Final Report of the Regional Co-ordination Group Meeting for the Mediterranean and Black Sea 2021 Workshop on Recreational Fishery 8-9 March 2021 and 9 April 2021 (follow-up meeting); and the Final Report of the RCG Med&BS 2019, Malta), will be taken under consideration.

Taking into consideration the recommendations and procedures proposed by the GFCM Handbook (https://www.fao.org/gfcm/publications/series/technical-paper/669/en/), and the experience gained by means of the implementation of the pilot studies, each MS will implement this RWP starting from 2025 following their own procedures (e.g., telephone surveys, license system or a combination for off-site surveys or an on-site survey) in order to cover all segments. The on-site sampling can be multispecies or a list can be used, if available, from off-site surveys.

*This applies to MS covering more than one sub-region: e.g., Italy (Western Med, Central Med, Adriatic) and Greece (Central Med, Eastern Med); Spain and France will aim at providing estimates for western Mediterranean recreational fisheries. Exceptions: Malta, Slovenia, Croatia, Cyprus, Bulgaria, Romania.

With the aim of facilitating this process and setting minimum standards, standardized protocols for performing the off-site survey (questionnaire to be used in a telephone survey) and on-site survey (questionnaire to be used in face-to-face interviews) are also attached as Annexes I and II respectively. These have to be considered as templates, and each MS can modify/adapt them according to specific needs.

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

National sampling schemes

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

Sampling scheme identifier: ESP_SGP_SelfOnShore_recreational (off site surveys)

National sampling fulfils the requirements of the Regional Work Plan (RWP) on Recreational Fisheries (RFs) in the Mediterranean and Black Sea:

1. The method used for estimating the population of recreational fishers by segment and sub-region is license-based: according to RD 347/2011 (https://www.boe.es/eli/es/rd/2011/03/11/347), it is necessary to hold an activity licence in order to carry out any recreational fishing activity.

2. Identification of lists of priority species by sub-region: a pilot study on recreational fishery was carried out in 2021 and a list of priority species in Spanish waters was identified. This list has been shared with the RCG.

Based on the results of this study, it was determined that there are no catches of elasmobranchs (mandatory species for data collection in the RWP) in the Mediterranean Sea, so there is no need for sampling.

Regarding the European eel (the other mandatory species in the RWP), the sampling is explained in "Table 2.3", "Text Box 2.3: Data collection for diadromous species in freshwater" and the corresponding Annexes.

In addition, data collection for highly migratory species [ESP_SGP_SelfOnShore_recreational (off site surveys)] is carried out.Data are collected by declaration of fishermen on the basis of Article 10 of RD 347/2011 (https://www.boe.es/eli/es/rd/2011/03/11/347). As the declaration of all catches is mandatory, the entire population is covered (census).For more information, see Annex 1.1.

(max 900 words per region)

Text Box 2.5: Sampling plan description for biological data

REGION: NORTH SEA AND EASTERN ARCTIC. (EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27))

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA

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

Sampling scheme identifier: ESP_IEO_P5_AtSea

National scheme for ICES areas 1 and 2, (in Eastern Arctic), ICES areas 5, 6a-7c,12 and 14 (in Noth East Atlantic) and NAFO (in Other regions)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_AZTI_ATSEA_CATCH&ETP_ICES

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

Sampling scheme identifier: ESP_AZTI_AtSea_Catch&ETP_ICES

National scheme for ICES areas 1 and 2.

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27))

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA

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

Sampling scheme identifier: ESP_IEO_P5_AtSea

National scheme for ICES areas 5, 6a-7c,12 and 14 (in Noth East Atlantic), ICES areas 1 and 2, (in Eastern Arctic), and NAFO (in Other regions)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ATSEA

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

Sampling scheme identifier: ESP_IEO_P1_AtSea

National scheme for ICES areas 6, 7 (excl. 7d), 8, 9

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ONSHORE

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

Sampling scheme identifier: ESP_IEO_P1_OnShore

National scheme for ICES areas 6, 7 (excl. 7d), 8, 9

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_AZTI_ATSEA_CATCH&ETP_ICES

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

Sampling scheme identifier: ESP_AZTI_AtSea_Catch&ETP_ICES

National scheme for ICES areas 6, 7 (excl. 7d), 8

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP-AZTI_ON SHORE_ICES

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

Sampling scheme identifier: ESP-AZTI_On shore_ICES

National scheme for ICES areas 6, 7 (excl. 7d), 8

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ATSEA

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

Sampling scheme identifier: ESP_IEO_P2_AtSea

National scheme for GFCM GSA 1, 2, 5, 6, 7

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ONSHORE

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

Sampling scheme identifier: ESP_IEO_P2_OnShore

National scheme for GFCM GSA 1, 2, 5, 6, 7

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_STOCKSPECIFIC_ATSEA

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

Sampling scheme identifier: ESP_IEO_P2_StockSpecific_AtSea

National scheme for GFCM GSA 1, 2, 5, 6, 7

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_STOCKSPECIFIC_ONSHORE

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

Sampling scheme identifier: ESP_IEO_P2_StockSpecific_OnShore

National scheme for GFCM GSA 1, 2, 5, 6, 7

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P3_ATSEA_CANARIAS

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

Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias

National scheme for the Outermost regions (EU waters around the Canary Islands (FAO area 34.1.2)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE_STOCK SPECIFIC

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

Sampling scheme identifier: ESP-IEO_P3_OnShore_stock specific

National scheme for the Outermost regions (EU waters around the Canary Islands (FAO area 34.1.2) and Other regions (Eastern Central Atlantic (FAO area 34). CECAF)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA

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

Sampling scheme identifier: ESP_IEO_P5_AtSea

National scheme for Other regions (North-West Atlantic (FAO area 21). NAFO, for ICES areas 5, 6a-7c,12 and 14 (in Noth East Atlantic), ICES areas 1 and 2, (in Eastern Arctic)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

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

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ATSEA_AFRICA

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

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

National scheme for Other regions (Eastern Central Atlantic (FAO area 34, except waters around the Canry Islands). CECAF)

Additional information on sampling schemes

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

The situation of the SFPAs, by country, is described in the following sections:

Morocco: The last Protocol of the current SFPA (2019-2023), expired in July 2023. The SFPA is currently dormant, and the conclusion of a new Protocol remains uncertain.

Mauritania: The last SFPA between the EU and Mauritania and its implementing Protocol was signed in December 2021, allowing some métiers included in the EU Data Collection Framework to be used for a period of six years.

Senegal: The last Protocol in the framework of the relevant SFPA between the EU and Senegal was signed in November 2019 for a duration of 5 years, including fishing possibilities for trawlers targeting black hake.

The Gambia: A new SFPA between the EU and The Gambia was signed in July 2019 and the relevant Protocol will last for a period of 6 years. Fishing opportunities for black hake trawlers are also included.

Guinea-Bissau: The last Protocol of the SFPA between the EU and Guinea-Bissau (2019-2024) expired in June 2024. A new Protocol has been negotiated and is expected to be implemented in a few months.

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

https://ec.europa.eu/oceans-and-fisheries/fisheries/international-agreements/sustainable-fisheries-partnership-agreements-sfpas_en

Additional description on sampling frames

FRAME- OTB_CRU_>=32-69_0_0 (into the scheme ESP-IEO_P3_AtSea_Africa): The observation programme on board shrimper vessels operating in Mauritania and Guinea-Bissau alternates both fishing grounds on an annual basis.

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

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE

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

Sampling scheme identifier: ESP-IEO_P3_OnShore

National scheme for Other regions (Eastern Central Atlantic (FAO area 34). CECAF)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE_STOCK SPECIFIC

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

Sampling scheme identifier: ESP-IEO_P3_OnShore_stock specific

National scheme for Other regions (Eastern Central Atlantic (FAO area 34). CECAF) and for the Outermost regions (EU waters around the Canary Islands (FAO area 34.1.2)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1).

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

REGION: OTHER REGIONS. (ATLANTIC OCEAN AND ADJACENT SEAS (FAO AREAS 21, 27, 31, 37, 41, 47, 34, 48). ICCAT)

SAMPLING SCHEME IDENTIFIER: TUNA SAMPLING ON SHORE SCHEME

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

Sampling scheme identifier: Tuna Sampling On Shore scheme

LARGE_PELAGIC_RWP_2025-27_Text_

Additional information on sampling schemes

Described in the annex 1.1, the Tuna Sampling On Shore scheme aiming at collecting length samples and species composition from commercial landings on foreign shores of purse seiner (PS) and bait boat (BB) for all tropical tuna species listed in Table 1 of the EU MAP Delegated Decision annex. The scheme covers two other regions which are managed by tuna RFMOs (IOTC and ICCAT). The sampling protocol has been jointly developed by Spain and France. For the unique vessel associated to the Italian fleet, collaboration is ongoing between France and Italy to optimise the data collection

Additional description on sampling frames

No additional information

SAMPLING SCHEME IDENTIFIER: OBSERVE SCHEME

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

Sampling scheme identifier: Observe scheme

LARGE_PELAGIC_RWP_2025-27_Text_

Additional information on sampling schemes

As outlined in the annex 1.1, the sampling scheme is designed to monitor at sea discards of target species (e.g., tunas,) and retained and discarded bycatch from the French, Italian and Spanish tropical purse seine fishery operating in the Atlantic and Indian oceans. The sampling scheme covers two tropical regions governed by tuna RFMOs: IOTC and ICCAT.

Additional description on sampling frames

No additional information

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme for Other regions, Atlantic Ocean and adjacent seas (FAO areas 21, 27, 31, 37, 34, 41, 47 and 48) ICCAT, and for Other regions IOTC, WCPFC and IATTC.

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P4_ONSHORE_ALL

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

Sampling scheme identifier: ESP-IEO_P4_OnShore_all

National scheme for Other regions Atlantic, Ocean and adjacent seas (FAO areas 21, 27, 31, 37, 34 and 37). ICCAT

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

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

SAMPLING SCHEME IDENTIFIER: TUNA SAMPLING ON SHORE SCHEME

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

Sampling scheme identifier: Tuna Sampling On Shore scheme

LARGE_PELAGIC_RWP_2025-27_Text_

Additional information on sampling schemes

Described in the annex 1.1, the Tuna Sampling On Shore scheme aiming at collecting length samples and species composition from commercial landings on foreign shores of purse seiner (PS) and bait boat (BB) for all tropical tuna species listed in Table 1 of the EU MAP Delegated Decision annex. The scheme covers two other regions which are managed by tuna RFMOs (IOTC and ICCAT). The sampling protocol has been jointly developed by Spain and France. For the unique vessel associated to the Italian fleet, collaboration is ongoing between France and Italy to optimise the data collection

Additional description on sampling frames

No additional information

SAMPLING SCHEME IDENTIFIER: OBSERVE SCHEME

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

Sampling scheme identifier: Observe scheme

LARGE_PELAGIC_RWP_2025-27_Text_

Additional information on sampling schemes

As outlined in the annex 1.1, the sampling scheme is designed to monitor at sea discards of target species (e.g., tunas,) and retained and discarded bycatch from the French, Italian and Spanish tropical purse seine fishery operating in the Atlantic and Indian oceans. The sampling scheme covers two tropical regions governed by tuna RFMOs: IOTC and ICCAT.

Additional description on sampling frames

No additional information

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme for Other regions, Indian Ocean (FAO areas 51 and 57) IOTC, and for Other regions, ICCAT, WCPFC and IATTC.

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme for Other regions, Western Central Pacific (FAO area 71 and 81) WCPFC, and for Other regions, ICCAT, IOTC and IATTC

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme for Other regions, Eastern Central Pacific (FAO area 77, 87) IATTC, and for Other regions, ICCAT, IOTC and WCPFC

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA_CCAMLR

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

Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR

National scheme for Other regions (Antarctic and Southern Indian Ocean (FAO area 48, 58 and 88). CCAMLR)

Additional information on sampling schemes

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

Additional description on sampling frames

No additional information to the information on the sampling schemes provided in the quality document (Annex 1.1)

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

Text Box 2.6: Research surveys at sea

REGION: NORTH-EAST ATLANTIC. (NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27))

RESEARCH SURVEY: INTERNATIONAL BLUE WHITING SPAWNING SURVEY (IBWSS)

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

EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Research survey: **Blue Whiting Spawning Survey (IBWSS)**

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Objectives of the survey

- The primary aim of the International blue whiting spawning stock survey is to determine the age stratified abundance and distribution of blue whiting (*Micromesistius poutassou)* using acoustic survey techniques
- Collect hydrographic data by means of vertical CTD profiles
- Conduct directed trawl sampling using a pelagic trawl to determine the biological profile of target species
- Conduct directed trawl sampling using a pelagic trawl to determine the species composition of mesopelagic fish echo traces
- Conduct visual abundance surveys of marine mammals and seabirds

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

The Manual for International Pelagic Surveys (IPS) describes the methods used for survey design, analysis and reporting of survey data: https://doi.org/10.17895/ices.pub.7582

Details of the implementation are available in the latest IBWSS survey report (WGIPS (ices.dk)

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

This survey acoustically measures the size of the spawning stock of blue whiting (Micromesistius poutassou) in western waters and is conducted by vessels from Ireland, The Netherlands and Spain.

In total, the IBWSS survey is carried out by three EU MSs and two non-EU countries (the Faroe Islands and Norway)..

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

Individual tasks to the survey participants are coordinated by WGIPS.

Cost sharing: A cost sharing agreement is in place, to reimburse Ireland and the Netherlands for their ship time at the relative share of their TAC. Participating Member States for the blue whiting survey are Denmark, Germany, the Netherlands, Ireland, France and Sweden (based on the share of catches determined for 2023). Spain will provide ship time on its own vessel.

Specific national aspects

Zone 7j-k. internal national name of the research survey: **Blue Whiting**

Systematic grid with random start, tracks 21 nmi apart, from self-break in the eastern limit to 13°W in the western limit, following the methodology defined in the "ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.1" The Spanish part of the International Survey is located in a polygon showed below in the area called Porcupine Seabight (Strata nº 7).

The Acoustic data are collected using a Simrad EK80 scientific echosounder at 18-38-70-120-200 kHZ. Day/night observation. Pelagic fishing stations to identify the species composition of the acoustic recordings. Hydrological characterisation (CTD).



(max 450 words per survey)

RESEARCH SURVEY: WESTERN IBTS 4TH QUARTER (INCLUDING PORCUPINE SURVEY)

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

Research survey: **Western IBTS 4th quarter (including porcupine survey)**

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Objectives of the survey

The main objective of the IBTS_Q4 is to collect data on the distribution, relative abundance and biological parameters of commercial commercially exploited demersal species. The indices currently utilised by assessment WG's are for haddock, whiting, plaice, cod, hake and sole. Survey data is also provided for white & black anglerfish, megrim, pollack, ling, gurnards, blue whiting and a number of elasmobranchs and cephalopods as well as several pelagics (herring, horse mackerel and mackerel). Occurrence of vulnerable or sentinel invertebrate species such as corals, sea pen, fan mussel and ocean quahog is also noted. Marine litter is also sorted and recorded. Oceanographic data are collected from CTD instrument on trawl door and occasional surface to sea bed CTD transects. Sediment grabs are carried out opportunistically using a Day grab.

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

Stations for the **Irish** survey are randomly selected within a stratified survey area in 6a south, 7b & 7g-j north based on depth and historic analysis of survey catch distribution rates. Fishing is conducted using a GOV 36/47 trawl (20mm liner) with 5.3m2 (1450 Kg) Morgere otter doors, 16" hoppers (D-gear) in area 6a and 8" disks (A- gear) areas 7b, g and j. The gear is trawled at 4kn for 30min at each station. Sweeps are 55m up to 80m depth, extended to 110m in deeper water to minimise variable trawl geometry.

The **Portuguese** surveys cover 9a area in Portuguese waters. The surveyed area extends from latitude 41°20' N to 36°30' N, and from 20 to 500 m depth. The surveys were carried out with the R/V "Mário Ruivo", a multipurpose oceanographic vessel, with 76 m. The used fishing gear is a bottom trawl (type Norwegian Campell Trawl 1800/96 NCT) with a 20 mm codend mesh size. The mean vertical opening is 4.6 m and the mean horizontal opening between wings and doors is 15.1 m and 45.7 m, respectively. The polyvalent trawl doors are rectangular (954 mm x 535 mm) with an area of 1.75 m2 and weighting 500 Kg.

The **French** survey samples ICES area 7d annually during 30 days in October following a fixed sampling design with about 88 trawling stations. The survey follows the standard protocol1 and uses the standard bottom trawl "gear A" (GOV 36/47) to conduct 30min tows during daylight.

The **Spanish** survey is carried out annually in three different surveyed areas following a stratified random sampling procedure with bottom trawl hauls: zones 8c and 9a north, 35 days in September-October with about 133 trawling stations; zone 9a south, 14 days in November with about 45 trawling stations; and zone 7ck: 31 days in October with about 80 trawling stations.

IBTS SISP 15 manual:https://doi.org/10.17895/ices.pub.3519

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

The survey is run by Spain, France, Ireland and Portugal.

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

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are coordinated by the IBTSWG for trawl samples and the WGSINS for plankton sampling. Each participating country is responsible for the activities conducted on its national part of the international survey.

Cost sharing: There is currently no cost sharing agreement in place for this survey.

Specific national aspects

Zones 8c and 9a North. internal national name of the research survey: **DEMERSALES**

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

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. About 12 extra hauls deeper than 500 m and shallower than 70 m are performed to cover those depths.

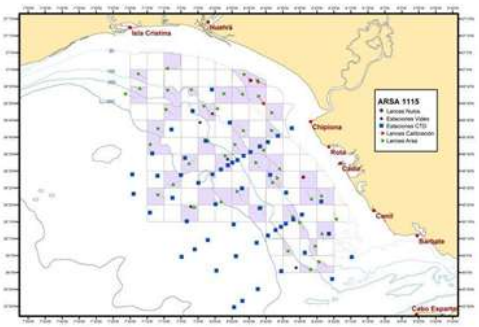
Zone 9a South. internal national name of the research survey: **Arsa-otoño**

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

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.

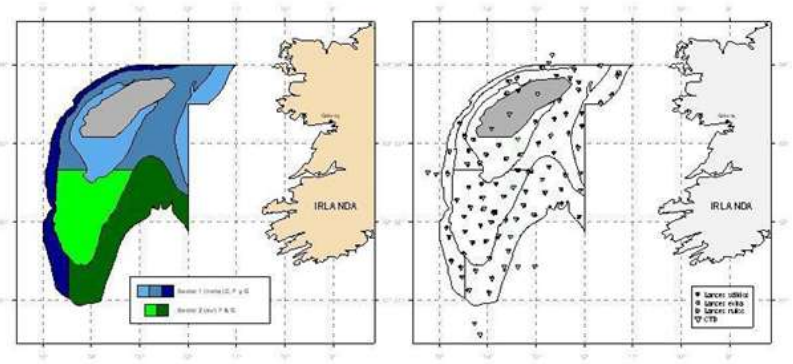
Temperature and salinity are collected during each tow with a CTD attached to the gear. A CTD by haul will be carried out in the survey area.



Zone 7ck. internal national name of the research survey: **PORCUPINE**

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

The survey is carried out in September (3rd quarter) including a few hauls in October depending on the years The sampling design is random stratified with two geographical sectors (Northern and Southern) and three depth strata (180-300 m, 301–450 m and 451-800 m), some extra hauls are performed, if possible, to cover gaps left by the random sampling. Hauls allocation is proportional to the strata area following a buffered random sampling procedure.



RESEARCH SURVEY: INTERNATIONAL MACKEREL AND HORSE MACKEREL EGG SURVEY (MEGS)

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

Research survey: **International Mackerel and Horse Mackerel Egg Survey (MEGS)**

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Objectives of the survey

The main objective of the survey is to extract, identify and stage the development of mackerel and horse mackerel eggs collected from plankton samples. Samples are collected every ICES half statistical rectangle. A CTD is attached to the plankton sampler and information on temperature, salinity and sample depth is collected at each station. Gonad samples are also collected from female fish which are analysed for fecundity, batch fecundity, atresia and POF stage. These data are used to provide WGWIDE, the assessment group for widely distributed pelagic fish, with a spawning stock biomass, SSB, estimate for mackerel, and an egg production estimate for horse mackerel.

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

The survey protocols have been published by ICES and can be accessed at https://doi.org/10.17895/ices.pub.5139 and https://doi.org/10.17895/ices.pub.5140).

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

The MEGS surveys are carried out by Ireland, Portugal, Spain, Germany and The Netherlands

In total, the MEGS is carried out by five EU MSs and four non-EU countries (UK-Scotland, the Faroe Islands, Norway and Iceland), each contributing with its own vessel.

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

The survey is coordinated by ICES WGMEGS. Task sharing applies. Fecundity and atresia samples are divided among the three analysing EU countries (Ireland, the Netherlands, Spain), and two non-EU countries UK-Scotland and Norway.

Cost sharing: There is currently no cost sharing agreement in place for this survey

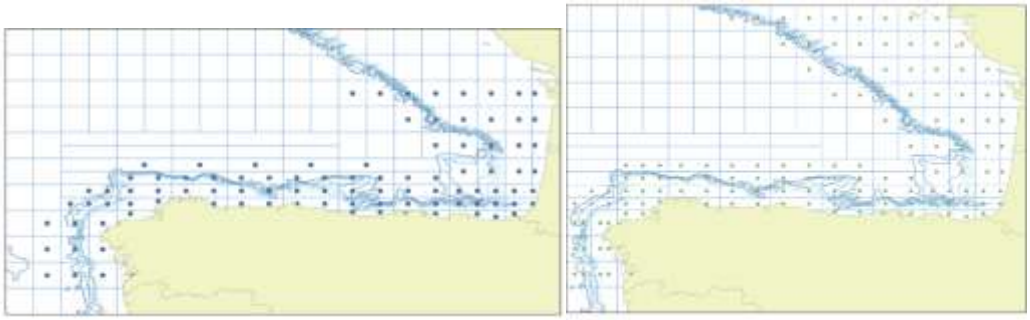
Specific national aspects

Zone 9a North,8c,8b and d South. internal national name of the research surveys: **CAREVA** (march april), **and JUREVA** (april may), **(IEO)**

In most of the western area plankton samplers are deployed at the center of half standard ICES rectangles, which are 0.5° latitude, by 0.5° longitude. To the north of Spain (Cantabrian Sea) more sampler deployments are undertaken, because of the proximity of the shelf edge to the coast.

The number of stations and geographic coverage is coordinated internationally within the framework of the WGMEGS and depends on the availability of ship days in the different countries, to allow full coverage of the spawning stock area. Also, the number of stations and their

location depend on the abundance and distribution of the target species (the maps show the number and geographical distribution of the stations carried out during CAREVA and JUREVA in 2022, as an example).



The standard plankton samplers used in the survey are Bongo 40 (oblique tows). All of these samplers generally have temperature and depth probes attached to the frames and they are also fitted with either mechanical flowmeters to enable the volume of water filtered on each deployment to be calculated.

CTD profiles with Seabird 25 are also obtained in each BONGO station.

Adult fish samples are obtained by pelagic trawls. Those samples are obtained either on board the vessel in which the ichthyoplankton survey CAREVA/JUREVA is carried out, on board of other vessels that simultaneously carry out other pelagic surveys in the area (i.e. PELACUS acoustic survey).

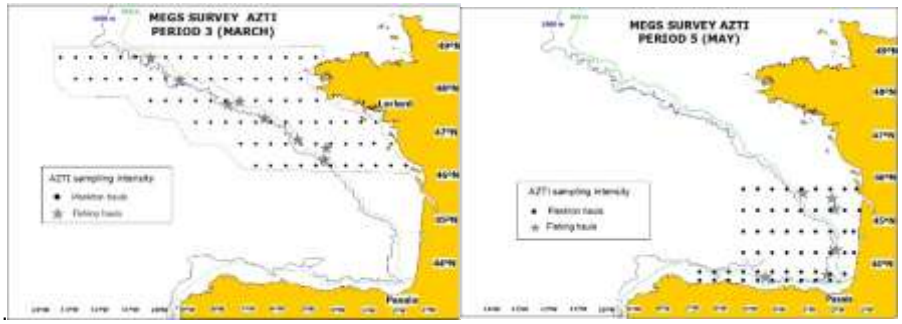
Zone 8abd, 7h and j South. internal national name of the research survey: **Trienal AZTI** (march may).

In most of the western area plankton samplers are deployed at the center of half standard ICES rectangles, which are 0.5° latitude, by 0.5° longitude. To the north of Spain (Cantabrian Sea) more sampler deployments are undertaken, because of the proximity of the shelf edge to the coast.

The number of stations and geographic coverage are internationally coordinated in the framework of the WGMEGS and depend on the availability of ship days in the different countries, to permit a complete coverage of the spawning stock area. The number of stations and their location also depend on the abundance and distribution of the target species (maps show standard station coverage, as an example).

The standard plankton net used by AZTI is the Bongo 40 furnished with RBR (CTD) to record environmental variables through the water column and with mechanical flowmeters that facilitate the calculation of the volume of water filtered at each deployment. On completion of the hauls, plankton is preserved in a 4% buffered formaldehyde solution. At sea, fish eggs from plankton samples are sorted out and once at the lab, the eggs (Mackerel and horse mackerel species) are identified and staged.

Adult samples are captured during the survey using pelagic trawls. The number of hauls to achieve the sampling target varies annually depending on the abundance of fish. The maps show a typical haul distribution.



RESEARCH SURVEY: SARDINE, ANCHOVY HORSE MACKEREL ACOUSTIC SURVEY (SAHMAS).

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

Research survey: **Sardine, Anchovy Horse Mackerel Acoustic Survey (SAHMAS)**

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Objectives of the survey

The surveys have a different origin, but together provide information on abundance estimates of a suite of small pelagic species, primarily anchovy, pilchard, horse mackerel and boarfish in the NE Atlantic (ICES areas 6, 7, 8, 9). The surveys take place between mid-March and July

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

Methods have been validated by WGACEGG and are described in details in the survey protocols manual: https://doi.org/10.17895/ices.pub.7462

Multibeam and multifrequency echosounders provide real time information on the spatial patterns and abundance of small pelagic fish. Simultaneously, a Continuous Fish Eggs Sampler (CUFES) provide complementary information on anchovy and sardine eggs. The presence and abundance of seabirds and marine mammals are also continuously recorded along transects during daytime. The species composition of fish school echoes are identified by midwater trawling, performed in an adaptative manner. CTD stations and zooplankton net casts are performed at night to characterize the small pelagic fish biotic and abiotic environment.

CUFES samples are processed onboard using the Zoocam egg and mesozooplankton scanner system, which allows for the semi-automatic identification and counting of anchovy and sardine eggs. Fish biological samples are recorded and analysed at sea, including anchovy and sardine age readings. Acoustic and fishing data are combined using the EchoR R package, to derive small pelagic fish biomass estimates and distribution maps.

Acoustic and fishing data, as well as biomass assessment results are stored in the EchoBase relational database. Acoustic and fishing data are shared within the ICES ACEGG working group. They are being stored in the ICES dedicated database: https://www.ices.dk/data/data-portals/Pages/acoustic.aspx.

Anchovy, sardine, mackerels, horse mackerels, blue whiting and boarfish biomass estimates derived from data collected during SAHMAS are provided to ICES stock assessment groups (WGHANSA and WGWIDE).

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

The spring acoustic survey SAHMAS includes the PELAGO survey carried by Portugal, the PELACUS survey carried out by Spain and the PELGAS survey carried out by France.

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

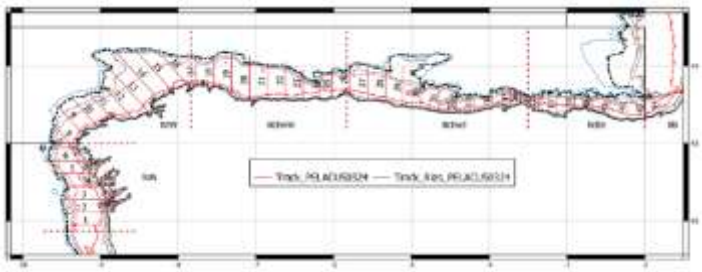
The survey is internationally coordinated within the ICES Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9 (WGACEGG). Each participating country is responsible for the activities conducted on its national part of the international survey.

Cost sharing: There is currently no cost sharing agreement in place for this survey.

Specific national aspects

Zone 8c and 9a North. internal national name of the research survey: **PELACUS**

The Acoustic tracks are systematic with parallel transects (random start) evenly distributed each 10 nmi.



RESEARCH SURVEY: SARDINE DEPM TRIENNIAL(SDEPM).

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

Research survey: **Sardine DEPM triennial (SDEPM)**

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Objectives of the survey

The objectives of the survey are to Estimate the spawning stock biomass (SSB) of the Atlanto-Iberian sardine stock (ICES 9a plus 8c- Spain), using the Daily Egg Production Method (DEPM).

The SDEPM survey involves vertical ichthyoplankton sampling on fixed stations with a CalVET net. Simultaneously, the auxiliary CUFES system operates underway (between the CalVET stations), collecting surface plankton samples (3m below surface approximately) every 3 nm. The deployment of both samplers follows a predefined grid of fixed transects perpendicular to the coast and spaced 8 nm, covering the platform at least until the 200 m isobath. Decisions on the offshore limit of surveying (delimitation of the spawning area) are made, adaptively, depending on the egg results provided by the samples obtained by the CUFES system. After hauling, ichthyoplankton samples are preserved and subsequently processed and analysed in laboratory. Concurrently to the plankton sampling with the CalVET and the CUFES, environmental data (temperature and salinity and fluorescence) are recorded. The ichthyoplankton samples are then used in view of:

- Quantifying and identifying per developmental stage sardine eggs observed over the whole surveyed area;
- Delimiting and estimating the spawning area of sardine;
- Estimating sardine daily egg production.

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

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

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

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

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

The EU MSs participating to this survey are Spain and Portugal

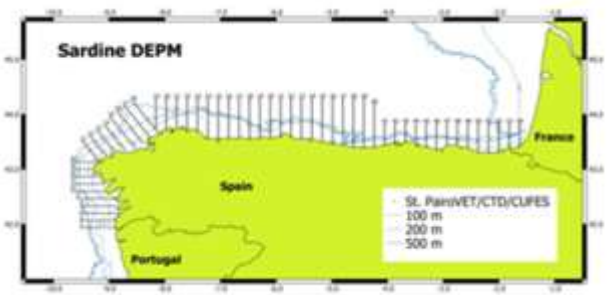
4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.

Sardine DEPM survey is coordinated internationally under the auspices of the ICES WGACEGG; Portuguese survey carried out jointly with the Spanish survey (from the Instituto Español de Oceanografía, IEO) in order to cover the Atlanto-Iberian sardine stock area (9a, 8c). Each participating country is responsible for the activities conducted on its national part of the international survey.

Cost sharing: There is currently no cost sharing agreement in place for this survey

Specific national aspects

Zone 8c and 9a North. internal national name of the research survey: **SAREVA**



RESEARCH SURVEY: NEPHROPS UWTV SURVEY (UWTV 30).

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

Research survey: **Nephrops UWTV Survey (UWTV30)**

NANSEA_RWP_2025-2027_TEXT_2024.08.23

1. Objectives of the survey

- To obtain estimates of Nephrops burrows densities in the Gulf of Cádiz from a randomized isometric grid of UWTV stations spacing 4 nautical miles using the underwater images.
- To define the Nephrops distribution in the Gulf of Cadiz
- To obtain density estimates of bentho-demersal macrofauna species and the occurrence of trawl marks on the sea bed
- To calibrate bentho-demersal macrofauna observed in the underwater videos and those obtained in the beam trawl.
- To measure oceanographic variables using a sledge mounted CTD

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

Manual for Nephrops Underwater TV Surveys, coordinated under ICES Working Group on Nephrops Surveys (WGNEPS) https://doi.org/10.17895/ices.pub.4370

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

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

Spain is the only participant to this survey (as in Table 2.6)

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

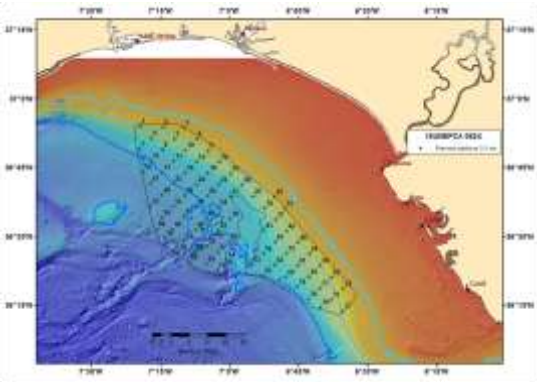
Individual tasks to the survey participants are allocated by the responsible ICES survey planning group. Each participating country is responsible for the activities conducted on its national part of the international survey.

Cost sharing: There is currently no cost sharing agreement in place for this survey

Specific national aspects

Zone 9a South (FU 30). internal national name of the research survey: **ISUNEPCA**

The spacing between stations is actually 3.5 nm, not 4.



RESEARCH SURVEY: BIOMASS OF ANCHOVY (BIOMAN).

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

Research survey: **Biomass of Anchovy**

internal national name of the research survey: **BIOMAN**

1. Objectives of the survey

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

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

The DEPM is applying following the protocol accorded at WGACEGG. In (ICES -Cooperative Research Report 332). https://doi.org/10.17895/ices.pub.4599

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

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

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



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

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

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

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

Not applicable

(max 450 words per survey)

RESEARCH SURVEY: ACOUSTIC SURVEY FOR JUVENILE ANCHOVY IN THE BAY OF BISCAY (JUVENA_ESP).

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

Research survey: **Acoustic Survey for Juvenile Anchovy in the Bay of Biscay (JUVENA_ESP)**

internal national name of the research survey: **JUVENA**

1. Objectives of the survey

The main objective of the project is estimating the abundance of juvenile anchovy in the Bay of Biscay in Autumn, as a tool for predicting the recruitment of anchovy. Secondary objectives are:

- Studying the biological condition of juvenile anchovy and its influence on the recruitment process.
- Caracterizing the hydrographic conditions and the abundance and distribution of the components of the pelagic ecosystem relevants to understand the dynamics of the recruitment.

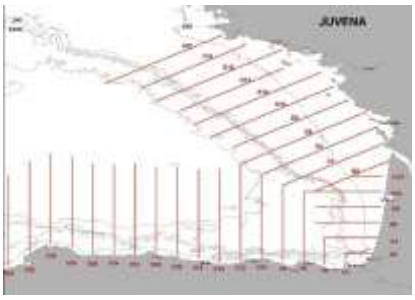
- Studying the interactions between top predators and their preys in the Bay of Biscay, as well as inter-specific interactions between marine birds and sub-superficial predators.
- Acoustic identification and vertical distribution of mesopelagic species in the Bay of Biscay.

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

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

https://ices-library.figshare.com/articles/report/Pelagic_survey_series_for_sardine_and_anchovy_in_ICES_subareas_8_and_9_Towards_an_ecosystem_approach/18624050

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



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

Spain: RV. Angeles Alvariño, RV. Enma Bardan

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

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

Not applicable

(max 450 words per survey)

RESEARCH SURVEY: DEEPWATER LONGLINE SURVEY (PALPRO_ESP).

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

Research survey: **Deepwater Longline Survey (PALPRO_ESP)**

internal national name of the research survey: **PALPROF**

1. Objectives of the survey

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

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

The methodology is published in the report of WGDEEP 2016 and in this link

https://www.azti.es/en/proyectos/deep-sea-longline-campaign-estimate-abundance-of-sharks/, and in the paper Diez et al. 2021

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

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

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

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

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

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

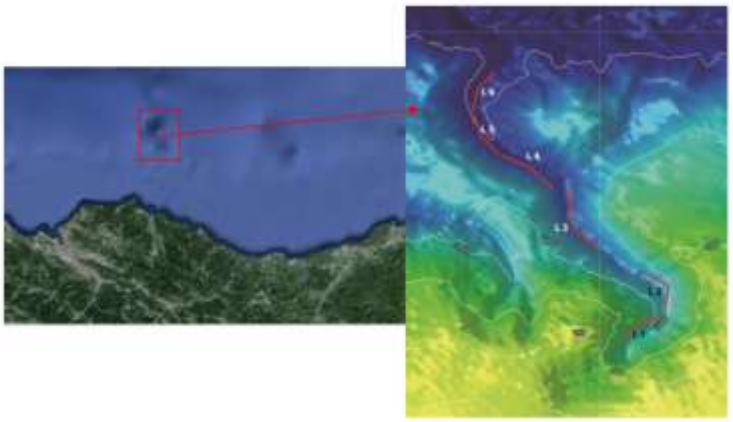
For the analysis of effort and CPUEs hauls' catches were grouped in four depth strata: 650-1050 m, 1051-1450 m, 1451-1850 m and 1851-2250 m.

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

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

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

CPUEst = kg / EFFORTst



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

It is not an International coordinated survey

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

Not applicable

(max 450 words per survey)

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

Research survey: **Western IBTS 1st quarter**

Acronym: IBTS_Q1

internal national name of the research survey: **Arsa03-primavera. (Not mandatory survey)**

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

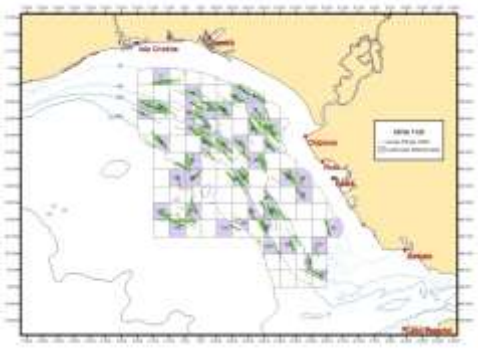
Manual for the International Bottom Trawl Surveys

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

The whole area (7224 km2) has been separated into five depth strata (15-30, 31-100, 101-200, 201-500 and 501-800 m). The sampling design is random stratified with proportional allocation with a total of 45 fishing stations and swept-area method.

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

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



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

UK-Scotland/Scotia; UK-North Ireland/Corystes; Ireland/Celtic Explorer; France/Thalassa; Spain/Vizconde de Eza; Portugal/Mar Portugal.

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

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

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

(max 450 words per survey)

RESEARCH SURVEY: ACOUSTIC SURVEY ON SARDINE AND ANCHOVY-RECRUITS.

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

Research survey: **Acoustic Survey on Sardine and Anchovy-Recruits**

internal national name of the research survey: **ECOCADIZ-reclutas. (Not mandatory survey)**

1. Objectives of the survey

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

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

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

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

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



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

Spain/ RV Ramon Margalef,

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

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

Not applicable

(max 450 words per survey)

RESEARCH SURVEY: ACOUSTIC INDEX FOR JUVENILE BLUEFIN TUNA IN THE BAY OF BISCAY

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

Research survey: **Acoustic index for juvenile bluefin tuna in the Bay of Biscay**

internal national name of the research survey: **BFT-index. (Not mandatory surveys)**

1. Objectives of the survey

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

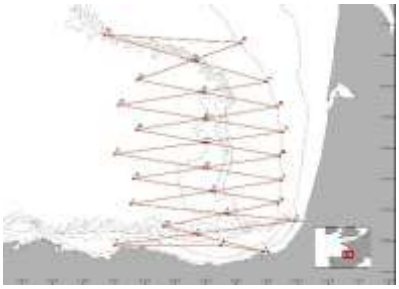
- Secondary objectives include:

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

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

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

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



Further details on the methodology used can be found here:

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

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

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

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

Not applicable.

(max 450 words per survey)

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

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

Research survey: **Acoustic Survey for Juvenile Anchovy Sardine in the Western Iberia-IBERAS**

Acronym: **IBERAS**

internal national name of the research survey: **IBERAS. (Not mandatory surveys)**

1. Objectives of the survey

- The main objective of this survey was to achieve a biomass' estimation by echo-integration of the sardine Young of the Year over the main recruitment area of the Ibero-Atlantic sardine stock:
- Determine the distribution area and density of the main pelagic fish species inhabiting the surveyed area
- Determine the main biological characteristics (length, sex, maturity stage and age) of the main pelagic fish species
- Characterise the main oceanographic conditions of the surveyed area
- Determine the distribution area and density of apical predators over the surveyed area

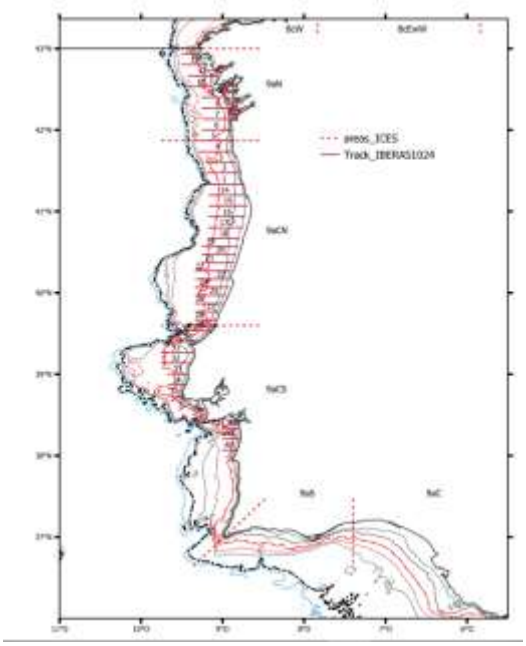
2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.

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

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

Acoustic, Systematic track with parallel transects evenly distribute each 8/6 nmi from shoreline up to 100-150 (i.e. main expected distribution area of sardine recruitment). Backscattering energy attributed to fish species after scrutinisation of the echograms, groundtruthed by pelagic trawl hauls. Biomass estimates using echo-integration method. Pelagic fishing stations for echo-trace allocation and biological characterisation. Trained observers recorded marine mammal, seabird, floating litter and vessel presence and abundance. Data on the hydrography and hydrodynamics of the water masses are collected via the deployment of conductivity, temperature and depth sensors and SSS, SST and SSF.

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



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

Spain and Portugal. /RV Angeles Alvariño or RV Ramon Margalef depending on vessel availability.

Relevant international planning group: WGACEGG: Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas 7, 8 and 9 (https://www.ices.dk/community/groups/pages/wgacegg.aspx).

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

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

(max 450 words per survey)

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

RESEARCH SURVEY: PAN-MEDITERRANEAN ACOUSTIC SURVEY (MEDIAS).

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

Research survey: **Pan-Mediterranean Acoustic Survey (MEDIAS)**

MedBS_RWP_2025-2027_text_2024.08.30

1. Objectives of the survey

The MEDIAS survey programme intends to evaluate the abundance and spatial distribution of small pelagic fish resources by direct methods (acoustics), independently of the data provided by commercial fisheries; Target species are anchovy and sardine.

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

Survey is conducted in the summer-autumn period of the year according to MEDIAS protocol.

Furthermore, a specific date for each GSA has been proposed by the MEDIAS coordination group during 2024, based essentially on the historical periods of the surveys and the availability of research vessels. This proposal will ensure the continuity of time series within the GSA level. A buffer period of plus or minus one month is authorized in case of particular difficulties that may be encountered in certain years. In the case the survey has to be brought forward or delayed by more than this buffer month outside the official period, a request must first be made to MEDIAS SC and the EC before launching the survey. The specific time period by GSA is provided below:

GSA	Official period (month)
GSA1	6 7
GSA6	6 7
GSA7	6 7
GSA9	8 9
GSA10	7 8
GSA15	7 8
GSA16	7 8
GSA17 E	8 9 10
GSA 17 W	6 7
GSA 18	6 7
GSA 20	9 10
GSA 22	6 7
GSA 29 (summer)	6 7
GSA 29 (autumn)	10 11

Acoustic data for fish abundance estimation are collected by calibrated scientific echo sounder at 38kHz; Fish samples are collected by use of pelagic trawl net, with aim to provide information needed for echograms scrutiny, as well as for collection of fish biological data; Abiotic environmental data (measurements of temperature and salinity) collections are made by CTD vertical profiles, while additional biotic data in pelagic ecosystem are obtained by plankton sampling (acoustic at 120kHz and/or vertical hauls).

n the case of GSAs 1 and 6 (Spain), acoustic data of the zooplankton community is collected taking advance of other frequencies (18, 70, 120 and 200 kHz) and specific fishing with plankton nets).

Collection of navigational data ensures that all other collected data are geo-referenced (suitable for spatial analyses). Manual of the survey is available at http://www.mediasproject.eu/medias/website/handbooks-menu.html, and it contains a graphical map of the surveys.

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

The MEDIAS acoustic surveys, performed in summer, should cover a series of areas in the Mediterranean EU MS (Spain, France, Croatia, Italy, Slovenia and Greece) with a standardised methodology. As proposed in the RCG Med&BS 2022 recommendation 7, Malta shall carry out the survey within GSA 15 on a voluntary basis, and this commitment will also be reflected in the NWP

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

The geographical areas that will be covered by the MEDIAS surveys and the respective days at sea per participating countries are reported in Table 1 of the Medias manual (MEDIAS-Handbook, 2023

Specific national aspects

internal national name of the research survey: **MEDIAS**

RESEARCH SURVEY: INTERNATIONAL BOTTOM TRAWL SURVEY IN THE MEDITERRANEAN (MEDITS).

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

Research survey: **International Bottom Trawl Survey in the Mediterranean (MEDITS)**

MedBS_RWP_2025-2027_text_2024.08.30

1. Objectives of the survey

The MEDITS survey programme intends to produce basic information on benthic and demersal species in terms of population distribution as well as demographic structure, on the continental shelves and along the upper slopes at a global scale in the Mediterranean Sea, through systematic bottom trawl surveys:

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

The MEDITS is conducted in spring - summer period from May to July based on MEDITS protocol using specially designed bottom trawl net GOC 73. Sampling stations are randomly distributed according to the depth strata (10-50; 50-100; 100-200; 200-500; 500-800 m) and the number of stations is proportional to the surface of each stratum.

MEDITS data are collected, processed and analysed according to the common protocol (MEDITS-Handbook. Version n. 9, 2017), to produce information (i.e. population distribution, abundance, size composition etc.), on benthic and demersal species found in an area with a depth ranging from 0 to 800 m. The working zone (on the continental shelves and along the upper slopes) has been adopted to cover at best the distribution areas of the main exploited or potentially exploitable species, considering the administrative and technical constraints of the project.

The stations are distributed in each GSA applying a random stratified sampling scheme using as strata the geographical combination of zones and depth.

In order to improve the quality of the MEDITS data and the consistency of the information collected a routine (RoME, Bitetto et al., 2017) has been developed for common use, which rationale has been incorporated in the checks made at JRC level during the data upload and the assessment working groups (STECF EWGs)

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

Since 2001, European MSs bordering the Mediterranean are obliged to carry out MEDITS survey yearly in the framework of the EU Data Collection. Italy, France, Spain, Croatia, Greece, Malta, Slovenia, and Cyprus are involved in the MEDITS and permanent links are maintained with relevant bodies (i.e., RCG Med&BS, MEDITS Steering Committee, and GFCM). Targets number of hauls, by area and participating countries, are reported in the Annex III of the MEDITS Handbook (MEDITS-Handbook Version n. 9, 2017). Currently, the MEDITS Handbook is under revision.

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

Targets number of hauls, by area and participating countries, are reported in the Annex III of the MEDITS Handbook (MEDITS-Handbook Version n. 9, 2017).

Specific national aspects

internal national name of the research survey: **MEDITS**

RESEARCH SURVEY: BLUEFIN TUNA LARVAL SURVEY.

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

Research survey: **Bluefin Tuna Larval Survey**

Acronym: TUNIBAL

internal national name of the research survey: **TUNIBAL**

1. Objectives of the survey

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

Secondary objectives include:

- Determine the influence of hydrographic scenarios on the structure, distribution and abundance of larval populations of large and medium pelagic species with special attention to the targeted species.

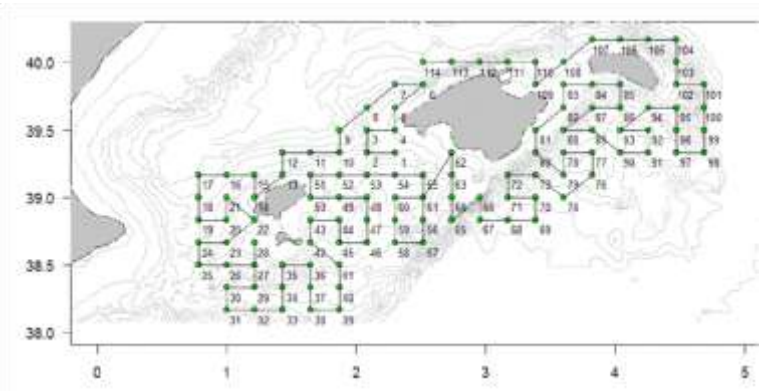
- Completing the database for the development of habitat models for the tuna species, models based on data taken in-situ by hydrographic profiles. The models are used to calibrate the fishery-independence abundance indices
- Deepening knowledge about growth, trophic ecology (interactions predator prey), survival and the genetic structure of larval populations of bluefin tuna and related species in the Balearic Sea.
- Determining the processes that determine planktonic productivity and biodiversity in the Balearic Sea
- 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
- Ensure the collection of samples that can be used for future inter-calibration of quantitative sampling carried out with different plankton samplers
- Ensure the preservation of collectors from Bongo-90 500 microns in ethanol whose larvae to will be provide to Bluefin Tuna (BFT) CKMR Project coordinated by the GBYP (ICCAT).

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

The methodology used to estimate the abundance of tuna larvae includes

In all stations, an oblique plankton fishing between 0 and 30 meters, with Bongo 20 networks equipped with meshes of 55 and 200 microns and mounted above the structure of the Bongo 90 equipped with meshes of 500 microns is conducted. All networks are equipped with flow meters. Fishing will be carried out using a 4 mm steel cable, maintaining the speed of the ship at 2 knots. One collector from the Bongo 90 will be preserved in ethanol and the other in formalin. Besides, in each station a hydrographic profile with a CTD mounted in the rosette, is conducted between 0 and 350 or 650 meters. In standard stations, Niskin bottles will be sampled at depths of 5, 25, deep chlorophyll maximum, 200, 500, the LIW (maximum salinity). The methods are standardized with NOAA and University of Miami (USA).

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



The methodology is detailed in:

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

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

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

Álvarez-Berasategui, D., *et al*., 2023. Informe de campña del programa de monitorización de los estadíos tempranos de túnidos y escenario hidrográfico en el Mar Balear. (TUNIBAL,2023) *https://doi.org/10.20350/digitalCSIC/16263*

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

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

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

Not applicable

(max 450 words per survey)

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

ACOUSTIC SURVEY FOR SMALL PELAGIC FISH WITH COMMERCIAL INTEREST IN THE CANARY ISLANDS

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

Research survey: **Acoustic Survey for Small Pelagic Fish with commercial interest in the Canary Islands (Not mandatory surveys)**

Acronym: PECAN

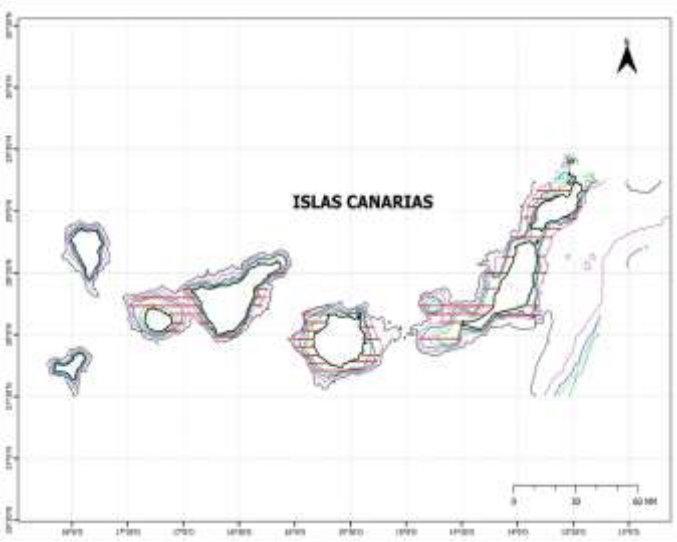
internal national name of the research survey: **PECAN**

1. Objectives of the survey

- The main goal of this study is to estimate the "biomass" by eco-integration of small pelagic fish of commercial interest in the Canary Islands: Atlantic chub mackerel, blue jack mackerel, European pilchard, round sardinella and Madeiran sardinella.
- Determine the distribution area and density of the commercial small pelagic fish species inhabiting the surveyed area
- Determine the main biological characteristics (length, sex and maturity stage) of the commercial small pelagic fish species
- Characterize the main oceanographic conditions of the surveyed area

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

Acoustic estimation of the abundance and biomass of the target species during daylight, along to a systematic grid composed by transects normal to the shore line, between 20 – 1000 m isobaths, with a Simrad™ EK-80 scientific echo-sounder working in a multi-frequency fashion (18, 38, 70, 120 and 200 kHz). The echo-traces identification, size and other biological aspects of the assessed species are obtained from opportunistic ground-truthing fishing hauls. Backscattering energy attributed to fish species after scrutinization of the echograms. Biomass estimates using echointegation method. Hydrographic characterization of the surveyed are collected via the deployment of conductivity, temperature and depth sensors (SSS, SST and SSF).



Distribution of transects in the surveyed area in the Canary Islands.

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

Spain/RV Ángeles Alvariño or other vessel with similar characteristics

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

Not applicable

(max 450 words per survey)

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

RESEARCH SURVEY: FLEMISH CAP GROUNDFISH SURVEY

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

Research survey: **FLEMISH CAP GROUNDFISH SURVEY**

Acronym: FCGS

internal national name of the research survey: **Flemish Cap**

1. Objectives of the survey

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

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

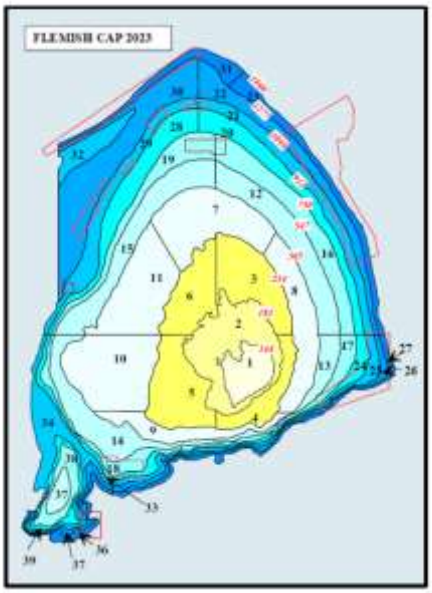
Target species: Cod (*Gadus morhua*), Redfish (*Sebastes mentella*, *S. fasciatus* and *S. norvegicus*), American plaice (*Hippoglossoides platessoides*), Greenland halibut (*Reinhardtius hippoglossoides*), Roughhead grenadier (*Macrourus berglax*) and Northern shrimp (*Pandalus borealis*)

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

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

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 2-13)

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



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

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

Research vessel: R/V Vizconde de Eza.

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

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

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

There is not signed agreement about task sharing.

(max 450 words per survey)

RESEARCH SURVEY: 3LNO GROUNDFISH SURVEY. (1ST PART -3NO)

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

Research survey: **3LNO GROUNDFISH SURVEY** (1st part -3NO)

Acronym: PLATUXA_ESP

internal national name of the research survey: **Platuxa**

1. Objectives of the survey

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

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

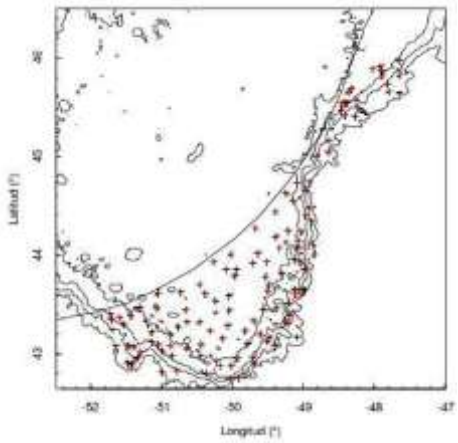
Target species: Cod (*Gadus morhua*), Redfish (*Sebastes spp.),* American plaice (*Hippoglossoides platessoides*), Yellowtail flounder (*Limanda ferruginea*), Witch flounder (*Glyptocephalus cynoglossus*), Black dogfish (*Centroscyllium fabricii*), Thorny skate (*Amblyraja radiata*); White hake (*Urophycis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

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

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

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-28).

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



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

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

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

Not applicable.

(max 450 words per survey)

RESEARCH SURVEY: 3LNO GROUNDFISH SURVEY. (2ND PART -3L)

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

EU MAP Implementing Decision will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU-MAP Implementing Decision or whether it is an additional survey.

Research survey: **3LNO GROUNDFISH SURVEY** (2nd part -3L)

Acronym: PLATUXA_ESP

internal national name of the research survey: **Fletán Negro 3L**

1. Objectives of the survey

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

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

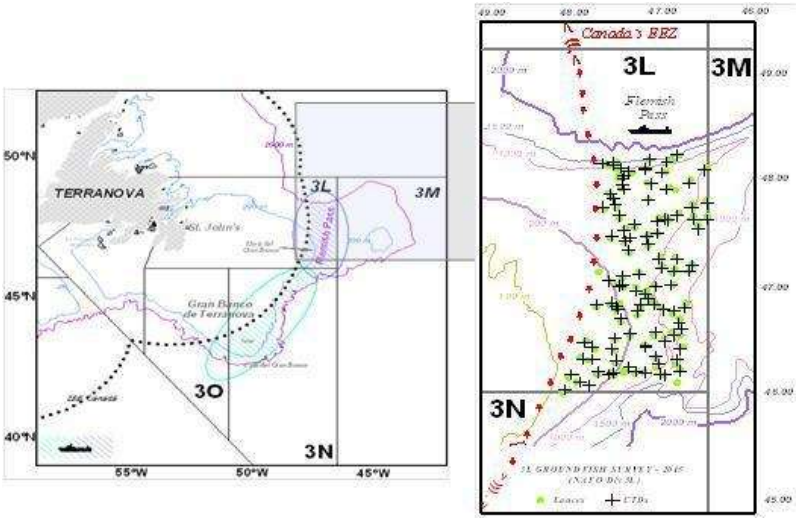
Target species: Cod (*Gadus morhua*), Redfish (*Sebastes spp.),* American plaice (*Hippoglossoides platessoides*), Witch flounder (*Glyptocephalus cynoglossus*), Thorny skate (*Amblyraja radiata*), Greenland halibut (*Reinhardtius hippoglossoides*), Northern shrimp (*Pandalus borealis*), Roughhead grenadier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

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

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

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 29-41)

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



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

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

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

Not applicable.

(max 450 words per survey)

SECTION 3: FISHING ACTIVITY DATA

Text Box 3.1: Fishing activity variables data collection strategy

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

Explain the reasons for implementing complementary data collection

Data are collected under the Regulation (EU) 2023/2842 of the European Parliament and of the Council of 22 November 2023 amending Council Regulation (EC) No 1224/2009, and amending Council Regulations (EC) No 1967/2006 and (EC) No 1005/2008 and Regulations (EU) 2016/1139, (EU) 2017/2403 and (EU) 2019/473 of the European Parliament and of the Council as regards fisheries control . No complementary data collection is planned.

No complementary data collection is planned.

(max. 900 words)

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

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

National strategies:

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

EMU_ES_Asturias (EMU_ES_Astu)

The only diadromous species with a commercial fishery is the eel. There is only glass eel commercial fishery. Glass eel fishery is performed from boat and from land ("a pie") using the sieve ("cedazo") as fishing gear. The Asturian regional administration is in charge of the management of the fishery in inner waters (including coastal waters).

Daily glass eel catches (kg), fishing effort (hours) and fishing area (beach, river) are recorded by glass eel fishermen (boat and land licenses) during the whole fishing season. This information is reported to the Administration through an online database.

Three Management Plans (Tinamayor, Nalon and East) and two other areas (West Area and Central Area) make up the Asturian coast.

EMU_ES_Galicia (EMU_ES_Gali)

Only one management unit has been defined in the Galicia-Costa RBD, in which recreational fishing activity has been completely forbidden. Yellow and silver eel fishery is performed from boat using a limited number of gears, silver eel must be released. The boats need a specific license for the fishing gear that will be used in each fishing trip. They might have more than one fishing gear license, but only one of them can

be used in each fishing operation. According to the resolution that allows eel fishing in the Arousa, Ferrol and Vigo Estuaries ("Resolución do 23 de decembro de 2010, da Dirección Xeral de Ordenación e Xestión dos Recursos Mariños, pola que se autoriza o plan de pesca de anguía para as confrarías de pescadores das rías de Arousa, Ferrol e Vigo" publicado no DOG nº 251 de 31 de diciembre de 2010), the maximum number of sieves is 80, and the fishing period is limited from the 1st of February to the 29th of October. Nowadays, there are 66 boats allowed to fish using the 'butrón' sieve, but only 37 of them are active nowadays. Regarding the 'anguila' sieve, there are 41 boat licenses but this gear has been practically abandoned, and there is only 1 boat currently working with it.

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

- Arousa Estuary: Cambados, Carril, and Rianxo fishermen guilds.

- Eo River: Asturian fishermen guilds.

- Ferrol Estuary: Barallobre, and Ferrol fishermen guilds.

- Pontevedra Estuary: Pontevedra fishermen guilds.

- Vigo Estuary: Arcade and Redondela fishermen guilds.

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

EMU_ES_Murcía (EMU_ES_Murc)

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

EMU_ES_Valencia (EMU_ES_Vale)

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

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

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

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

O Alicante: In this province, professional fishery occurs in 7 autorized private between the El Hondo wetlands (Elche) and the salt flats of Santa Pola. In these fishing areas of Alicante, a maximum number of fishing rigs (named "mornells") is allowed.

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

EMU_ES_Cantabria(EMU_ES_Cant)

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

EMU_ES_Cataluña (EMU_ES_Cata)

Eel fishery is now professional. There are two RBDs in Catalonia: the Inner Catalonia River Basin, which includes small and medium Rivers, and the Ebro RBD, which is the second largest river basin in Spain. The delta of the Ebro River is the most important eel fishing spot in Catalonia regarding the number of active fishermen with license and eel catches. The glass eel fishery is professional in the Ter, Muga and Fluvià Rivers (province of Girona; Inner Catalonia River Basin) and the delta of the Ebro River (province of Tarragona). In both areas, the fishing effort is regulated by the number of fishing licenses and specific sites. There are currently 6 fishing entities involved in eel fishery, 3 fishermen guild in the Girona rivers (10 licenses) and 3 fishermen guild in the Ebro (with a total of 56 licenses). Fishing is only allowed for 6 months (October to March). Fishing methods of glass eel are basically by means of adapted fyke nets, placed in the river mouth, canals or along the estuary. Yellow and silver eel recreational fishing is only allowed with rods and 'catch and release' modality, except from the lagoons of the Delta, where there is a professional yellow and silver eel fishery.

(max. 900 words)

SECTION 4: IMPACT OF FISHERIES ON MARINE BIOLOGICAL RESOURCES

Text Box 4.2: Incidental catches of sensitive species

REGION: NORTH SEA AND EASTERN ARCTIC. EASTERN ARCTIC, NORWEGIAN SEA AND BARENTS SEA (ICES AREAS 1, 2, FAO AREA 27)

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

Data collection has been improved in relation to existing Regulations.

Sampling scheme identifier: ESP_IEO_P5_AtSea

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found)

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

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

The main objective of the "ESP_IEO_P5_AtSea" sampling scheme is the sampling of commercial catches.

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

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

OTB_DEF_>=120 and OTM_DEF_100-129 (ICES 1,2).

- What are the methods to calculate the observation effort?

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

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

Y

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

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

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

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

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

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

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

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

Y.

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

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

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

Not sampling planned in gill nets and hook and line fisheries

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

Yes

Additional information on sampling schemes

No adicional information

Additional description on sampling frames

A specific sampling protocol is applied for sampling indicators of benthic invertebrates in OTB fisheries. The sampling design is done to check the sorting process of 10% hauls and when there is an important occurrence of organisms as well.

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

REGION: NORTH-EAST ATLANTIC.NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)

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

Incidental catches of sensitive species - List of PET Species provided by ICES

NANSEA_RWP_2025-2027_TEXT_2024.08.23

List of PET Species has been developed by ICES on a region-wide level (https://ices-library.figshare.com/articles/report/ICES_Roadmap_for_bycatch_advice_on_protected_endangered_and_threatened_species/19657167).

A shorter list of species is specifically required in ICES datacall (https://ices-library.figshare.com/articles/report/WGBYC_Data_call_2022_Bycatch_of_protected_species_for_ICES_advisory_work/19745809/2?file=35156167

These species lists will be used by the RCGs to prioritize future regional work plans regarding PETS sampling programmes. These species lists will be subjected to periodic review and update.

Agreement and commitment on a Regional list of priority PET species

MS involved: ALL

MS to ensure that the species listed in the documents referred above are recorded when encountered during the commercial sampling and given high priority in case concurrent sampling cannot be implemented.

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

RDBES incorporation of bycatch data

NANSEA_RWP_2025-2027_TEXT_2024.08.23

The regional coordination of data collection of PET species is under development in the RCG ISSG on PETS. The work relates to the incorporation of bycatch data into the RDBES.

WGBYC members have worked with the RDBES core group over the last years to make sure some formats were suitable for bycatch data (ICES WGBYC, 2023). The results of the tests carried out will allow to assess the incorporation of all PETS bycatch related data into the RDBES, essential for the regional coordination of potential regional sampling plans.

Agreements and commitments on incorporation of bycatch data into the RDBES

MS involved: ALL

- Data format has been agreed
- All MS to upload PETS bycatch related data into the RDBES, essential for the regional coordination of potential regional sampling plans.

It is to be noted that the second bullet point is conditional to data uploading tests which will be carried out together with ISSG PETS, WGBYC and RDBESGOV in 2023/2024.

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

Identification of high-risk fisheries

NANSEA_RWP_2025-2027_TEXT_2024.08.23

The work ongoing in ICES WGBYC and PETSAMP series of workshops makes it possible to identify the high-risk fisheries from PETS bycatch, including their effort. The methodology used and the available data also provides information on the spatial coverage of the fisheries, and the abundance and overlap of PET species in the ecoregion. The information obtained through this assessment needs to be processed further by ISSG on PETS to allow the RCGs to identify which are the main fisheries that should be sampled at regional level based on the needs of the main end-users.

Agreements and commitments on the Identification of high-risk fisheries

MS involved: ALL

- The methodology developed by WGBYC (2018) to identify high-risk fisheries, was agreed by the ISSG/PETS and RCG TM of NANSEA.
- MS agreed to give consideration to the identified high-risk fisheries when designing their sampling programme.

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

Sampling scheme identifier: ESP_IEO_P5_AtSea

National scheme for ICES areas 5, 6a-7c,12 and 14

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found)

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

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

The main objective of the "ESP_IEO_P5_AtSea" sampling scheme is the sampling of commercial catches.

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

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

OTM_DEF_32-69 (ICES ICES 6a-7c)

- What are the methods to calculate the observation effort?

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

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

Y

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

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

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

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

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

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

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

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

Y.

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

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

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

Not sampling planned in gill nets and hook and line fisheries

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

Yes

Additional information on sampling schemes

No adicional information

Additional description on sampling frames

A specific sampling protocol is applied for sampling indicators of benthic invertebrates in OTB fisheries. The sampling design is done to check the sorting process of 10% hauls and when there is an important occurrence of organisms as well.

Sampling scheme identifier: ESP_IEO_P1_AtSea

National scheme for ICES areas 6, 7 (excl. 7d), 8, 9

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found)

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

No, the main objective of the ESP_IEO_P1_AtSea sampling programme is the estimation of fishing discards. The selection of metiers was based on exploratory pilot projects carried out in the 1990s with the aim of identifying the metiers that produce the highest levels of discards: trawls (OTB and PTB) and industrial gillnets (GNS).

Following the inclusion of PETs in the DCF in 2017, the sampling protocols were adapted to ensure the correct recording of bycatch. Subsequent modifications regarding metiers or sampling coverage have not specifically taken into account bycatch. Since then, different risk analyses have been published (MARE/2016/22, ICES, 2024), which confirm that the metiers covered under ESP_IEO_P1_AtSea also present a high risk of bycatch.

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

According to the conclusions obtained from the last revision of the WGBYC in the year 2023 in the Bay of Biscay and Iberian waters the métiers with highest risk of bycatch of sensitive species are (ICES, 2024: Table 6.1): drift gillnets (GND), set gillnets and entangling nets (GNS), trammel nets (GTR), bottom otter trawl (OTB), drifting long lines (LLD), pelagic pair trawl (PTM), midwater otter trawl (OTM), set longlines (LLS), bottom pair trawl (PTB) y multi-rig otter trawl (OTT).

There is no Spanish fleet operating with PTM, OTM or OTT. LLD is covered by the ESP_IEO_P4_AtSea_all sampling scheme. The only Spanish GND that currently exists is a small traditional artisanal fishery targeting sardines in a small coastal area of southern Galicia ("xeito"), with very little effort. So, the only métiers with risk of bycatch that we do not consider in our OAB programme are artisanal GNS and GTR, both with serious difficulties in hosting observers on board as well as LLS.

The industrial GNS and OTB are included in the "ESP_IEO_P1_AtSea" sampling scheme.

- What are the methods to calculate the observation effort?

Our observation effort was calculated for the purpose of estimating discards and taking into consideration the total effort of each sampling stratum, trying to reach at least 1% coverage. Sampling effort estimation calculations in these same métiers to obtain robust estimates of cetacean bycatch (Castro et al., 2024) indicate levels of up to 17% and 26% of sampling effort for GNS and PTB, respectively, levels that are not achievable under our DCF, but which are attempted to be achieved through the dedicated program of the General Secretariat of Fisheries (SGP).

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

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

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

The on-board observers pay particular attention to the accidental capture of different pets during all stages of the fishing operation, recording at each stage the duration of the operation and the observation time of each phase. In the case of accidental capture of PETS, the following data are collected: identification of species, number and weight of individuals, size measurements, location and timing of bycatches. In addition, observers have been instructed to tag each and every cetacean accidentally captured during fishing operations with a bridle on the caudal fin, regardless of the number of individuals (single or multiple capture), or what is to be done afterwards (taking samples, transferring to port, or discarding it). In relation to marine mammals, data on the use of acoustic deterrent devices ("pingers") on board are also collected: presence/absence, number and model.

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

No, special attention is paid to the capture of birds, turtles and marine mammals during all phases of fishing. For the rest of the species, concurrent sampling of a sample of the catch is carried out, but some species may be left out of the sampling at random.

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

Yes

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

Yes

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

Sampling scheme identifier: AZTI_AtSea_Catch&ETP_ICES

National scheme for ICES areas 6, 7 (excl. 7d), 8

This program includes an exhaustive observation of all PETS species (mammals, birds, reptiles, fishes) bycaught during the sampling on board. More information about the sampling scheme can be found in Annex 1.1

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found)

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

The risk assessment carried out by WGBYC and in the FishPi project has been considered where in the case of ETP species bycatch in the Bay of Biscay. The PTB_8abd is considered as a high risk metier, and sampling effort for this fleet has been increased since 2021.

https://ices-library.figshare.com/articles/report/ICES_Roadmap_for_bycatch_advice_on_protected_endangered_and_threatened_species_2022_/19657167?file=35854196)

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

Based on the final report from ICES WKEMBYC (ICES 2020), in the BoB there are several high-risk metiers regarding cetaceans (in this specific sampling scheme common dolphins). These include, PTB, OTB, GNS and GTR.

- What are the methods to calculate the observation effort?

The observation effort is calculated following the guidelines published in FAO´S 2019, report "FAO. 2019. Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection. FAO Fisheries and Aquaculture Technical Paper No. 640. Rome, FAO." (link) and also ICES (2024). EU request on appropriate bycatch monitoring systems at Member State level and on regional coordination. ICES Advice: Special Requests. Report. https://doi.org/10.17895/ices.advice.25562220.v1

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

The sampling design follows the best practice guidelines provided by ICES WKPICS 1,2,3, WGCATCH and WGBYC expert groups. More information can be found in the Annex 1.1 (AZTI_AtSea_Catch&ETP_ICES.

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

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

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

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

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found):

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

The observer is instructed to check in detail this part of the fishing operation. In addition, and once this checking is finished, the observer also checks the conveyor belt to identify any other rare species bycatch and is instructed to indicate the % of the observed period. All these data are reported to the RDBES.

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

Sampling scheme identifier: ESP_SGP_PET_AtSea

National scheme for ICES areas 8, 9a North

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found)

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

The risk assessment carried out by WGBYC and FishPi project has been considered. Furthermore, this sampling complies with the obligations of the Joint Recommendation of the South Western Waters High-Level Group aiming to reduce small cetaceans accidental catches in the Bay of Biscay, that was assessed by the STECF July plenary,

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

According to the Joint Recommendation, the on-board observation programs must observe pelagic pair trawls (PTM), bottom pair trawls (PTB), midwater otter trawls (OTM), trammel nets (GTR), set (anchored) gillnets (GNS) and purse seine (PS) in EU waters of ICES subareas 8. In the case of Spain, the gears present in the Spanish fleet in this region are: PTB, GTR, GNS and PS.

- What are the methods to calculate the observation effort?

The observation effort is 1% of the total effort of each sampling stratum (PTB, GTR, GNS and PS) and at least 5% in 2025 of the total fishing effort of bottom pair trawls (PTB) from January to March. These percentages may vary in the next year, depending on the update of the Joint Recommendation.

Its monthly distribution was estimated from the fishing activity carried out by the vessels in each sampling stratum as recorded in their corresponding fishing logs, homogenized to facilitate the monthly implementation of the program and reinforced, for activities with less fishing effort, in the months with the highest accidental catches estimated by ICES. (doc. plan ZCO)

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

Yes, the sampling design follows the guidelines provided by the WGBYC and WGCATCH expert groups.

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

Observers.

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

Yes, observers are instructed to observe all hauls. However, on trips where vessels fish with bottom otter trawls and gillnets set in community waters of divisions 8abd all possible hauls are sampled, but the observation of all hauls made is not completed, as these are trips of a longer duration (10 to 15 days). In these cases where it has not been possible to observe all or part of the hauls, this is recorded.

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

Yes.

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

The specific on-board bycatch observation program requires the collection of information differentiating the phases that make up a fishing operation, indicating the % observed, including the catch classification phase, whether on the deck, conveyor belt or classification platform.

Additional information on sampling schemes

No adicional information

Additional description on sampling frames

No adicional information

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

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

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

MedBS_RWP_2025-2027_text_2024.08.30

The regional coordination on Incidental catches of sensitive species is under development in the RCG Med&BS ISSG on PETs. The work relates to the development of a regional list of priority PET species, the incorporation of PETs data into the RDBFIS, the assessment of the relative risk of bycatch for the different gear types and/or metiers and agreeing on common methods for data collection.

List of PET Species agreed

A list of PET Species has been developed at GFCM level. This species list will be considered as a baseline by the RCG Med&BS to prioritize future regional work plans regarding PETs sampling programmes. Species lists are living documents and will be subjected to periodic review and update.

Link to the list of PET species:

https://www.fao.org/gfcm/data/dcrf/fr/

The regional coordination of data collection of PETs species is under development in the RCG ISSG on PETs. The work relates to the list of PET species which need to be given high priority in the fisheries monitoring in the region. The guidelines provided by the FAO Handbook (https://www.fao.org/3/ca4991en/CA4991EN.pdf) will be taken into consideration in terms of sampling methodologies and sampling coverage, as well as the guidelines provided by the EU regional grants (e.g., STREAM, STREAMLINE, etc.; https://dcf.ec.europa.eu/coordinations-more/regional-grants_en).

Agreement and commitment: MS to ensure that the species listed in the documents referred above are recorded when encountered during the sampling activities and given high priority in case concurrent sampling cannot be implemented.

RDBFIS incorporation of bycatch data

The regional coordination of data collection of PETs species is under development in the RCG ISSG on PETS. The work relates to the incorporation of bycatch data into the RDBFIS.

Cooperation with RDBFIS II project will be implemented to continue the work done under RDBFIS, and further refine the database structure to upload and store bycatch data. The results of the tests carried out will allow to assess the incorporation of all PETs bycatch related data into the RDBFIS, essential for the regional coordination of potential regional sampling plans.

Identification of high-risk fisheries

The work ongoing under the MSs NWPs and at GFCM level will make it possible to identify the high-risk fisheries from PETs bycatch, but also the coverage of these fisheries, taking into account the effort exerted by these fisheries, the abundance of the different PETs species in the ecoregion and their overlap. The information obtained through this assessment at regional level should allow the RCGs to identify which are the main fisheries that should be sampled at regional level based on the needs of the main end-users.

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

Sampling scheme identifier ESP-IEO_P2_AtSea

National scheme for GFCM GSA 1, 2, 5, 6

Additional information on planning the observation of incidental catches of sensitive species if already filled in in Annex 1.1, please indicate where it can be found)

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

No, the main objective of the ESP_IEO_P2_AtSea sampling programme is the estimation of value of discards and length frequency distribution of discards and landings. The selection of métiers was based on three pilot studies carried out between 2018 and 2021 carried out with the aim to identifying the fisheries that produce the highest levels of discards, in our case trawlers.

In the last years, MS of Mediterranean and Black Sea are working in a regional coordination on Incidental catches of sensitive species. This coordination is under development in the RCG Med&BS ISSG on PETs. The work relates to the development of a regional list of priority PET species, the incorporation of PETs data into the RDBFIS, the assessment of the relative risk of bycatch for the different gear types and/or metiers and agreeing on common methods for data collection.

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

According with the revision presented in the RCGMed&BS 2023 by the STREAMLINE project (Task 2.2 (WP2) – monitoring incidental bycatch of vulnerable species), the metiers with highest risk of bycatch of PETs are longlines (LL), bottom otter trawl (OTB) and with less severity, set nets (GN).

In the case of longlines, LLD is covered by the ESP_IEO_P4_AtSea_All sampling scheme. Artisanal set nets (GNS and GTR) are not sampled at sea due to the serious difficulties in hosting observers on board.

- What are the methods to calculate the observation effort?

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

Methods: Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection. FAO Fisheries and aquaculture Technical Paper Nº 640. Rome, FAO.

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

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

Y

Sampling desing and protocol: Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection. FAO Fisheries and aquaculture Technical Paper Nº 640. Rome, FAO.

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

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

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

Y

Y

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

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

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

Not sampling planned in gill nets and hook and line fisheries

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

Y

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

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

Additional information on sampling schemes

No Additional information

Additional description on sampling frames

No Additional information

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

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

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

Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias

National scheme for the Outermost regions (EU waters around the Canary Islands (FAO area 34.1.2)

Additional information on planning the observation of incidental catches of sensitive species if already filled in in Annex 1.1, please indicate where it can be found):

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

Yes

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

In the Canary Islands the métier with the highest risk of bycatch per species/taxa of PETS is MIS_DES. This métier is targeting demersal species using the following gears: traps, nets and hooks

- What are the methods to calculate the observation effort?

Checked for birds, mammals and reptiles in all fishing operations.

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

Yes. The sampling design follows the best practice guidelines provided by ICES expert groups on bycatch (WGBYC).

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

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

Yes. The observer is instructed to indicate if the gear was not checked in a fishing operation.

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

The hauling process is fully checked.

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

No large catches, small scale fishery

Additional information on sampling schemes

ESP-IEO_P3_AtSea_Canarias: Onboard observers are instructed to collect data on by-catch species. A specific datasheet is designed to collect information on turtles, including measurements, physical state and geographic position. Moreover, if other rare specimens (marine mammals and birds) would appear the observer on board is required to identify and record their catch.

Additional description on sampling frames

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

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

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

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

Sampling scheme identifier: ESP-IEO_P5_AtSea

National scheme for Other regions (North-West Atlantic (FAO area 21). NAFO)

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found):

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

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

The main objective of the "ESP_IEO_P5_AtSea" sampling scheme is the sampling of commercial catches.

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

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

OTB_MDD_40-60-130-280 (NAFO 3LMNO)

- What are the methods to calculate the observation effort?

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

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

Y

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

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

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

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

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

Observers collect the following data: identification of species, number and weight of individuals, length measurements, indicators of species condition and fishing operantions data of by catch.

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

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

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

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

Y.

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

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

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

Not sampling planned in gill nets and hook and line fisheries

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

Yes

Additional information on sampling schemes

No adicional information

Additional description on sampling frames

OTB_MDD_40-60-130-280 (Bottom trawlers operating in NAFO SA3 targeting Greenland Halibut, Cod, Redfish, Skates, Squid and Shrimp)

In the NAFO fishery the by-catch of Greenland sharks (Somniosus microcephalus) has been analyzed

https://digital.csic.es/handle/10261/329368

The data analysis shows that Greenland sharks is not abundant and that this species appears in these divisions sporadically and in depths of more than 300 meters.

OTB_MDD_40-60-130-280 (Bottom trawlers operating in NAFO SA3 targeting Greenland Halibut, Cod, Redfish, Skates, Squid and Shrimp)

A specific sampling protocol is applied for sampling indicators of benthic invertebrates in OTB fisheries. The sampling design is done to check the sorting process of 10% hauls and when there is an important occurrence of organisms as well.

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

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

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

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

National scheme for Other regions (Eastern Central Atlantic (FAO area 34, except waters around the Canry Islands). CECAF)

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found):

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

Yes

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

Trawlers

- What are the methods to calculate the observation effort?

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

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

Yes

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

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

Yes

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

No

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

Yes

Additional information on sampling schemes

Onboard observers (ESP-IEO_P3_AtSea_Africa) are instructed to collect data on by-catch species. A specific datasheet is designed to collect information on turtles, including measurements, physical state and geographic position. Moreover, if other rare specimens (marine mammals and birds) would appear the observer on board is required to identify and record their catch.

Additional description on sampling frames

Though no mitigation devices are used in the trawler fleets (OTB_CRU_>=40_0_0, OTB_DEF_>=70_0_0; OTB_MCF_>=70_0_0), no marine mammals or birds have been caught. Each haul is checked for birds, mammals and reptiles. For fishes it is checked in random hauls only.

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

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

REGION: OTHER REGIONS. ATLANTIC OCEAN AND ADJACENT SEAS (FAO AREAS 21, 27, 31, 37, 41, 47, 34, 48). ICCAT

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

Sampling scheme identifier: Observe scheme

LARGE_PELAGIC_RWP_2025-27_Text_

Several measures are implemented within each RFMO (mitigation measures, etc.) tailored to the specific gears and areas of fishing. Data are registered by scientific observers and reported to the respective RFMO.

The onboard sampling scheme aiming at monitoring the French, Italian, and Spanish tropical purse seine fisheries operating in the Atlantic and Indian oceans includes sensitive bycatch species. The sampling scheme covers two tropical regions governed by tRFMOs: IOTC and ICCAT. The sampling protocol has been collaboratively developed by Spain and France. In the case of the unique Italian vessel operating in the area, collaboration is ongoing between France and Italy to facilitate data collection.

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme from Other regions, Atlantic Ocean and adjacent seas (FAO areas 21, 27, 31, 34, 37). ICCAT

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found)

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

Yes.

Cortés, E., A. Domingo, P. Miller, R. Forselledo, F. Mas, F. Arocha, S. Campana, R. Coelho, C. Da Silva, F.H.V. Hazin, H. Holtzhausen, K. Keene, F. Lucena, K. Ramirez, M.N. Santos, Y. Semba-Murakami, and K. Yokawa (2015). Expanded ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. Collect. Vol. Sci. Pap. ICCAT 71:2637–2688.

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

Longliners and purse seiners.

- What are the methods to calculate the observation effort?

In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.

In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.

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

The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs

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

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

The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.

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

As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.

The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices

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

The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

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

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

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

Sampling scheme identifier: Observe scheme

LARGE_PELAGIC_RWP_2025-27_Text_

Several measures are implemented within each RFMO (mitigation measures, etc.) tailored to the specific gears and areas of fishing. Data are registered by scientific observers and reported to the respective RFMO.

The onboard sampling scheme aiming at monitoring the French, Italian, and Spanish tropical purse seine fisheries operating in the Atlantic and Indian oceans includes sensitive bycatch species. The sampling scheme covers two tropical regions governed by tRFMOs:

IOTC and ICCAT. The sampling protocol has been collaboratively developed by Spain and France. In the case of the unique Italian vessel operating in the area, collaboration is ongoing between France and Italy to facilitate data collection.

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

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme from Other regions, Western Central Pacific (FAO area 71, 81). WCPFC

Additional information on planning the observation of incidental catches of sensitive species if already filled in in Annex 1.1, please indicate where it can be found):

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

No

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

Longliners and purse seiners.

- What are the methods to calculate the observation effort?

In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.

In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.

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

The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs

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

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

The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.

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

As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.

The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices

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

The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

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

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

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

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

National scheme from Other regions, Eastern Central Pacific (FAO area 77, 87). IATTC

Additional information on planning the observation of incidental catches of sensitive species if already filled in in Annex 1.1, please indicate where it can be found):

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

No

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

Longliners and purse seiners.

- What are the methods to calculate the observation effort?

In longline fisheries, onboard observers take data on catches and technical characteristics of each individual set. Catches are referred to several effort units, such as the number of sets by trip or number of hooks.

In addition, the observers on board longliners and purse seiners have protocols for collecting data on incidental bycatch species when occurred for all the sets.

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

The sampling design and protocol follow the recommendations of the expert groups on tuna RFMOs

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

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

The observers on board purse seiners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch during the set. All the stages are observed and checked including the identification and destiny of the species caught in the cod-end, and if the species are released or evade the net by themselves.

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

As a general procedure in the longline fisheries, we used the census of the capture of the selected trips. So all specimens in the selected sets are noted and sampled. When a very rare specimen is caught in a set this is photographed and/or frozen to be studied at our laboratory. When the observer cannot sample a set completely, this circumstance is noted by the onboard observer in the set sheet.

The observers on board longliners have protocols for collecting data on incidental bycatch species when occurred. Specific training and forms are designed for recording bycatch. In addition, the onboard observer protocol instructs observers to report on the use of mitigation devices

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

The scientific observers on board are instructed to check all the specimens contained in the codend (case of purse seine) and in the hooks (case of longline).

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

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

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

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

Sampling scheme identifier: ESP_IEO_P5_AtSea-CCAMLR

National scheme for Other regions (Antarctic and Southern Indian Ocean (FAO area 48, 58 and 88). CCAMLR)

Additional information on planning the observation of incidental catches of sensitive species if already filled in in Annex 1.1, please indicate where it can be found):

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

No assessment of the relative risk of bycatch for different gears has been done as the only gear type monitored in the area is LLS.

The objectives of the "ESP_IEO_P5_AtSea_CCAMLR" sampling scheme is the sampling of retained and discarded catch, incidental catch and potential VMEs.

The record and sampling of incidental catch (sea birds, mammals and reptiles) is carried out routinely although the incidence has been found to be very low.

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

LLS_DWS_0_0_0 in 88.1 and 48.6 CCAMLR subareas.

- What are the methods to calculate the observation effort?

There are two observers designated on board and the observer's coverage for the LLLS fleet is 100%. A tally period of a minimum of 25% of the hooks in every haul must be observed for each of the observers.

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

Y

The Scheme of International Scientific Observation (SISO) meets periodically in a Workshop. The last meeting was in 2017. Forms and procedures are reviewed and all recommended changes are submitted to the Scientific Committee for their approval.

There is a Working Group on Incidental Mortality Associated with Fishing but it has not met since 2011.

The Working Groups on Fish Stock Assessment (FSA) and Statistics, Assessments and Modelling (SAM) meet annually and usually make recommendations to the SC about improvements in the data collection.

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

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

Observers collect the following data on incidental catch: identification of species, number and weight of individuals, length measurements and haul data.

Pictures of the incidental catch species are taken by observers using a digital camera for data validation at the Lab when in doubts.

The self-training guide is useful for seabird identification. (Annex 1.1)

All vessels must carry the guide "Fish the Sea not the Sky" on board and have it visible to the crew: https://www.ccamlr.org/en/document/publications/fish-sea-not-sky

The incidental catch data are stored in the CCAMLR data base and submitted to end users when required to the CCAMLR Secretariat and agreed by the original data base owners.

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

NA.

This is a LLS fishery.

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

Yes.

Observers should monitor interactions of seabirds and marine mammals with fishing gear in all CCAMLR fisheries. It is critical that an observer differentiates between observations recorded during assigned observation periods and those recorded when the observer is alerted by the vessel, as this has an effect on mortality calculations. For example, if the crew delivers a dead bird to the observer and tells him that it was found during the turning of the gear, this should be made clear in the scientific observation logbook

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

Yes.

The observers form includes the number of hooks observed

A specific sampling protocol is applied for sampling indicators of benthic invertebrates in lonliners operating in the Southern ocean for all areas. The sampling design is done to check the sorting process of 25% of the hauls and when there is an occurrence of invertebrate organisms above the stablished threshold. The protocol is available in the CCAMLR web page:

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

Additional information on sampling schemes

No additional information

Additional description on sampling frames

No additional information

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

Text Box 4.3: Fisheries impact on marine habitats

REGION: NORTH-EAST ATLANTIC.NORTH-EAST ATLANTIC AND WESTERN CHANNEL (ICES AREAS 5, 6, 7 (EXCL. 7D), 8, 9, 10, 12 AND 14, FAO AREA 27)

General comment: This text box fulfils Article 5 paragraph 2(a) and 2(b), Article 6 paragraph 3(a), 3(b) and 3(c) of Regulation (EU) 2017/1004 and Chapter 2, section 4.2 of the EU MAP Delegated Decision annex. It contains information on additional studies on the fisheries impact on marine habitats. This text box applies to the work plan and the annual report.

Data collection has been improved in relation to existing Regulations.

Different actions are carried to cover the data collection and management to study the impact of fisheries on marine habitats

1- On-board observation of VME in the sampling schemes at Sea.

1. Aim of the study

Regular observation of VME listed in 2016/2336 during the at-sea observer trips and during the research surveys at sea on an annual basis.

2. Duration of the study

2025-2027

3. Methodology and expected outcomes of the study

The VME listed in 2016/2336 are regularly observed during the at-sea observer trips and during the research surveys at sea on an annual basis.

See Annex 1.1 for further information on the sampling schemes under Observation type 'SciObsAtSea'. Sampling protocol includes instructions to sample these species and follows the guidelines of the relevant WG.

2- Estimation of spatial distribution of fishing effort and landings

1. Aim of the study

To describe the spatial distribution of large- and small- scale fisheries using geo-spatial data.

2. Duration of the study

2025-2027

3. Methodology and expected outcomes of the study

The institutes compile data, perform quality checks and analyse spatial fisheries data (Vessel Monitoring System, VMS, and Automatic Identification System class, AIS), logbook and sales notes data), in order to describe the spatial distribution of fisheries and improve the estimation of fishing. These tasks are performed regularly every year and are in parallel and under MSFD analysis on gear impact on marine habitat.

The institutes participate actively at the ICES Working Group on Spatial Fisheries Data (WGSFD), and this work follows the guidelines developed by the group.

3- Test study HABITATS

See Text box 1a for more information.

(max 900 words per study)

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

General comment: This text box fulfils Article 5 paragraph 2(a) and 2(b), Article 6 paragraph 3(a), 3(b) and 3(c) of Regulation (EU) 2017/1004 and Chapter 2, section 4.2 of the EU MAP Delegated Decision annex. It contains information on additional studies on the fisheries impact on marine habitats. This text box applies to the work plan and the annual report.

MedBS_RWP_2025-2027_text_2024.08.30

Name of the study: Regional coordination **on fish stomach contents collection and analysis in the Med&BS**

1. Aim of the study:

Regional coordination on fish stomach contents collection and analysis in the Med&BS

2. Duration of the study:

2025-2027

3. Methodology and expected outcomes of the study

In the Mediterranean, the stomach sampling shall be based on European hake, *Merluccius merluccius*, and on the MEDITS international trawl survey. However, in order to cover all the quarters (and a larger size range), it is suggested, if possible, to sample other full stomachs of European hake from the biological sampling of commercial fisheries during all the year. The stomach sampling of European hake shall be done according to three size classes: Juveniles, sub-adults and adults.

In addition, it is proposed to sample the stomachs of monkfish and anglerfish, *Lophius piscatorius* and *L. budegassa*. It is suggested to sample full stomachs of monkfish and anglerfish during all the year, taking advantage of both the MEDITS survey and, if possible, the biological sampling of commercial fisheries.

In the Black Sea, the stomach sampling shall be based on turbot, *Scophthalmus maximus*, and on the Black Sea international surveys. However, in order to cover all the quarters, it is suggested to sample full stomachs of turbot also from the biological sampling of commercial fisheries, in the quarters not covered by the surveys. The stomach sampling of S. maximus shall be done according to three size classes: juveniles, discarded adults, and adults.

In addition, it is suggested to sample the stomachs of Mediterranean horse mackerel and sprat, *Trachurus mediterraneus* and *Sprattus sprattus*. It is proposed to sample full stomachs of the two species during all the year, taking advantage of both the surveys and the biological sampling of commercial fisheries. The subdivision of stomachs to be sampled between the two EU MSs (Bulgaria, Romania) was proportionally assigned.

Please see Table 4.1.

SECTION 5: ECONOMIC AND SOCIAL DATA IN FISHERIES

Text Box 5.2: Economic and social variables for fisheries data collection

General comment: This Text box fulfils Article 5(2)(d), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 5 of the EU MAP Delegated Decision annex. It is intended to specify data to be collected under Tables 7, 8 and 9 of the EU MAP Delegated Decision annex.

1.Description of clustering

The fleet segmentation is carried out assessing for each vessel: the main gear used during the year under study; the length of the vessel; and the fishing ground where most of its activity takes place. To be included in any segment, vessels must have at least one day of activity. Once we have classified all vessels into different segments, we perform the clustering.

This clustering is carried out to maintain statistical confidentiality in those segments where there is a low number of vessels. When this happens, we unify segments that are similar to other segments. This clustering consists, in general, of unifying these segments with others that are slightly smaller or larger than them, but that use the same gear and fish in the same Region.

When this is not possible, segments that use different gears can be unified (for instance, DFN with PMP), or even segments that fish in a region next to another region can also be unified. However, these vessels are not included in the economic survey as they are not really representative of the segment.

2. Description of activity indicator

Activity indicator based on salaries is not applied in the Spanish Fleet because this data is subsequently obtained from the Economic Survey. However, we consider this variable is not representative of the real activity, since the salary obtained by the shipowner may come from other sources of income independent of fishing activity.

3. Deviation from the RCG ECON (ex. PGECON) definitions

No desviation.

Additional comments

Under the provisions of Council Regulation (EC) 2017/1004, we are requesting the economic variables for the fleet detailed in Table 5A of the Commission Delegated Decision (EU) 2021/1167. Member States are invited to submit these data following the geographical stratification by region and fleet segmentation of the Commission Delegated Decision (EU) 2021/1167.

In this sense, although table 8 does not contemplate the use of the gear, other tables in this decision do (such as table 5). Since economic variables are also collected at the gear level, it should be possible to use gear in table 8 as well.

As the gear cannot be used in TABLE 5.1 "Fleet population", the number of vessels using the gear "DRH" has been included in comments in order to differentiate hand dredger (DRH) from boat dredges (DRB). For further clarification, the names of the segments are given below by adding the gear:

MS	Supra region	Fishing technique	Gear	Length class	Segment or cluster name	Total population (WP)
ESP	NAO	Dredgers		0-< 10 m	Dredgers 0-< 10 m	51
ESP	NAO	Dredgers	DRH	0-< 10 m	Dredgers DRH 0-< 10 m	1020
ESP	NAO	Dredgers		10-< 12 m	Dredgers 10-< 12 m	23
ESP	NAO	Dredgers		12-< 18 m	Dredgers 12-< 18 m	85

NAO* = Baltic Sea; North Sea; Eastern Arctic; NAFO; extended North Western waters (ICES areas 5, 6 and 7) and extended South Western waters (ICES areas 10, 12 and 14)

Moreover, as the gear cannot be used in TABLE 5.1 "Fleet population", the number of vessels using the gear "LLD" has been included in comments in order to differentiate drifting longlines (LLD) from other vessels using hooks. For further clarification, the names of the segments are given below by adding the gear:

MS	Supra region	Geo Indicator	Fishing technique	Gear	Length class	Segment or cluster name	Total populatio (WP)
ESP	NAO	NGI	Vessels using hooks		0-< 10 m	Vessels using hooks 10-< 12 m*	4
ESP	NAO	NGI	Vessels using hooks		10-< 12 m	Vessels using hooks 10-< 12 m*	59
ESP	NAO	NGI	Vessels using hooks		12-< 18 m	Vessels using hooks 12-< 18 m	74
ESP	NAO	NGI	Vessels using hooks		18-< 24 m	Vessels using hooks 18-< 24 m	30
ESP	NAO	NGI	Vessels using hooks		24-< 40 m	Vessels using hooks 24-< 40 m	49
ESP	NAO	NGI	Vessels using hooks	LLD	12-< 18 m	Vessels using hooks LLD 24-< 40 m*	2
ESP	NAO	NGI	Vessels using hooks	LLD	18-< 24 m	Vessels using hooks LLD 24-< 40 m*	8
ESP	NAO	NGI	Vessels using hooks	LLD	24-< 40 m	Vessels using hooks LLD 24-< 40 m*	27
ESP	NAO	IC	Vessels using hooks		0-< 10 m	Vessels using hooks 10-< 12 m*	8
ESP	NAO	IC	Vessels using hooks		10-< 12 m	Vessels using hooks 10-< 12 m*	38
ESP	NAO	IC	Vessels using hooks		12-< 18 m	Vessels using hooks 12-< 18 m	35
ESP	NAO	IC	Vessels using hooks		18-< 24 m	Vessels using hooks 24-< 40 m*	7
ESP	NAO	IC	Vessels using hooks		24-< 40 m	Vessels using hooks 24-< 40 m*	15
ESP	MBS	NGI	Vessels using hooks		12-< 18 m	Vessels using hooks 12-< 18 m*	17
ESP	MBS	NGI	Vessels using hooks		18-< 24 m	Vessels using hooks 12-< 18 m*	1
ESP	MBS	NGI	Vessels using hooks		6-< 12 m	Vessels using hooks 6-< 12 m	54

ESP	MBS	NGI	Vessels using hooks	LLD	12-< 18 m	Vessels using hooks LLD 12-< 18 m*	22	
ESP	MBS	NGI	Vessels using hooks	LLD	18-< 24 m	Vessels using hooks LLD 18-< 24 m*	14	
ESP	MBS	NGI	Vessels using hooks	LLD	24-< 40 m	Vessels using hooks LLD 18-< 24 m*	1	
ESP	MBS	NGI	Vessels using hooks	LLD	6-< 12 m	Vessels using hooks LLD 12-< 18 m*	2	
ESP	OFR	NGI	Vessels using hooks		18-< 24 m	Vessels using hooks 24-< 40 m*	2	
ESP	OFR	NGI	Vessels using hooks		24-< 40 m	Vessels using hooks 24-< 40 m*	5	
ESP	OFR	NGI	Vessels using hooks		40 m or larger	Vessels using hooks 24-< 40 m*	2	
ESP	OFR	NGI	Vessels using hooks	LLD	24-< 40 m	Vessels using hooks LLD 24-< 40 m	61	
ESP	OFR	NGI	Vessels using hooks	LLD	40 m or larger	Vessels using hooks LLD 40 m or larger	28	

NAO = Baltic Sea; North Sea; Eastern Arctic; NAFO; extended North Western waters (ICES areas 5, 6 and 7) and extended South Western waters (ICES areas 10, 12 and 14)

MBS = Mediterranean Sea and Black Sea

OFR = Other Regions

Finally, as the fishing technique “vessels using passive gears only < 12 m” is not included it in the MasterCode for TABLE 5.1 “Fleet population”, the comment “this fishing technique refers to PG” has been added to the fishing technique “Vessels using other Passive gears”. According to the definitions set out on the Data Collection website, the abbreviation PG refers to the fishing technique “vessels using passive gears only < 12 m” and is a fishing technique that can be used in Data Collection.

The inclusion of this comment has been necessary in order to differentiate the PG fishing technique from the PGO fishing technique, which has been used in Spain in previous ARs to identify a number of vessels that are very different from these.

(max. 900 words)

SECTION 6: ECONOMIC AND SOCIAL DATA IN AQUACULTURE

Text Box 6.1: Economic and social variables for aquaculture data collection

General comment: This text box fulfils Article 5(2)(e), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 6 of the EU MAP Delegated Decision annex. It is intended to specify data to be collected under Tables 10 and 11 of the EU MAP Delegated Decision annex.

1. Description of the threshold application

Data extracted on 24/06/2024 07:35:09 from [ESTAT]

Dataset:	**Aquaculture production in tonnes and value [tag00075]**
Last updated:	17/06/2024 11:00

Time frequency	Annual
Aquaculture method	All methods
Aquatic environment	Tota l
Species	TOTAL FISHERY PRODUCTS
Fishing regions	Total fishing areas
Unit of measure	Tonnes live weight

TIME	2022				
GEO (Labels)	Tonnes		% Production	€	% Value
Belgium	243		0,02%	1.738.908	0,04%
Bulgaria	9.063,84		0,85%	30.799.871,0577	0,65%
Czechia	19.259		1,80%	49.219.959,864	1,03%
Denmark	36.200,62		3,38%	113.896.838,3328	2,39%
Germany	26.498,2		2,47%	147.780.461,4	3,10%
Estonia	800,8189		0,07%	4.898.026,89	0,10%
Ireland	39.963		3,73%	159.161.963	3,34%
Greece	140.452,2		13,10%	844.819.983	17,71%
Spain	272.589,681		25,42%	803.627.138,2312	16,85%
France	184.052,1125		17,16%	791.532.533,1169	e 16,59%
Croatia	27.217,73		2,54%	177.868.048,0471	3,73%
Italy	130.246,945		12,14%	553.121.234,82	11,60%
Cyprus	7.593,9		0,71%	47.936.755,6	1,00%
Latvia	869,9		0,08%	3.303.362,5	0,07%
Lithuania	4.393,556		0,41%	18.376.738,5398	0,39%
Hungary	18.706,824		1,74%	53.302.145,6372	1,12%
Malta	18.050,5386		1,68%	320.434.038,75	6,72%
Netherlands	39.090		3,64%	113.777.136,8329	2,39%
Austria	4.718,738		0,44%	37.634.896,7447	0,79%
Poland	42.201,4985		3,93%	185.828.823,6225	3,90%
Portugal	18.688,19		1,74%	168.533.123,3346	3,53%
Romania	11.212	e	1,05%	41.201.711,6662	e 0,86%
Slovenia	1.466,3		0,14%	14.160,06	0,00%
Slovakia	2.680,75		0,25%	8.061.251,5967	0,17%
Finland	16.280,5		1,52%	93.464.451	1,96%
Euro area	1.072.540		100,00%	4.770.333.562	100,00%

Special value

:	not available	not available

Available flags:

b	break in time series	break in time series, estimated
e	estimated	estimated

CLUSTERS

Salmon.Polyculture.All methods	3	Salmon.Fish farming techniques.Tanks and raceways	1
		Salmon.Hatcheries and nurseries.All methods	2
Trout.Fish farming techniques.Ponds	3	Trout.Fish farming techniques.Ponds	3
Trout.Fish farming techniques.Tanks and raceways	67	Trout.Fish farming techniques.Tanks and raceways	67
Trout.Hatcheries and nurseries.All methods	8	Trout.Hatcheries and nurseries.All methods	8
Sea bass & Sea bream.Fish farming techniques.Cages	20	Sea bass & Sea bream.Fish farming techniques.Cages	20
Sea bass & Sea bream.Polyculture.All methods	4	Sea bass & Sea bream.Fish farming techniques.Tanks and raceways	2
		Sea bass & Sea bream.Hatcheries and nurseries.All methods	2
Carp.Fish farming techniques.Ponds	19	Carp.Fish farming techniques.Ponds	19
Carp.Polyculture.All methods	3	Carp.Fish farming techniques.Tanks and raceways	2
		Carp.Hatcheries and nurseries.All methods	1
Tuna.Fish farming techniques.Cages	3	Tuna.Fish farming techniques.Cages	3
Sturgeon (Eggs for human consumption).Fish farming techniques.Tanks and raceways	3	Sturgeon (Eggs for human consumption).Fish farming techniques.Tanks and raceways	3
Other fresh water fish.Fish farming techniques.Tanks and raceways	5	Eel.Fish farming techniques.Recirculation systems	1
		Eel.Hatcheries and nurseries.All methods	1
		Other fresh water fish.Fish farming techniques.Tanks and raceways	1
		Other fresh water fish.Fish farming techniques.Recirculation systems	2
Other marine fish.Fish farming techniques.Tanks and raceways	8	Other marine fish.Fish farming techniques.Tanks and raceways	8
Other marine fish.Polyculture.All methods	5	Other marine fish.Fish farming techniques.Recirculation systems	4
		Other marine fish.Fish farming techniques.Cages	1
Mussel.Shellfish farming techniques.Off bottom.Rafts	1926	Mussel.Shellfish farming techniques.On bottom	2
		Mussel.Shellfish farming techniques.Off bottom.Rafts	1924

The population is grouped each year according to the activity of each company's establishments, so the clusters may vary.

No thresholds apply

2. Deviation from the RCG ECON (ex. PGECON) definitions

No desviation

(max. 900 words)

SECTION 7: ECONOMIC AND SOCIAL DATA IN FISH PROCESSING

Text Box 7.1: Economic and social variables for fish processing data collection

General comment: This text box fulfils Article 5(2)(f), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 7 of the EU MAP Delegated Decision annex. MS should provide justification for complementary data collection for fish processing.

1. The Member State should provide justification for complementary data collection for fish processing in addition to Eurostat data.
No additional information to the information in Annex 1.2.

The non-main activity data collection is voluntary. Furthermore, all Spanish fish processing enterprises are engaged in this activity as their main activity. The sampling included in Table 7.1 covers the fish processing activity in Spain.

2. Deviation from the RCG ECON (ex. PGECON) definitions
The data collected by the industrial survey is used as structural statistics to respond to the regulatory needs imposed by the EU.

(max. 900 words)

ANNEX 1.1 - QUALITY REPORT FOR BIOLOGICAL DATA SAMPLING SCHEME

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

RELATED TO TABLE 2.5, 2.2 AND TEXT BOX 2.5, 4.2 (COMMERCIAL FISHERIES DATA COLLECTION)

SAMPLING SCHEME IDENTIFIER: TUNASAMPLINGONSHORE

MS : FRA - ESP - ITA
Region: Other Regions
Sampling scheme identifier: TunaSamplingOnShore
Sampling scheme type: Commercial fishing trip
Observation type: SciObsOnShore
Time period of validity: from 1998 onwards
Short description (max 100 words): The sampling scheme aiming at collecting length samples and species composition from commercial landings on foreign shores of purse seiners (PS) and baitboats (BB) operating in tropical areas for all tuna species listed in Table 1 of the EU MAP Delegated Decision annex. The scheme covers two other regions which are governed by tuna RFMOs (IOTC and ICCAT). The sampling protocol has been jointly developed by Spain and France. For the unique vessel associated to the Italian fleet, collaboration is ongoing between France and Italy to optimise the data collection..

Description of the population

Population targeted:

The population targeted are the major tropical tuna stocks of Atlantic and Indian ocean exploited by the French, Spanish and Italian PS and BB fishery. The primary sampling unit is the vessel, PS and BB of the corresponding fleet..

Population sampled:

The sampled population are the major tropical tuna stocks of Atlantic and Indian ocean exploited by the French, Spanish and Italian PS and BB fishery landed in major ports. Only major ports are covered by the sampling scheme: Dakar (Senegal), Abidjan (Côte d'Ivoire) and Victoria (Seychelles). The sample design excludes landings in minor ports.

Major tropical tuna species targeted are yellowfin tuna (Thunnus albacares), bigeye tuna (Thunnus obesus), skipjack tuna (Katsuwonus pelamis) and albacore tuna (Thunnus alalunga).

Stratification:

Population is stratified according to four features:

- Population stratified in 2 geographical lots: "Atlantic Ocean Central East and West" (FAO areas 34, 41 and 47) and "Indian Ocean" (FAO areas 51 and 57). Each lot is governed by a dedicated tuna RFMO: ICCAT and IOTC, respectively.
- The fisheries are the PS/BB. Each fisheries have its own organisation and dedicated catches.
- Port
- Vessel.

Sampling design and protocols

Sampling design description:

In the case of tropical tuna fisheries, it is imperative to estimate the species composition of landings insofar as these are weighted according to commercial categories based more on length size than on species, which is a major source of bias. The catch for each species can be estimated by crossing information from fishing logbooks, VMS data and information about landings provided by the producer organisation, as well as from the scientific sampling of species composition at the landing site. Sampling is carried out concurrently in major ports. All vessels (PSU) and almost every landing (SSU) are covered and wells (TSU) within landings are selected according to quality criteria (fishing mode, homogeneity in species composition). Finally simple random sampling is performed on selected wells. The aim of such hierarchical design is to cover both the spatial and temporal dimension of the catch by the fisheries. This involves a minimum number of samples for each stratum and a predetermined population of individuals for each sample. Adherence to these procedures results in an important number of sampled and measured individuals, this arises from the fact that to achieve a reasonable level of precision for the estimation of the species composition it is necessary to examine many individuals for each sample (500 for log sets, 200 for free school sets).

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

Y

Regional coordination:

The sampling scheme is analysed in joint workshops (T3 sub-ISSG) in the frame of RCG Large Pelagic, with other scientific institutes using the same methodology (IEO for Spain, SFA for Seychelles) and IRD for France.

Link to sampling design documentation:

Báez, J.C., Mª.L. Ramos, M- Herrera, H. Murua, J.L. Cort, S. Deniz, V. Rojo, J. Ruiz, P.J. Pascual-Alayón, A. Muniategi, A. Perez San Juan, J. Ariz, F. Fernández & F. Abascal (2020). Monitoring of Spanish flagged purse seine fishery targeting tropical tuna in the Indian ocean: Timeline and history. Marine Policy, 119: 104094. https://doi.org/10.1016/j.marpol.2020.104094

Duparc, A., P. Cauquil, M. Depetris, P. Dewals, D. Gaertner, A. Hervé, J. Lebranchu, F. Marsac, and P. Bach. 2018. Assessment of accuracy in processing purse seine tropical tuna catches with the T3 methodology using French fleet data. Case of the French fleet in Indian Ocean. Pages 1–19 Report of the 20th session of the IOTC Working Party on Tropical Tunas. IOTC, Victoria, Seychelles 10.5281/zenodo.3255565

Pianet R., P. Pallares and Ch. Petit, 2000. New sampling and data processing strategy for estimating the composition of catches by species and sizes in the European purse seine tropical tuna fisheries. IOTC-WPDCS/2000/10

Compliance with international recommendations:

Yes, the sampling design and protocols follow the RFMOs guidelines of sampling.

Link to sampling protocol documentation:

Bach et al., « Sampling on-shore procedures for tropical tuna landed by purse seiner in the Atlantic and Indian oceans » (September 2018), fdi:010075957).

Compliance with international recommendations:

Yes, the sampling design and protocols follow the RFMOs guidelines of sampling.

Sampling implementation

Recording of refusal rate:

Y.

Monitoring of sampling progress within the sampling year:

For onshore on foreign shores, 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.

A meeting of a steering group comprising IRD and sampling companies is held on a semester basis. The mandate of the steering group is to discuss the realisation, address the main issues encountered and prepare for the next semester.

IEO is in close communication with the sampling teams, and organising the work together.

Data capture

Means of data capture:

IRD has developed a fully-fledged software for capturing the fisheries landings and sampling data on foreign shores, named AVDTH. This software offers scientists and technicians the complete palette of forms required for the entry of all types of data to be collected as part of EU-MAP and during fieldwork in general.

IEO use the AVDTH developed by IRD, and every year sharing the data with IRD.

Data capture documentation:

Dewals Patrice, Damiano Alain, Floch Laurent, Cauquil Pascal. (2017). AVDTH : Acquisition Validation des Données Thon : Manuel de l'utilisateur (màj 27/07/2017). Sète : IRD, 75 p. multigr. fdi:010082886.

Quality checks documentation:

Y. All quality checks are detailed on the AKaDo website (https://git.outils-is.ird.fr/ob7/akado2/-/wikis/home) which is the software dedicated to these tasks. Furthermore, theses quality checks will be upgraded soon, in term of software structure and quality checks efficiency.

Data storage

National database:

So far, T3 database is designed to store the raw data collected from logbook, landings and sampling onshore on foreign shores, and the corrected data after T3 processing. This structure should be evolved in the next years, especially with the updated of the T3 processes.

International database:

NA

Quality checks and data validation documentation:

The data validation documentation is still in development. The latest version is available online: https://ob7-ird.github.io/t3/.

Sample storage

Storage description:

NA

Sample analysis:

NA

Data processing

Evaluation of data accuracy (bias and precision):

N. Development is ongoing regarding this section. Last documentation and methodology will be available through the T3 R package documentation https://ob7-ird.github.io/t3/.

Editing and imputation methods:

Articles:

Báez, J.C., Mª.L. Ramos, M- Herrera, H. Murua, J.L. Cort, S. Deniz, V. Rojo, J. Ruiz, P.J. Pascual-Alayón, A. Muniategi, A. Perez San Juan, J. Ariz, F. Fernández & F. Abascal (2020). Monitoring of Spanish flagged purse seine fishery targeting tropical tuna in the Indian ocean: Timeline and history. Marine Policy, 119: 104094. https://doi.org/10.1016/j.marpol.2020.104094

Duparc, A., P. Cauquil, M. Depetris, P. Dewals, D. Gaertner, A. Hervé, J. Lebranchu, F. Marsac, and P. Bach. 2018. Assessment of accuracy in processing purse seine tropical tuna catches with the T3 methodology using French fleet data. Case of the French fleet in Indian Ocean. Pages 1–19 Report of the 20th session of the IOTC Working Party on Tropical Tunas. IOTC, Victoria, Seychelles

Duparc, A., V. Aragno, M. Depetris, L. Floch, P. Cauquil, J. Lebranchu, D. Gaertner, F. Marsac, and P. Bach. 2019. Assessment of the species composition of major tropical tunas in purse seine catches: a new modelling approach for the Tropical Tuna Treatment processing. Pages 1–35 Report of the 21st session of the IOTC Working Party on Tropical Tunas. IOTC, San Sabastián, Spain.

Duparc, A., M. Depetris, P. Cauquil, and J. Lebranchu. 2020a. Improved version of the Tropical Tuna Treatment process: new perspectives for catch estimates of tropical purse seine fishery. Pages 1–21 Report of the 22nd session of the IOTC Working Party on Tropical Tunas - Stock Assessment Meeting. Virtual Meeting.

Duparc, A., M. Depetris, L. Floch, P. Cauquil, P. Bach, and J. Lebranchu. 2020b. Development status of the new Tropical Tunas Treatment (T3) software. Pages 1–5 Report of the 22nd session of the IOTC Working Party on Tropical Tunas - Data preparatory meeting. Online/virtual.

Software:

Depetris, M., A. Duparc, L. Floch, P. Cauquil, and J. Lebranchu. 2020. OB7-IRD/t3: Beta version of T3 software. Zenodo. Url - https://doi.org/10.5281/zenodo.3878125.

The online documentation:

https://ob7-ird.github.io/t3/

Quality document associated to a dataset:

There is no quality document. However, the estimation process followed are described in the report of RCG LP's Tropical Tuna ISSG.

Validation of the final dataset:

N.

SAMPLING SCHEME IDENTIFIER: OBSERVE SCHEME

MS : FRA - ESP - ITA

Region: Other Regions

Sampling scheme identifier: Observe scheme

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from 2005 onwards

Short description (max 100 words):

The sampling scheme aims at monitoring at sea discards of target species (e.g., tunas,) and retained and discarded bycatch from the French, Italian, and Spanish tropical purse seine fishery operating in the Atlantic and Indian oceans. The scheme covers two tropical regions which are governed by tRFMOs (IOTC and ICCAT). The sampling protocol has been jointly developed by Spain and France. For the unique vessel associated to the Italian fleet, collaboration is ongoing between France and Italy regarding data collection. Some non-EU countries, such as Seychelles and Mauritius, share the same protocol. Sampling is coordinated by IRD, IEO and AZTI.

Description of the population

Population targeted:

The targeted population corresponds to the catches (retained and discarded) of commercial purse seine and pelagic longline fishing operations. The primary sampling unit (PSU) is the trip.

Population sampled:

The sampled population is a selected list of the species listed in table 2.1 with a different priority:

1. Discards of target species: yellowfin tuna (Thunnus albacares), bigeye tuna (Thunnus obesus), skipjack tuna (Katsuwonus pelamis) and albacore tuna (Thunnus alalunga) for the purse seine
2. Retained and discarded bycatch species (including all PETS): sharks, rays, turtles, billfishes, marine mammals, and other bony fish species.

Stratification:

The population is stratified in 2 geographical lots: “Atlantic Ocean Central East and West” (FAO areas 34, 41 and 47) and “Indian Ocean” (FAO areas 51 and 57). Each lot is governed by a dedicated tuna RFMO: ICCAT and IOTC, respectively.

Sampling design and protocols

Sampling design description:

Discards of target species (tropical tunas) and retained and discarded bycatch are monitored by observers at-sea. Observations consist in counting, determining species composition, condition at release (dead or alive), taking length measurements (and weighting when possible), and determining sex (when possible). The observer monitors exhaustively the entire sorting operations. Observations include the recording of incidental catches of PETS including seabirds, turtles, marine mammals, and fish protected under EU legislation and international agreements.

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

Y. The sampling design of PSU can be defined as “non-probabilistic convenience”, meaning the trips of only vessels that can embark observers (some cannot due to the lack of place on the vessel) are sampled depending on opportunities, and in a fashion where all fishing companies (that may have different fishing strategies or practises) are represented.

Regional coordination:

Yes, there is some coordination. The sampling scheme is analysed and revised at the occasion of an annual workshop (Observers sub-ISSG) in the frame of RCG Large Pelagic, that includes several scientific institutes using the same methodology (IRD (France), IEO and AZTI, (Spain), and SFA (Seychelles), Seychelles).

Link to sampling design documentation:

There is no specific document made describing the sampling design. The sampling design is based on the respective Regional Observer Schemes (ROS) of ICCAT and IOTC. The ROS defines the minimum standards and mandatory information to be collected and reported to each RFMO. Also, the sampling scheme complies with the minimum observer coverage required by

each RFMO. Importantly, the sampling scheme is supposed to comply with the minimum observer coverage required by each RFMO, which in the case of ICCAT is 100% this is not covered by the EU-MAP.

Compliance with international recommendations:

Y - observer coverage is in line with EU requirements and with ICCAT and IOCT recommendations.

Link to sampling protocol documentation:

The sampling protocol on purse seine vessels is described in detail in Sabarros P.S. and Mollier E. (2030) Manuel à l'usage des observateurs embarqués à bord des thoniers senneurs tropicaux (version 2.2) https://hal.ird.fr/ird-02293012v3/

A species identification guide was developed at the attention of observers that can be used for tropical fisheries: Sabarros P.S., Moussy F., Mollier E. (2021) Guide d'identification des espèces capturées dans les pêcheries tropicales (version 2.1) https://hal.science/hal-03358650/

Compliance with international recommendations:

Y – sampling protocol is in line with ICCAT and IOCT recommendations.

Sampling implementation

Recording of refusal rate:

N. Refusals for embarking observers is dealt with by the subcontractors that will reschedule on a different date or vessel if needed.

Monitoring of sampling progress within the sampling year:

Purse seine:

Sampling effort is managed at the MS level and not coordinated at the regional level.

Coordination process:

Coordination is conducted under the purse seine observer ISSG coordination meeting. The group's main objective is the coordination of the onboard data collection and monitoring of the tropical purse seine fleet operating in the Atlantic and Indian Oceans, as well as the preparation of the EU data provision to ICCAT and IOTC. There is a yearly face to face meeting, and additionally intersessional work can be conducted to address specific issues.

Data capture

Means of data capture:

IRD has developed a fully-fledged software for entering data collected at sea by observers, named ObServe. This software offers scientists and technicians the complete palette of forms required for the entry of all types of data to be collected as part of EU-MAP and during fieldwork in general. Its core purpose is thus to cover the biological sampling and scientific surveys at sea. To ensure high quality for the data prior to their transfer to the central database, the data are pre-validated at the national level automatically by applying plausibility criteria consistent with the reference criteria (active vessels, taxonomic references, reference lists of metiers, etc.). In addition, this software also provides observers with all the documentation required for their data collection activities..

Data capture documentation:

Cauquil P. (2018) ObServe 7: Système intégré de gestion de données d'observation de pêche à la senne et à la palangre: manuel d'utilisation de l'observateur (Révision 60 le 20/11/2018), 67 p. multigr. fdi:010082885.

Quality checks documentation:

There are different levels of controls for the data. First, data entry controls are part of ObServe used by observers. These controls based of reference data are used to constrained data entry to plausible data. Secondly, prior to being sent to the correspondent national institute, subcontractors control various key elements data entered by their observers and make sure data collected on paper forms is well transcripted digitally in ObServe. Third, data are screened at national level through several scripts before uploading to the respective central database.

Data storage

National database:

NA

International database:

NA **Quality checks and data validation documentation:** NA
Sample storage
Storage description: NA **Sample analysis:** NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset:** NA **Validation of the final dataset:** N.

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ATSEA

MS :ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_IEO_P1_AtSea

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2025 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting discard volume and length samples from commercial fleets at sea for all species listed in Table 1 of the EU MAP Delegated Decision annex.

Secondarily, information on incidental catches of sensitive species is also collected. The sampling plan covers métiers that use less selective fishing gear and are more likely to produce discards (selected in old pilot programmes) within the Spanish (non-Basque) fleet operating in the Atlantic European waters (i.e. EEZ of UK, Ireland, France, Portugal and Spain in ICES Subareas 6, 7, 8 and 9).

Description of the population

Population targeted:

The population targeted are the fishing trips of the Spanish (non-Basque) trawlers and gillnetters operating in Atlantic European waters.

Population sampled:

The entire target population is susceptible to sampling, excluding the small-scale vessels without habitability for observers on board, as well as metiers developed by industrial trawlers and gillnetters that, due to their low number of fishing trips, prevent obtaining robust estimates. Therefore, sampling is focused on:

1. gillnet métiers which target hake (using the fishing gear locally known as "volanta") and white anglerfish (gear “rasco”).
2. trawl métiers operating in both national fishing grounds, i.e. the Cantabrian-Northwest and Gulf of Cadiz, as well as the Spanish bottom otter trawlers targeting megrims in non-Iberian European Atlantic waters.

Stratification:

The sampled population is stratified in four technical strata (fleet/métier):

3. IEO_P1_S_CN_GNS: set gillnetters targeting hake and white anglerfish in the Cantabrian-Northwest fishing ground.
4. IEO_P1_S_CN_TB: bottom trawlers in the Cantabrian-Northwest fishing ground.
5. IEO_P1_S_GC_OTB: bottom otter trawlers of the Gulf of Cadiz fishing ground.
6. IEO_P1_S_S7_OTB: bottom otter trawlers targeting megrims in European non-Iberian waters (mainly ICES Subarea 7).
   IEO_P1_S_Out_of_frame: small scale fleet operating with gillnets and trammel nets in Spanish Iberian waters, bottom trawl fleet in Portuguese waters, gillnet fleet targeting hake in ICES Subarea 7 and Divisions 8abd, bottom otter trawlers targeting demersal fish in ICES Divisions 8abd and bottom otter trawlers targeting hake in Subarea 7.

Sampling design and protocols

Sampling design description:

The vessel represents the Primary Sampling Unit (PSU), which are randomly selected using official lists of vessels with an active fishing licence, by selecting the fishing trip to be sampled immediately after the telephone call. For strata 1 to 3, the PSU is selected by Simple Random Sampling With Replacement (SRSWR). For métier 4 and for operational reasons, the selection of the PSU is made directly by the fishermen's association, so that it must be considered as Non-Probabilistic Quasi Simple Random Sampling Without Replacement (NPQSRSWOR).

The selection of fishing operations (hauls), are done in the métiers which operate in the national fishing grounds (Cantabrian-Northwest and Gulf of Cadiz) based on the daily trips (strata 1 to 4). However, in the case of métier 4, whose trips last an

average of 12 days, the hauls are selected systematically, spreading the samples equally during the day and night and as well as throughout the duration of the whole trip.

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

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

Y

Regional coordination:

N

Link to sampling design documentation:

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

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

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

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

Monitoring of sampling progress within the sampling year:

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

Data capture

Means of data capture:

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

Data capture documentation:

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

Quality checks documentation:

Y

Data storage

National database:

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

International database:

RDB until 2022 (Regional DataBase) and RDBES (Regional DataBase & Estimation System).

Quality checks and data validation documentation:

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

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Data processing

Evaluation of data accuracy (bias and precision):

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

Editing and imputation methods:

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

Quality document associated to a dataset:

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

Validation of the final dataset:

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_ONSHORE

MS :ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_IEO_P1_OnShore

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2025 until December 2027

Short description (max 100 words):

Sampling plan aiming at length samples from commercial landings on-shore for all species listed in Table 1 of the EU MAP Delegated Decision annex. The sampling plan covers the Spanish (non-Basque) ports on the Atlantic Iberian waters.

Description of the population

Population targeted:

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

The ports included in the population targeted are all Atlantic Spanish (non-Basque) ports with landings of the target fishing fleets operating in the Atlantic European waters: trawlers, purse seiners, loglines, gillnetters, trammel nets and hand line.

Population sampled:

The national ports with the most of the landings of the target métiers, available for biological sampling of landings. No sampling during the week-ends, when fishing activity is prohibited in Spain.

Stratification:

Population is stratified in 2 national areas with different fleets landing at their respective ports:

- **IEO_P1_M_CN**: 15 ports in the North-western Spanish coast: A Coruña (ESLCG), Avilés (ESAVS), Burela (ESBRL), Cedeira (ESCED), Celeiro (ESCIO), Fisterra (ESFNE), Gijón (ESGIJ), Llanes (ESLNS), Luarca (ESLUA), Marín (ESMPG), Muros (ESMRS), Ribeira (ESSNI), San Vicente de la Barquera (ESSVB), Santoña (ESSNN) and Vigo (ESVGO).
- **IEO_P1_M_GC**: 7 ports in Gulf of Cadiz Spanish coast: Barbate (ESBDF), Cadiz (ESCAD), Isla Cristina (ESZGA), Punta Umbría (ESZJY), Rota (ESROT), Sanlúcar de Barrameda (ESSBA) and Tarifa (ESTRF).
- **IEO_P1_M_Out_of_frame**: All Spanish (non-Basque) Iberian Atlantic ports not included in the two previous strata.

Sampling design and protocols

Sampling design description:

The PSU selection is based on historical knowledge of the target fisheries, covering the main national ports (22 from 111 different ports with landings of target métiers in the triennium 2021-2023, which host around 61% of the trips and 77% of the landings), trying to maintain a temporary periodicity throughout the year (generally weekly). Thus, the design of this sampling scheme has been defined as Non-Probabilistic Judgement Sampling (NPJS).

Then, the Secondary Sampling Unit (SSU), i.e., the landing event (ensuring that entire trips are sampled), for sampling among the total trips available on the day of visit will be a sequential random selection within the list of target sampling strata, whose landed species are sampled by commercial category under concurrent coverage.

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

N

Regional coordination:

N

Link to sampling design documentation:

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

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

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

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y.

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

Monitoring of sampling progress within the sampling year:

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

Data capture

Means of data capture:

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

Data capture documentation:

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

Quality checks documentation:

Y

Data storage

National database:

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

International database:

RDB until 2022 (Regional DataBase) and RDBES (Regional DataBase & Estimation System).

Quality checks and data validation documentation:

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Data processing

Evaluation of data accuracy (bias and precision):

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

Editing and imputation methods:

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

Quality document associated to a dataset:

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

Validation of the final dataset:

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

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P1_BIOLOGICAL_SPECIFIC

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_IEO_P1_Biological_Specific

Sampling scheme type: Biological parameters specific

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity variables) from commercial landings on-shore for next pelagic and demersal species included in Table 2.2 of the WP: *Engraulis encrasicolus, Micromesistius poutassou, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Conger conger, Helicolenus dactylopterus, Lepidorhombus whiffiagonis, Lepidorhombus boscii, Loligo vulgaris, Lophius budegassa, Lophius piscatorius, Merluccius merluccius, Molva molva, Nephrops norvegicus, Octopus vulgaris, Pagellus bogaraveo, Parapenaeus longirostris, Phycis blennoides, Sepia officinalis and Trisopterus luscus.*

Description of the population

Population targeted.

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

Population sampled:

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

Stratification:

Population Targeted (Distribution Area)		Geographical strata for sampling	Frequency	N. PSUs
Engraulis encrasicolus	8	8.c.E / 8.c.W	Quarter	8
Engraulis encrasicolus	9, 10	9.a.N / 9.a.S	Quarter	8
Micromesistius poutassou	1-9, 12, 14	8.c + 9.a	Quarter	4
Sardina pilchardus	8c, 9a	8.c.E / 8.c.W / 9.a.N / 9.a.S	Quarter	16
Scomber scombrus	5, 6, 7, 8, 9	8.c.E / 8.c.W / 9.a.N	Quarter	12
Scomber colias	8, 9, 10	8.c.E / 8.c.W / 9.a.N / 9.a.S	Quarter	16
Trachurus trachurus	4a, 5b, 6a, 7a-c, 7e-k, 8	8.c.E / 8.c.W	Quarter	8
Trachurus trachurus	9a	9.a.N	Quarter	4
Conger conger	All areas	All areas	Half Year	2
Helicolenus dactylopterus	All areas	All areas	Half Year	2
Lepidorhombus boscii	8c, 9a	8.c (8.c.E+8.c.W) + 9.a	Quarter	4
Lepidorhombus whiffiagonis	7, 8abd	7	Quarter	4
Lepidorhombus whiffiagonis	8c, 9a	8.c (8.c.E+8.c.W) + 9.a	Half Year	2
Loligo vulgaris	All areas	9.a.S	Quarter (*)	4
Lophius budegassa	7b-k, 8abd	7b-k	Quarter	4
Lophius budegassa	8c, 9a	8.c+9.a	Half year	2
Lophius piscatorius	7, 8abd	7b-k	Quarter	4

Lophius piscatorius	8c, 9a	8.c + 9.a	Half year	*2*
Merluccius merluccius	5b, 6, 7, 12, 14	7	Quarter	4
Merluccius merluccius	8c, 9, 10	8.c+9.a	Half year	*2*
Molva molva	jun-14	7	Half year	*2*
Nephrops norvegicus	9	9.a.S (FU 30)	Quarter	*4*
Nephrops norvegicus	8	FU 31 + FU 25 (If TAC>0)	Quarter	*8*
Octopus vulgaris	All areas	9.a.S	Quarter (*)	*4*
Parapenaeus longirostris		9.a.S	Quarter (*)	*4*
Phycis blennoides	All areas	All areas	Half year	*2*
Sepia officinalis	All areas	9.a.S	Quarter (*)	*4*
Trisopterus luscus	All areas	9.a.N	Half year	*2*

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

(*) sampling of these species is planned on a triennial basis

Sampling design and protocols

Sampling design description:

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

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

For the “pelagic” species group (*Engraulis encrasicolus, Micromesistius poutassou, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Loligo vulgaris, Nephrops norvegicus, Octopus vulgaris, Parapenaeus longirostris* & *Sepia officinalis*), a Simple Random Sampling (SRS) is carried out from the landing boxes. The selected sample is entirely biologically analyzed (various biological variables are collected on each sampled individual 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 individuals of each length class for biological sampling, in such a way that several biological variables are collected from each individual. The sample attempts to represent the full length range of the landings, so the least abundant length classes are preferably selected for sampling.

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

N.

Regional coordination:

N.

Link to sampling design documentation:

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

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

ICES SubDivision 9.a.South	C.O. Cádiz
ICES SubArea 7	C.O. Coruña & C.O. Vigo

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

Compliance with international recommendations:

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

Link to sampling protocol documentation:

There are sampling protocols for many of the demersal species in which the methodologies used in sampling, the storage and processing of data, and the processing and observation of skeletal parts (PE) for the allocation of age are described (Guía práctica para el estudio del crecimiento de species demersales en el Área ICES: https://digital.csic.es/handle/10261/323651).

Age determination procedures from pelagic and benthic species from ICES Área in Spanish Institute of Oceanography (IEO) are also available at https://digital.csic.es/handle/10261/327125.

Compliance with international recommendations:

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

Sampling implementation

Recording of refusal rate:

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

Monitoring of sampling progress within the sampling year:

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

Data capture

Means of data capture:

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

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

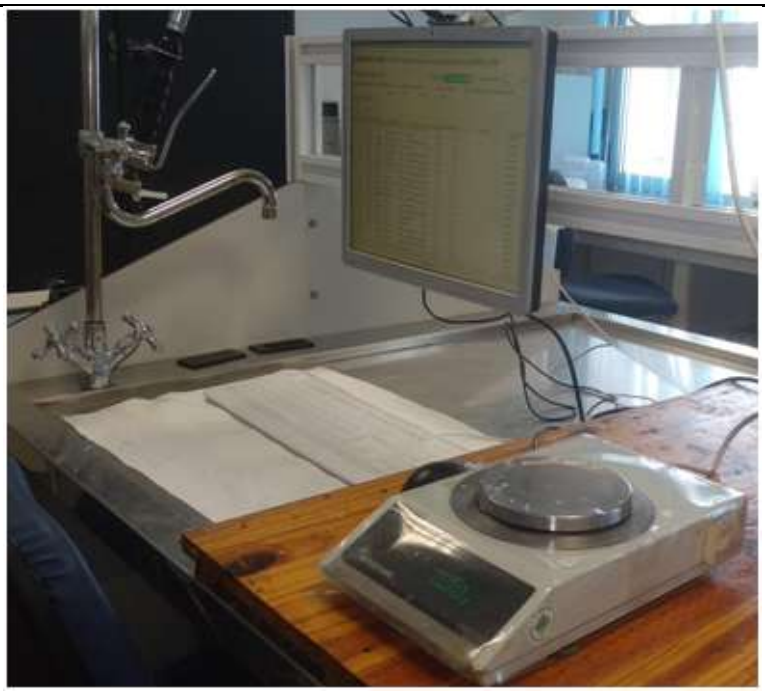


Figure 1. Typical icrOS sampling kiosk setup at IEO's Cádiz laboratory.

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

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

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

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

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

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

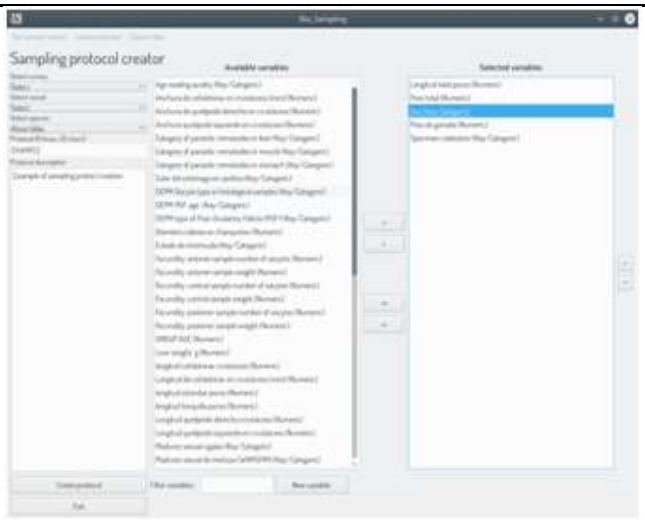


Figure 2. Sampling protocol creator.

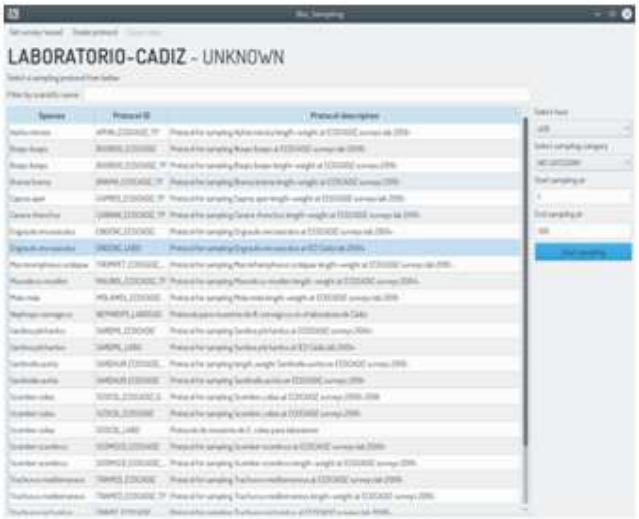


Figure 3. Selection of the sampling protocol.

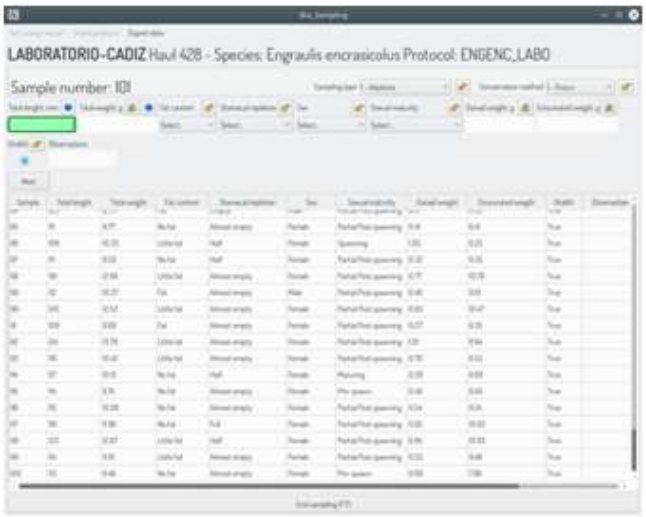


Figure 4. Biological sampling.

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

Data capture documentation:

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

For the icrOS software/hardware system a description of the system can be found at RCG NANSEA RCG Baltic 2021. Part I Report. 'New data sources and technology'. icrOS. Pgs 38-39

(https://datacollection.jrc.ec.europa.eu/documents/d/dcf/2021_rcg-na-nsea-and-rcg-baltic_tm_parti)

Quality checks documentation:

No documentation targeting quality checks is available.

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

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

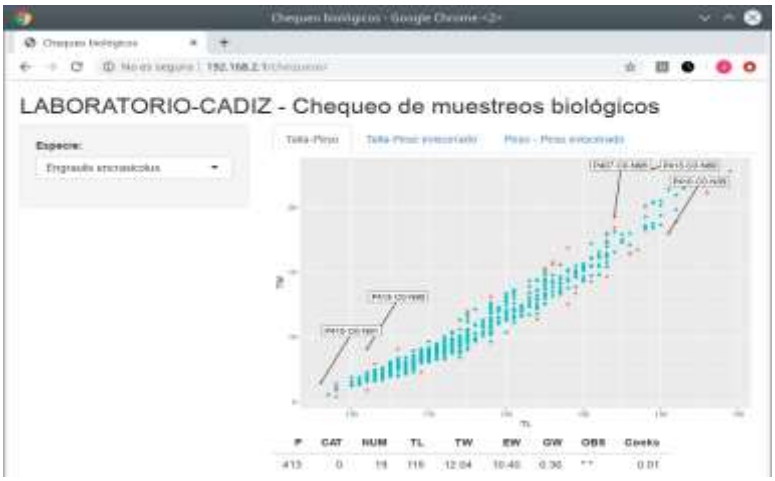


Figure 5. Application for data checking from biological sampling.

Data storage

National database:

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

International database:

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

Quality checks and data validation documentation:

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

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

In the case of using icrOS system (small pelagic species from 9a-S Gulf of Cadiz), the icrOS system doesn't allow the occurrence of missing values/zeros in those variables defined as mandatory, i.e., total length or total weight

Sample storage

Storage description:

The otoliths of almost all these species, after having been photographed for ageing, They are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Coruña, Vigo, Santander and Cádiz. These pieces are stored systematically, without expiration date.

When the histological processing of the gonads is necessary to determine the sex or the state of sexual maturity of the specimens, as is the case of the conger eel, both the gonadal tissue samples included in paraffin blocks, as the slides with their respective histological sections, are also carefully kept and systematically stored in their respective places, where they remain indefinitely.

Sample analysis:

Sampling protocol for many of the demersal species in which the methodologies used in sampling, the storage and processing of data, and the processing and observation of skeletal parts (PE) for the allocation of age are described in sampling protocols (see the "Sampling design and protocols" section.

Data processing

Evaluation of data accuracy (bias and precision):

The ageing data are obtained based on the agreement of two readers (pelagic and benthic species) and of three, in the case of demersal species. The quality assurance procedure is described in the sampling protocols (see the "Sampling design and protocols" section).

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of anchovy from the Gulf of Cádiz, for maturity ogives, missing maturity percentages are imputed from historical data.

Quality document associated to a dataset:

N.

Validation of the final dataset:

A tool developed by the IEO in R INBIO 2.0[1] (Estimation of biological parameters and their uncertainties by simulation techniques) is used to check the quality of the biological datasets. [*Sampedro, P., Sainza, M. and Trujillo, V.*, 2005. A simple tool to calculate biological parameters'uncertainty. Working Document, In: *Workshop on Sampling Desing for Fisheries Data* (WKSDFD), Pasajes, Spain.]. The methodologies used are:

Growth in age: von Bertalanffy, non-linear estimation by least squares (Gauss-Newton algorithm).

Size-weight ratio: non-linear estimation by least squares (Gauss-Newton algorithm).

Sex ratio: estimation of the global sex-ratio, it calculates the weighted coefficient of overall variation (weighted average of the coefficients of variation by size, being the number of individuals the weighting factor of each group) and the number of individuals used in the calculation.

Maturity (size and age): generalized linear model (GLM) with binomial errors and connection function: logistics function. Adjusting log-maximum likelihood.

SAMPLING SCHEME IDENTIFIER: ESP_AZTI_ATSEA_CATCH&ETP_ICES.

MS : ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_AZTI_AtSea_Catch&ETP_ICES

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2025 until December 2027

Short description (max 100 words):

The objective of the sampling scheme is to monitor commercial fisheries catches, whether landed or discarded. All species that come onboard are sampled.

This sampling scheme covers the collection of length-weight information of species in the discarded and retained fraction of the catch, and the sampling of sex and maturity of monkfish. It also covers the recording of incidental catches of birds, mammals, reptiles and fish protected under EU legislation and international agreements. VME listed in 2016/2336 are also observed during at-sea vessels with deep-sea fishing authorization (stratum OTB_8abd_6_7). The tasks are compatible, so observers can perform them during the same trip.

Since 2018, the sampling effort has been increased for pair bottom trawlers, from December to April, in order to get better data of bycatch of common dolphin in the Bay of Biscay.

Description of the population

Population targeted:

The population targeted are the catches landed in Basque ports by the Spanish fleet.

Population sampled:

The population sampled at sea are the catches landed in Basque ports by the basque fleet.

- For bottom otter trawlers in areas 8abd, 6 and 7, pair bottom trawlers and small-scale fisheries, all landings made in Basque ports are made by the Basque fleet, so all the target population is covered.
- Bottom other trawlers in area 8c are not covered
- The polyvalent coastal fishery is not covered
- Trollers and hand lines for large pelagic fishes are excluded from the sampling. As they are considered gears with very low discard.

Stratification:

(I) OTB_8abd_6_7: bottom otter trawlers operating in areas 8abd, 6 and 7
(II) PTB_8c: pair bottom trawlers operating in area 8c;
(III) OTB_8c: bottom otter trawlers operating in areas 8c
(IV) PS: boats within the 'purse seine' census
(V) SSF: small scale fishery (i.e. artisanal fleet);
(VI) PCF: polyvalent coastal fishery, including vessels in census not included in previous strata, and
(VII) OTB_1_2: bottom otter trawlers in areas 1 and 2.

The temporal stratum is the quarter, although equal monthly coverage is aimed.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined by a quasi-simple random sampling matrix with replacement, considering the vessel*week as the primary sampling unit, and the trip as secondary sampling unit (SSU).The sampling is stratified by quarter and fleet.

In the case of purse seiners, a similar method is used, but the same vessel can be fishing with different gears along the year. The sampling is carried out only when the fleet is fishing with purse seiners. When they start with this modality the sampling starts.

The sampling effort has been increased for pair bottom trawlers, from December to April, in order to get better data of bycatch of common dolphin in the Bay of Biscay.

All fish species captured onboard are analyzed for the estimation of total discard, as well as retained weight and length distribution. When it is possible, monkfish captured in bottom otter trawlers are also sampled for sex and maturity of monkfish (opportunistic sampling)

Data on cetaceans, seabirds and other megafauna bycatch is also collected. This data collection includes the information required by the current fishery regulation (i.e., ETP species involved and the number of Indvidual's caught) but also additional information that was added during the test study PETFISH carried out in the NWP 2022-2024. This includes reporting the environmental conditions (e.g., wind conditions) and the number of fishing vessels operating around for every haul or set. In the case of cetaceans, body size measures, sex-ratio and biological samples of the skin, muscle and blubber are also taken.

VME listed in 2016/2336 are also observed during at-sea vessels with deep-sea fishing authorization (stratum OTB_8abd_6_7).

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

The sampling has been designed to comply with the 4S principle as closer as possible.

Regional coordination:

A defined Regional Coordination procedure is expected in a near future. In this sense, many samplings follow common protocols in coordination within the RCG in the North Atlantic area, to coordinate all the samplings and avoid overlapping. Accordingly, sampling procedures follow the recommendations from the RCG-NANSEA, ICES WGCATCH, ICES WGBYC and ICES-WKPICS. AZTI also participates in the subgroup of the Case Study of the trawl fishery in Iberian Waters.

The regional Case Study: “Bay of Biscay and Iberian waters common dolphin (Delphinus delphis) case study” has been included in the RWP. AZTI will participate and will incorporate the results obtained in the Annual Report.

Link to sampling design documentation:

No sampling design documentation.

Compliance with international recommendations:

Yes, the sampling design is in line with international recommendations (already commented above).

Link to sampling protocol documentation:

A preliminary draft containing a detailed sampling protocol is included in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

The final document will be uploaded as soon as the remaining sections are completed.

Compliance with international recommendations:

Yes, the sampling protocol is in line with international recommendations (already commented above).

Sampling implementation

Recording of refusal rate:

Yes, refusals are recorded. When a survey cannot be carried out or the sampling is not possible, the reason is written down and the sampling is moved to the next vessel in the list.

Monitoring of sampling progress within the sampling year:

Sampling coverage is continuously monitored and controlled, comparing the planned or expected sampling (based on the PSU sampling matrix) and the sampled units quarterly (i.e. every three months) throughout the year.

Data capture

Means of data capture:

Catch sampling:

Fish length measurements are obtained with ichtyometers and weights with a hand scale. Lengths, as well as sampled weight, species, and total capture data are first recorded with a voice-recorder, and then introduced in an Excel sheet. From the Excel sheet it will be automatically uploaded to the AZTI database.

Data on VME species are also recorded and introduced in an excel file

Bycatch sampling:

The most important phase to check during the fishing operation is the pre-sorting, period, once the codend is onboard. The observer is instructed to check in detail this part of the fishing operation. In addition, and once this checking is finished, the observer also checks the conveyor belt to identify any other rare species bycatch and is instructed to indicate the % of the observed period. Data are first recorded with a voice-recorder, and then introduced in an Excel template. Addtional information that may be helpful in bycatch evaluation such as seabird and cetaceans counts are done during the hauling back; when cetacean bycatch ocurs body size measures and biological samples are taken once the remaining tasks have been done.

Data capture documentation:

Please see the sampling protocol in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

Quality checks documentation:

Coordination meetings are organized regularly to ensure that the staff collecting and entering the data have had sufficient training, are competent and follow documented standard protocols and procedures.

Training workshops are organized when new people enter the team, when significant changes are implemented in the sampling design or in AZTI Fisheries Data Base (ADB), and when a specific need for training is identified.

Data storage

National database:

AZTI Fisheries Data Base (ADB)

Coordination meetings are organized regularly to ensure that the staff collecting and entering the data have had sufficient training, are competent and follow documented standard protocols and procedures.

Training workshops are organized when new people enter the team, when significant changes are implemented in the sampling design or in AZTI Fisheries Data Base (ADB), and when a specific need for training is identified.

International database:

Data are sent to the RDB and the RDBES, as well as to INTERCATCH. Bycatch data are sent to ICES WGBYC and WGMOMA

Data on ETP species distribution are sent to WGMME and JWGBIRD.

Quality checks and data validation documentation:

Data are quality checked using an R script, as documented in: https://www.azti.es/servicios/programa-de-muestreo-de-pesquerias/

- Quality checks are implemented at different stages:
- Data are first checked by observers recording the data
- Data are imported in the ADB using excel templates with build-in checks (dates, duration of the haul, empty cells…)
- Imported data are quality checked using an R script which is improved avery year. the scripts check the consistency of the data, look for outliers and anomalous values, etc. These checks are based on the work done in COST and FishPi, but adapted to our own data.
- Expert knowledge is used to detect errors and data is compared with different data sources and with historical data.

Sample storage

Storage description:

Catch sampling :

No samples are stored from the catch sampling (discards and landings)

ByCatch sampling :

When cetacean biological samples are taken, these are introduced in zip bags and kept as cold as possible onboard. Then, on land, samples are stored in the freezer at -20ºC.

Sample analysis:

ByCatch sampling:

Sample size is still small to conduct analysis.

Data processing

Evaluation of data accuracy (bias and precision):

Quality checks are performed regularly as explained in the workflow described in the following link https://www.azti.es/en/servicios/fisheries-sampling-programme/ (Data Quality)

Editing and imputation methods:

Yes, imputation methods are used when required by the stock coordinator. In such cases, the nearest neighbour criteria is applied.

Quality document associated to a dataset:

NA.

Validation of the final dataset:

The final dataset is revised and compared with previous years, considering different data sources in order to check the quality of data, reduce bias, detect outliers, etc.

SAMPLING SCHEME IDENTIFIER: ESP-AZTI_ONSHORE_ICES.

MS : ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP-AZTI_OnShore_ICES

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from 2022 until 2027

Short description (max 100 words):

This is an on-shore sampling scheme designed to collect length samples from commercial fisheries landing in the Basque Country, for species listed in Table 1 of the EU MAP Delegated Decision annex.

The aim of this sampling is to estimate landings at length (i.e. length abundance distribution) of all the fish stocks targeted by the different types of commercial fishing fleet (i.e. trawlers, purse seine and small-scale fisheries), according to predefined strata (see detailed description below).

Is in charge of sampling fisheries landed in the Basque Country and coordinates with IEO, who is in charge of sampling fisheries in the rest of the Spanish coast.

Description of the population

Population targeted:

All fish species landed by the Basque fleet are considered for length sampling. The primary sampling units (PSU) are all port*days with landings. The secondary sampling unit (SSU) is the trip (i.e. the boat unloading fish that is sampled each day*port). The sampling design is stratified multistage sampling (see Stratification below).

Population sampled:

Fleet landing in Basque ports, including bottom otter trawlers, pair bottom trawlers, purse seiners, small scale fisheries and polyvalent coastal fisheries are sampled. Sampling is carried out in the main fishing ports of the Basque Country (mostly in Hondarribia, Pasaia, Getaria, Ondarroa, and Bermeo; and also in Lekeitio, Santurtzi and Armintza when small scale fisheries are sampled).In addition, during northern albacore season in spring-summer, Irish pelagic trawlers (PTM) are included as an strata in our sampling frame when they land in Basque ports (e.g., Ondarroa), although such sampling effort is often limited to accessibility and compatibility with the routinary sampling of local fleets.

Out of frame:

- paired bottom trawlers oprating in area 8abd are not sampled onshore, sampling for this fleet is done at-sea.
- >24m longliners are not sampled, they are out of our sampling frame.

For the rest of sampled strata, the sampling effort is focused on ports with highest fishing activity, which means that ports with less activity are not covered.

No sampling is carried out during the week-ends or holiday

Stratification:

On-shore sampling is based on five different strata, predefined according to boat census and/or main fishing gear:

(I) OTB_8abd_6_7: bottom otter trawlers operating in areas 8abd, 6 and 7
(II) PTB_8c: pair bottom trawlers operating in area 8c;
(III) OTB_8c: bottom otter trawlers operating in areas 8c
(IV) PS: boats within the 'purse seine' census (including fishing activities by purse seine, hand lines during the mackerel season and trolling lines or live bait during the tuna season);
(V) SSF: small scale fishery (i.e. artisanal fleet); and
(VI) PCF: polyvalent coastal fishery, including vessels in census not included in previous strata.
(VII) OTM: Recently, we have included the PTM strata to identify foreign pelagic trawlers targeting northern albacore and landing in Basque ports.

The temporal stratum is the quarter, although equal monthly coverage is aimed.

The predefined strata are mutually exclusive, since one boat cannot be included in more than one stratum at the same time.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined by a quasi-simple random sampling matrix with replacement, considering the port*day as the primary sampling unit. In order to avoid bias on the sampling effort, samplers avoid repeating the sampling on the same boats (SSU) many times within each week, following a week*month-based scheme in which sampled boats are registered (see Sampling Design documentation). This way a special effort is made to get the sampling as random as possible.

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

The sampling has been designed to comply with the 4S principle as closer as possible.

Regional coordination:

A defined Regional Coordination procedure is expected in a near future. In this sense, many samplings follow common protocols in coordination within the RCG in the North Atlantic area, to coordinate all the samplings and avoid overlapping. Accordingly, sampling procedures follow the recommendations from the RCG-NANSEA, ICES WGCATCH and ICES-WKPICS. AZTI also participates in the subgroup of the Case Study of the trawl fishery in Iberian Waters.

Link to sampling design documentation:

A quasi random sampling matrix is used to chose the port*day (PSU) by each sampler (see Figure 1 in 'OnShoreSamplingDesignAZTI_PSU_SSU.pdf' document attached). The sampling effort allocation is based on the number of port*days with landings.

The secondary sampling unit (SSU) is the boat(s) or trip(s) sampled in each day*port. Repeating SSU within each sampling week is avoided with a sampling control scheme (Figure 2 in 'OnShoreSamplingDesignAZTI_PSU_SSU.pdf' document attached).

https://www.azti.es/en/servicios/fisheries-sampling-programme/.

Compliance with international recommendations:

Yes, the sampling design is in line with international recommendations (already commented above).

Link to sampling protocol documentation:

A detailed sampling protocol is included in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/

Compliance with international recommendations:

Yes, the sampling protocol is in line with international recommendations (already commented above).

Sampling implementation

Recording of refusal rate:

Yes, refusals are recorded.

Expected difficulties: each stratum has its own particularities. In general: refusals, incomplete trips (due to landings sent to a processing industry, where the sampling is not possible), getting in advance information about whether landings will take place in the selected port (for small vessels), randomization of the vessel selection, etc.

Monitoring of sampling progress within the sampling year:

Sampling coverage is continuously monitored and controlled, comparing the planned or expected sampling (based on the PSU sampling matrix) and the sampled units quarterly (i.e. every three months) throughout the year.

Data capture

Means of data capture:

Fish length measurements are obtained with ichtyometers. Lengths, as well as sampled weight, species, and total capture data are first recorded with a voice-recorder, and then tranposed to the sample-sheets. All the collected sample-sheet data are transferred to the database every month.

Data capture documentation:

Please see the sampling protocol in the following link: https://www.azti.es/en/servicios/fisheries-sampling-programme/ (Protocolo muestreo tallas)

See also the data introduction protocol, named 'ProtocoloIntroduccionDatos_AZTI_draft1.pdf', where the procedure of data transfer from sample sheets to the database is explained.

Quality checks documentation:

Coordination meetings are organized regularly to ensure that the staff collecting and entering the data have had sufficient training, are competent and follow documented standard protocols and procedures.

Training workshops are organized when new people enter the team, when significant changes are implemented in the sampling design or in AZTI Fisheries Data Base (ADB), and when a specific need for training is identified.

Data storage

National database:

AZTI Fisheries Data Base

International database:

Data are sent to the RDB and the RDBES, as well as to INTERCATCH and FDI

Quality checks and data validation documentation:

Yes, automatic quality checks are applied when entering the data in the database, and R scripts are used to detect errors, outliers, etc. and to compare different data sources with historical data

https://www.azti.es/servicios/programa-de-muestreo-de-pesquerias/ (Data quality)

Sample storage

Storage description:

NA

Sample analysis:

NA

Data processing

Evaluation of data accuracy (bias and precision):

Quality checks are performed regularly as explained in the workflow described in the following link https://www.azti.es/en/servicios/fisheries-sampling-programme/ (Data Quality).

Editing and imputation methods:

Yes, imputation methods are used when required by the stock coordinator. In such cases, the nearest neighbour criteria is applied.

Quality document associated to a dataset:

NA.

Validation of the final dataset:

The final dataset is revised and compared with previous years, considering different data sources in order to check the quality of data, reduce bias, detect outliers, etc.

SAMPLING SCHEME IDENTIFIER: ESP-AZTI_BIOLOGICAL_SPECIFIC

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_AZTI_Biological_Specific

Sampling scheme type: Biological parameters specific

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity) from commercial landings onshore for the next pelagic and demersal species included in Table 2.2 of the WP:

Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Trachurus trachurus, Lepidorhombus whiffiagonis, Merluccius merluccius, Lophius budegassa, Lophius piscatorius.

Description of the population

Population targeted:

The population targeted is the following stocks into which the sampled species above are divided: ane.27.8, pil.27.8.abd, pil.27.8c9a, mac.27.nea, hom.27.2a4a5b6a7a-ce-k8, meg.27.7b-k8abd, hke.27.3a46-8abd, hke.27.8c9a, ank.27.78abd, ank.27.8c9a, mon.27.78abd, mon.27.8c9a.

Population sampled:

The available fraction of the target populations is the commercial landings at the main markets on the Basque Country; minor ports are not sampled.

Stratification:

Each target population is stratified by geographical lots, namely, 8.c.E, 8abd and 7, being this lots where Basque fleets mostly operate. Then each lot is stratified by time frame, i.e., month, quarter, semester, and year, and by the length class. Programa de Muestreo de Pesquerías | AZTI/

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic, in such a way that the samples of the stocks are obtained in those market which receive the most important landings of the selected strata (Programa de Muestreo de Pesquerías | AZTI). Mandatory biological parameters are obtained from a determinate number of individuals in the selected sample as required in the sampling scheme.

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

N

Regional coordination:

N

Link to sampling design documentation:

There is currently a matrix describing the design of this sampling scheme. It defines the number of individuals to be sampled per target population, geographic strata, and length class (Programa de Muestreo de Pesquerías | AZTI).

Compliance with international recommendations:

Y. Sampled species are evaluated by international groups of experts i.e., ICES WGBIOP and EGs referenced in the protocols (Programa de Muestreo de Pesquerías | AZTI).

Link to sampling protocol documentation:

Biological sampling protocols for all the species are available at the following (Programa de Muestreo de Pesquerías | AZTI

Compliance with international recommendations:

Y. Biological sampling protocols are updated according to the international workshops' recommendations i.e., ICES WGBIOP and EGs referenced in the protocols (Programa de Muestreo de Pesquerías | AZTI).

Sampling implementation

Recording of refusal rate:

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

Monitoring of sampling progress within the sampling year:

Sampling for biological parameters is monitored quarterly, thus the degree of achievement of the sampling coverage objectives is always known and any deviation can be mitigated by intensifying the sampling in the required strata.

Data capture

Means of data capture:

Sampling data is firstly noted in the sampling sheet and thereafter imported into the internal database in about 1 month time Date, fishing area and gear, total weight of the corresponding capture, and weight of the sample are registered along with the biological measurements in the sampling. Data capture is assisted by a variety of material, the same in all species: ichthyometer (length), analytical balance with 2 decimal places of accuracy (weight), international agreed maturity scales and ageing criteria and sex discrimination descriptions (Programa de Muestreo de Pesquerías | AZTI).

Data capture documentation:

Documentation on sampling templates, measurement equipment, maturity scales and ageing criteria in force is available within the sampling protocols (Programa de Muestreo de Pesquerías | AZTI).

Quality checks documentation:

N. There is an internal protocol detailing all the data check, but it is not ready to be shared.

Measuring equipment is calibrated (internal monitoring system for lab equipment) and the most updated maturity scales and ageing criteria are used (Programa de Muestreo de Pesquerías | AZTI). Technicians are trained accordingly both in internal and international exchanges to ensure that the staff have had sufficient training, are competent and follow documented standard protocols and procedures.

Training workshops are organized when new people enter the team, when significant changes are implemented in the sampling design or in AZTI Fisheries Data Base (ADB), and when a specific need for training is identified.

Data storage

National database:

Biological sampling data capture carried by AZTI stored in AZTI Fisheries database and sent to IEO to populate SIRENO national database.

International database:

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

Quality checks and data validation documentation:

Automatic quality checks and validations are applied when entering the data in the database. The errors and gaps in data capture are checked with what it is registered in paper first, and then corrected in the database. If there is no possibility to correct it, the data is usually removed or replaced with average values/expert judgement. Data duplication is also checked. During the data quality process data captured is checked for outliers/non-realistic values in biological parameters along with spatial position and dates. For length data the graphs developed in FishPi are used. For the rest of biological parameters, the outlier is considered the observation out of the interquartile range. Data is then represented graphically with boxplots using R ggplot2 package and using expert judgement.

All the data checks performed are gathered in the following link (Programa de Muestreo de Pesquerías | AZTI).

Sample storage

Storage description:

The otoliths of all these species mentioned above and illicii of monkfishes are stored dry according to all standards at our laboratory. Depending on the species they may be firstly processed (e.g., cutting, burning) before being conserved in Eukitte medium or envelopes in the corresponding place in the storeroom. They are stored without expiration date. The access to the

stored samples is done using an internal application of samples reception and management Programa de Muestreo de Pesquerías | AZTI). Information on quantities of sampled stored by species/stock, geographic sub-area and by year is available at Programa de Muestreo de Pesquerías | AZTI.

Sample analysis:

The sampling analysis is done according to the manuals(Programa de Muestreo de Pesquerías | AZTI) which are based on internationally agreed protocols that are the outputs from EGs.

Data processing

Evaluation of data accuracy (bias and precision):

Y, the maturity assignment is evaluated by the percentage of agreement amount all readers on samples of 50 individuals. An internal calibration exercise is set up by species and year. The information we use are the EGs reports and workshops of international exchanges in which we also participate. The reference to them are in the protocols at Programa de Muestreo de Pesquerías | AZTI.

Ageing data is obtained based on the agreement of two readers. The information we use are the EGs reports and workshops of international exchanges in which we also participate. The references to them are in the protocols at Programa de Muestreo de Pesquerías | AZTI.

Additionally, we plan to compile all instructions in quality assurance protocols for the rest of biological parameters that will be developed during the present EU MAP exercise.

Editing and imputation methods:

Y. Missing information is filled using the nearest neighbour in case there is a small gap between unsampled sizes with respect to the observed size range. However, if the number of samples is very small, the ALK is complemented with other sources: sometimes from the surveys, other times from adjacent regions or adjacent periods.

Quality document associated to a dataset:

N.

Validation of the final dataset: How

Mentioned through the sections above all the quality checked steps to get a validated dataset to provide to the end user.

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ATSEA

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_AtSea

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting volume of discards and length samples from the catches (All fractions) at sea for all commercial species caught in the trip. When the observer has not the possibility of sample all species, he/she should priorize the species listed in Table 2.1 of the Spanish work plan covered by a commercial sampling scheme for length.

Description of the population

Population targeted:

The primary sampling unit (PSU) is all Spanish Mediterranean fishing trips of trawlers.

Population sampled:

List of vessels (trawlers) based in the most important ports in terms of landing and effort, which operate in the main areas of each sampling frame.

Stratification:

Four different strata are considered: GSA, metier, selected ports and time frame. For each GSA, metiers are non-probabilistic selected, based on the rules of the regional RFMO (GFCM). For each combination of GSA-metier-base port, the selection is according to previous knowledge which include their importance for each métiers (both in terms of biomass landed and effort as number of vessels) as well as their availability to carry out the sampling (predisposition and adequate facilities). Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.

Population targeted		subGeographical strata	N strata	Temporary strata
OTB_DEF_>=40_0_0	1, 5, 6, 7	E1, W1, Mall5, Meno5, S6, N6, 7	7	Quarter
OTB_DWS_>=40_0_0	1, 2, 5, 6, 7	1, 2, Mall5, Meno5, S6, N6, 7	7	Quarter

(the sampling frame OTB_DWS_>40_0_0 includes the OTB_DWS and OTB_MDD metier due to the imposibility to identify a priori the metier of the trip)

Sampling design and protocols

Sampling design description:

The sampling frame is the list of vessels for each GSA or subGeographical strata and métier, with fishing trip as PSU. The trip to sample is selected by Simple Random Sampling as follows:

The list of vessels which operated in each GSA and métier and in the previous year would be available.

The list of vessels will be randomly ordered and vessels will be contacted in order as they appear in the list. Every unit is equally likely to be in the sample.

Results of the contact (no answer, refusal and reasons for refusals) will be tracked.

All catches will be concurrently sampled.

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

Y

Regional coordination:

N

Link to sampling design documentation:

Sampling design: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Sampling design: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

When data records come to laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with observers to explain the methodology and resolve possible doubts.

Data capture

Means of data capture:

All data of the trip (general data, position of hauls, faunistic list, length distributions of species in the catch) are captured and registered written directly on the sampling sheets designed specifically for it. The observer uses a recorder to collect the data on faunistic composition of catches and length distributions, and after the trip he/she transcribes the information to sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible.

Weight of length samples are taken with an electronic dynamometer. Length measurements of fish and cephalopods are taken with ichtyometers, while calipers are used for crustaceans.

Data capture documentation:

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

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

Measuring on board: http://www.fao.org/gfcm/data/dcrf

Quality checks documentation:

Y, not documented.

Documentation will be available at the end of 2022

Data exploration to investigate the errors committed during the sampling process such as:

Length distribution of a sample: checked with the comparison of SOP value and the sample weight value

Length distribution of the population: checked with the comparison of SOP value of the length distribution and the landing weight.

Detection of values out of range through graphs

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Handbook of IEO database: **MED3. Handbook SIRENO**

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples.

Data processing

Evaluation of data accuracy (bias and precision):

Y

Data accuracy: **MED4. Spanish National Programme Quality Frame**

Landing data processing and evaluation of data accuracy: **MED5: Raising of length of the landings**

Discard data processing and evaluation of data accuracy: **MED6. Raising discards**

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

Editing and imputation methods:

N

We hope to have available the Editing and Imputation documentation at the end of 2022.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Format is cheked with external tools (for example, DV Tool in the JRC webpage, RDBFIS platform, platform to upload the Tasks in the GFCM-DCRF webpage)

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_ONSHORE

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_OnShore

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for all commercial species caught in the trip. When the observer has not the possibility of sampling all species, he/she should prioritise the species listed in Table 2.1 of the Spanish work plan covered by a commercial sampling scheme for length.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Major ports for each sampling frame in terms of landings and effort for the selected métiers. Excluding all minor ports.

Stratification:

Four different strata are considered: GSA, metier, selected ports and time frame. For each GSA, metiers are non-probabilistic selected, based on the rules of the regional RFMO (GFCM). For each combination of GSA-metier, the ports to sample have previously been selected according to previous knowledge which include their importance for each métiers (both in terms of biomass landed and effort as number of vessels) as well as their availability to carry out the sampling (predisposition and adequate facilities). Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.

Population targeted		N Strata	Temporary strata
PS_SPF_>=14_0_0	GSAs 1, 5 and 6	3	Quarter
GTR_DEF_>=16_0_0	GSAs 1, 5 and 6	3	Quarter
LLS_DEF_0_0_0	GSAs 6 and 7	2	Quarter
FPO_DEF_0_0_0	GSAs 1 and 6	2	Quarter
LA_SLP_>=14_0_0	GSA 5	1	Quarter

Sampling design and protocols

Sampling design description:

The PSU (port*day) selection is done by Non Probabilistic Judgement Sampling from a selection of 13 major national ports. The Secondary Sampling Units (SSU = landed trips) are systematically selected from the target métiers in each GSA as follows:

- For those métiers selected in each GSA to sample, in each selected port, a vessel would be randomly selected (for example, the first vessel in the auction, or the first vessel at right or at left…). Then, in the same day or in the next day, the observer will select n'th subject from the list,
- Results of the contact (vessel sampled, refusal and reasons for refusals) will be tracked.
- All catches landed will be concurrently sampled.

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

Y

Regional coordination:

N

Link to sampling design documentation:

Sampling desing: MED1. Sampling plan description for biological data in the Spanish Mediterranean

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Sampling design: MED1. Sampling plan description for biological data in the Spanish Mediterranean

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

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

When data records come to laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with samplers to explain the methodology and resolve possible doubts.

Data capture

Means of data capture:

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the sampler uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible.

Length measurements of fish and cephalopods are taken with measuring boards, while callipers are used for crustaceans.

Data capture documentation:

Onshore sampling protocol (hadbook): **MED7. Manual de instrucciones para muestreadores en lonja**.

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

Measuring protocols: http://www.fao.org/gfcm/data/dcrf

Quality checks documentation:

Y, not documented.

Documentation will be available at the end of 2022

Data exploration to investigate the errors committed during the sampling process such as:

Length distribution of a sample: checked with the comparison of SOP value and the sample weight value

Length distribution of the population: checked with the comparison of SOP value of the length distribution and the landing weight.

Detection of values out of range through graphs.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Handbook of IEO database: **MED3. Handbook SIRENO**

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples.

Data processing

Evaluation of data accuracy (bias and precision):

Y

Data accuracy: **MED4. Spanish National Programme Quality Frame**

Landing data processing and evaluation of data accuracy: **MED5: Raising of length of the landings**

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

Editing and imputation methods:

N

We hope to have available the Editing and Imputation documentation at the end of 2022.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Format is cheked with external tools (for example, DV Tool in the JRC webpage, RDBFIS platform, platform to upload the Tasks in the GFCM-DCRF webpage)

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_STOCKSPECIFIC

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_StockSpecific

Sampling scheme type: Commercial by category

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for selected commercial species landed in a port.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Major ports for each sampling frame in terms of landings and effort for the selected species/métier. Excluding all minor ports.

Stratification:

Four different strata are considered: GSA, metier, selected ports and time frame. For each GSA, metiers are non-probabilistic selected, based on the rules of the regional RFMO (GFCM). For each combination of GSA-metier, the ports to sample have previously been selected according to previous knowledge which include their importance for each métiers (both in terms of biomass landed and effort as number of vessels) as well as their availability to carry out the sampling (predisposition and adequate facilities). Finally, the time frame (quarter or month) is set to force the sampling to cover the entire year.

Population targeted		N Strata	Temporary strata
PS_SPF_>=14_0_0	GSAs 1, 5 and 6	3	Quarter
GTR_DEF_>=16_0_0	GSAs 1, 5 and 6	3	Quarter
LLS_DEF_0_0_0	GSAs 6 and 7	2	Quarter
FPO_DEF_0_0_0	GSAs 1 and 6	2	Quarter
LA_SLP_>=14_0_0	GSA 5	1	Quarter

Sampling design and protocols

Sampling design description:

The PSU (port*day) selection is done by Non Probabilistic Judgement Sampling from a selection of 10 major national ports. The Secondary Sampling Units (SSU = boxes of the target species) are systematically selected from the target métiers in each GSA as follows:

For those species/métiers selected in each GSA to sample, in each selected port, a box (or more) would be randomly selected (for example, the first box in the auction, or the first box at right or at left…).

Results of the contact (vessel sampled, refusal and reasons for refusals) will be tracked.

Samples should be large enough to allow to obtain a well-defined mean.

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

Y

Regional coordination:

N

Link to sampling design documentation:

Sampling desing: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Sampling design: **MED1. Sampling plan description for biological data in the Spanish Mediterranean**

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

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

When data records comes to laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with observers to explain the methodology and resolve possible doubts.

Data capture

Means of data capture:

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the observer uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerised to the IEO SIRENO database as soon as possible.

Length measurements of fish and cephalopods are taken with measuring boards, while callipers are used for crustaceans.

Data capture documentation:

Onshore sampling protocol (hadbook): **MED7. Manual de instrucciones para muestreadores en lonja**.

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

Measuring protocols: http://www.fao.org/gfcm/data/dcrf

Quality checks documentation:

Y, not documented.

Documentation will be available at the end of 2022

Data exploration to investigate the errors committed during the sampling process such as:

Length distribution of a sample: checked with the comparison of SOP value and the sample weight value

Length distribution of the population: checked with the comparison of SOP value of the length distribution and the landing weight.

Detection of values out of range through graphs

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Handbook of IEO database: **MED3. Handbook SIRENO**

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

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples.

Data processing

Evaluation of data accuracy (bias and precision):

Y

Data accuracy: **MED4. Spanish National Programme Quality Frame**

Landing data processing and evaluation of data accuracy: **MED5: Raising of length of the landings**

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

Editing and imputation methods:

N

We hope to have available the Editing and Imputation documentation at the end of 2022

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Format is cheked with external tools (for example, DV Tool in the JRC webpage, RDBFIS platform, platform to upload the Tasks in the GFCM-DCRF webpage)

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_BIOLOGICAL_SPECIFIC_ATSEA

MS:ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_Biological_Specific_AtSea

Sampling scheme type: Biological parameters specific

Observation type: SciObsAtSea

Time period of validity: from January 2025 until December 2027

Short description (max 100 words):

In some crustacean species (*Nephrops norvegicus* and *Aristeus antennatus*), in which sex and maturity can be determinated without dissecting the individuals, part of the biological sampling will be done on board.

Sampling scheme aiming at collecting some biological samples (sex and maturity variables) from commercial landings at sea for next demersal species included in Table 2.2 of the WP, and requiered by the GFCM: species Group 1: *Nephrops norvegicus*, and species Group 2: *Aristeus antennatus*

Description of the population

Population targeted:

The primary sampling unit (PSU) is the stock. The selection of stocks to sample has been made following the requeriments of the GFCM: individual information on sex and length at maturity would be mandatory for species belonging to Group 1 (Appendix A.1 of the GFCM-DCRF manual). The collection of this information is not compulsory for species G2 and G3, but countries are invited to provide them.

Population sampled:

The retained fraction of the target populations will be sampled periodically at sea, in order to cover the largest possible distribution area of each population.

The design has been done taking into consideration the representativeness of the data to collect with relation to the population (catches from the commercial fleet), considering that these data should be obtained cost-effectively and the information obtained can be used to estimate the population characteristics of interest precisely (low variability) and accurately (unbiased).

In general, species G1 will be sampled annually in all Spanish GSAs, while species G2 and the other main species in the Spanish fisheries will be sampled each three years in the more relevant GSA or GSAs.

Stratification:

Population targeted	Geographical stratas	N strata	Temporary strata
Aristeus antennatus*	GSA1 and GSA2	2	Quaterly
Nephrops norvegicus	GSA1, GSA5 and GSA6	3	Quaterly
*Species which sampling will be carried out once every three years			

Sampling design and protocols

Sampling design description:

The sample/subsample is selected by a Simple Random Sampling (SRS) from retained catch on board. A fixed number of individuals by length class is selected in order to obtain the following information: individual length, sex and maturity.

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

N

Regional coordination:

N

Link to sampling design documentation:

Working group on biological parameters (WGBIOP): https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EOSG/2019/WGBIOP%202019.pdf

Compliance with international recommendations:

Yes. Almost all these species are evaluated by international groups of experts, and their recommendations are carried out. The sampling scheme is common to all of them.

Link to sampling protocol documentation:

Selection of species, and how to take the information of individual length, individual weight, sex and maturity. http://www.fao.org/gfcm/data/dcrf

Sampling implementation

Recording of refusal rate:

NA. The fraction of the landing to be sampled is obtained on board.

Monitoring of sampling progress within the sampling year:

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

Data capture

Means of data capture:

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

Length measurements of crustaceans are taken with callipers.

Maturity scales follow the agreements and recommendations of related workshops.

MATURITY DOCUMENTATION AND PROTOCOLS:

*Workshop on Sexual Maturity Sampling WKMAT; 2007. Including general rules and protocols for all groups of species:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acfm/PGCCDBS/WKMAT07.pdf

* Report of the Workshop on crustaceans (*Aristeus antennatus*, *Aristaeomorpha foliacea*, *Parapenaeus longirostris*, *Nephrops norvegicus*) maturity stages (WKMSC), 2009:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2009/WKMSC/WKMSC%202009.pdf

Data capture documentation:

Measuring protocols: GFCM Data Collection Reference Framework:

http://www.fao.org/gfcm/data/dcrf

ICES WorkShops and WorkingGroups documents related to biological parameters and data quality assurance are storage in a repository:

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Quality checks documentation:

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

Checks are usually carried out when the sampling sheets come from laboratories and are computerised.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (port, species, name od vessel, gear, commercial category) must be selected from a dropdown.

Handbook of IEO database: **MED3. Handbook_SIRENO**

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

Sample storage

Storage description:

The otoliths of all these species, after having been photographed for aging, are stored in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Malaga, Murcia and Baleares. These pieces are stored systematically, without expiration date.

Sample analysis:

ICES WorkShops and WorkingGroups documents related to biological parameters and data quality assurance are storage in a repository:

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Data processing

Evaluation of data accuracy (bias and precision):

Y

The estimation of the biological parameters and their uncertainties is to be carried out using the tool INBIO 2.0 ("Estimation of biological parameters and their uncertainties through simulation techniques"), developed in R environment by the IEO. INBIO makes possible to fit the most usual models and to estimate the coefficient of variation for parameters by using the non-parametric bootstrap methodology.

Sampedro P., Saínza M., Trujillo V. 2005. A simple tool to calculate biological parameter's uncertainty. Working Document in Workshop on Sampling Design for Fisheries Data. ICES CM 2005/ACFM:11, Pasajes (Spain), 82 pp. MED10. INBIO 2.0

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N

Validation of the final dataset:

A tool developed by the IEO in R INBIO 2.0[1] (Estimation of biological parameters and their uncertainties by simulation techniques) is used to check the quality of the biological datasets. [*Sampedro, P., Sainza, M. and Trujillo, V.*, 2005. (MED10. INBIO 2.0). A simple tool to calculate biological parameters'uncertainty. Working Document, In: *Workshop on Sampling Desing for Fisheries Data* (WKSDFD), Pasajes, Spain.]. The methodologies used are:

Growth in age: von Bertalanffy, non-linear estimation by least squares (Gauss-Newton algorithm).

Size-weight ratio: non-linear estimation by least squares (Gauss-Newton algorithm).

Sex ratio: estimation of the global sex-ratio, it calculates the weighted coefficient of overall variation (weighted average of the coefficients of variation by size, being the number of individuals the weighting factor of each group) and the number of individuals used in the calculation.

Maturity (size and age): generalized linear model (GLM) with binomial errors and connection function: logistics function. Adjusting log-maximum likelihood.

On the other hand, format and quality of data will be checked with the RDBFIS platform

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P2_BIOLOGICAL_SPECIFIC_ONSHORE

MS:ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: ESP_IEO_P2_Biological_Specific_OnShore

Sampling scheme type: Biological parameters specific

Observation type: SciObsOnShore

Time period of validity: from January 2025 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity variables) from commercial landings on-shore for next pelagic and demersal species included in Table 2.2 of the WP, and requiered by the GFCM: species Group 1*: Engraulis encrasicolus, Sardina pilchardus, Merluccius merluccius, Mullus barbatus, Mullus surmuletus, Parapenaeus longirostris*, and species Group 2: *Aristeus antennatus, Loligo vulgaris, Lophius budegassa, Micromesistius poutassou, Octopus vulgaris, Raja clavata, Scomber colias, Sepia officinalis, Trachurus mediterraneus, Trachurus trachurus*.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the stock. The selection of stocks to sample has been made following the requirements of the GFCM: individual information on sex and length at maturity would be mandatory for species belonging to Group 1 (Appendix A.1 of the GFCM-DCRF manual). The collection of this information is not compulsory for species G2 and G3, but countries are invited to provide them to.

Population sampled:

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

The design has been done taking into consideration the representativeness of the data to collect with relation to the population (catches from the commercial fleet), considering that these data should be obtained cost-effectively and the information obtained can be used to estimate the population characteristics of interest precisely (low variability) and accurately (unbiased).

In general, species G1 will be sampled annually in all Spanish GSAs, while species G2 and the other main species in the Spanish fisheries will be sampled each three years in the more relevant GSA or GSAs.

Stratification:

Population targeted	Geographical stratas	N strata	Temporary strata
Engraulis encrasicolus	GSA1, GSA5 and GSA6	2	Quaterly
Sardina pilchardus	GSA1 and GSA6	3	Quaterly
*Scomber colias**	GSA6	1	Quaterly
*Trachurus mediterraneus**	GSA1	1	Quaterly
*Trachurus trachurus**	GSA1	1	Quaterly
*Aristeus antennatus**	GSA5 and GSA6	2	Quaterly
Loligo vulgaris	GSA5	1	Quaterly
*Lophius budegassa**	GSA6	1	Quaterly
Merluccius merluccius	GSA1, GSA5 and GSA6	3	Quaterly
*Micromesistius poutassou**	GSA6	1	Quaterly
Mullus barbatus	GSA1 and GSA6	2	Quaterly
Mullus surmuletus	GSA1, GSA5 and GSA6	3	Quaterly
*Octopus vulgaris**	GSA1	1	Quaterly
Parapenaeus longirostris	GSA1, GSA5 and GSA6	3	Quaterly

Raja clavata	GSA5	1	Quaterly
Sepia officinalis	GSA5	1	Quaterly
*Species which sampling will be carried out once every three years			

Sampling design and protocols

Sampling design description:

The sample/subsample is selected by a Simple Random Sampling (SRS) from landing boxes. In the laboratory, a fixed number of individuals by length class is selected in order to obtain the following information: individual length, weight, eviscerated weight, sex, maturity, gonad weight and, if applicable, the otolith or the structure to estimate the age of the individual every period (month, quarter or year) and other biological parameters if required.

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

N

Regional coordination:

N

Link to sampling design documentation:

Working group on biological parameters (WGBIOP):

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EOSG/2019/WGBIOP%202019.pdf

Compliance with international recommendations:

Yes. Almost all these species are evaluated by international groups of experts, and their recommendations are carried out. The sampling scheme is common to all of them.

Link to sampling protocol documentation:

Selection of species, and how to take the information of individual length, individual weight, sex, maturity, and collection of structures to determine the age:

http://www.fao.org/gfcm/data/dcrf

Sampling implementation

Recording of refusal rate:

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

Monitoring of sampling progress within the sampling year:

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

Data capture

Means of data capture:

For most of the stocks, data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized to the 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 callipers are used for crustaceans.

Maturity scales follow the agreements and recommendations of related workshops.

MATURITY DOCUMENTATION AND PROTOCOLS:

*Workshop on Sexual Maturity Sampling WKMAT; 2007. Including general rules and protocols for all groups of species:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acfm/PGCCDBS/WKMAT07.pdf

*Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF): Include all the WKs and maturity scale by species so far:

https://www.ices.dk/community/Documents/WKASMSF%20Report%202018.pdf

*Report of the workshop on sexual maturity staging of mackerel and horse mackerel (WKMSMAC), 2007:

https://www.ices.dk/community/Documents/PGCCDBS/WKMSMAC_2007.pdf

*Report of the Workshop on Sexual Maturity Staging of Elasmobranchs (WKMSEL), 2010:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2010/WKMSEL/WKMSEL%202010.pdf

* Report of the Workshop on Sexual Maturity Staging of Cephalopods (WKMSCEPH), 2010:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2010/WKMSCEPH/WKMSCEPH%20Report.pdf

* Report of the Workshop on crustaceans (Aristeus antennatus, Aristaeomorpha foliacea, Parapenaeus longirostris, Nephrops norvegicus) maturity stages (WKMSC), 2009:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2009/WKMSC/WKMSC%202009.pdf

* Report of the Workshop on Small Pelagics (Sardina pilchardus, Engraulis encrasicolus) maturity stages (WKSPMAT), 2008:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2008/WKSPMAT/wkspmat_2008.pdf

* Report of the workshop on sexual maturity staging of hake and monk

(WKMSHM), 2007:

https://www.ices.dk/community/Documents/PGCCDBS/WKMSHM_2007.pdf

Data capture documentation:

Measuring protocols: GFCM Data Collection Reference Framework:

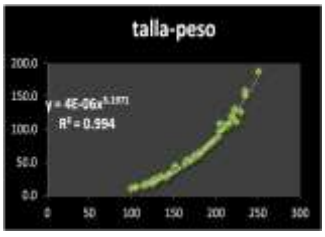
http://www.fao.org/gfcm/data/dcrf

ICES WorkShops and WorkingGroups documents related to biological parameters and data quality assurance are storage in a repository:

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Quality checks documentation:

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



Checks are usually carried out when the sampling sheets come from laboratories and are computerised.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (port, species, name of vessel, gear, commercial category) must be selected from a dropdown.

Handbook of IEO database: **MED3. Handbook_SIRENO**

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

Sample storage

Storage description:

The otoliths of all these species, after having been photographed for aging, are stored in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Malaga, Murcia and Baleares. These pieces are stored systematically, without expiration date.

Sample analysis:

Otolith reading and age estimation follow the agreements and recomendations of related workshops

AGE ESTIMATION DOCUMENTATION AND PROTOCOLS:

*Workshop on Ageing Validation methodology of Mullus species (WKVALMU), 2017

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WKVALMU/01%20WKVALMU%20Report%202017.pdf

*Workshop on Age estimation of Blue Whiting (Micromesistius poutassou) WKARBLUE2, 2017:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WKARBLUE2/01%20WKARBLUE2%20Report%20of%20the%20Workshop%20on%20Age%20estimation%20of%20Blue%20Whiting%20(Micromesistius%20poutassou)%20(WKARBLUE).pdf

*Report of the Workshop on Age estimation of European anchovy (Engraulis encrasicolus), 2016:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2016/WKARA2/WKARA2%202016%20Report.pdf

*Report of the Workshop on Age reading of Horse Mackerel, Mediterranean Horse Mackerel and Blue Jack Mackerel (Trachurus trachurus, T. Mediterraneus and T. picturatus) (WKARHOM2), 2015:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2015/WKARHOM2%20Report_01.pdf

*Report of the Workshop on Age Reading of Chub mackerel (Scomber Colias) (WKARCM), 2015:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2015/WKARCM%20Report%2001.pdf

*Report of the Workshop on Age Validation Studies of Gadoids (WKAVSG), 2013:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKAVSG/WKAVSG%202013.pdf

*Workshop on age reading of european sardine (Sardina pilchardus) (NE Atlantic and Mediterranean) (WKARAS2), 2019:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EOSG/2019/WKARAS2%20Report%202019.pdf

*Anglerfish Illicia/Otoliths Ageing Workshop, 2011

https://www.ices.dk/community/Documents/PGCCDBS/Anglerfish%20(Lophius%20piscaorius)%20illicia%20and%20otoliths%20exchange%202011_.pdf

For more information ICES WorkShops and WorkingGroups documents related to biological parameters and data quality assurance are storage in a repository:

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Data processing

Evaluation of data accuracy (bias and precision):

Y

The estimation of the biological parameters and their uncertainties is to be carried out using the tool INBIO 2.0 ("Estimation of biological parameters and their uncertainties through simulation techniques"), developed in R environment by the IEO. INBIO makes possible to fit the most usual models and to estimate the coefficient of variation for parameters by using the non-parametric bootstrap methodology.

Sampedro P., Saínza M., Trujillo V. 2005. A simple tool to calculate biological parameter's uncertainty. Working Document in Workshop on Sampling Design for Fisheries Data. ICES CM 2005/ACFM:11, Pasajes (Spain), 82 pp.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N

Validation of the final dataset:

A tool developed by the IEO in R INBIO 2.0[1] (Estimation of biological parameters and their uncertainties by simulation techniques) is used to check the quality of the biological datasets. [*Sampedro, P., Sainza, M. and Trujillo, V.*, 2005. (MED10. INBIO 2.0). A simple tool to calculate biological parameters'uncertainty. Working Document, In: *Workshop on Sampling Desing for Fisheries Data* (WKSDFD), Pasajes, Spain.]. The methodologies used are:

Growth in age: von Bertalanffy, non-linear estimation by least squares (Gauss-Newton algorithm).

Size-weight ratio: non-linear estimation by least squares (Gauss-Newton algorithm).

Sex ratio: estimation of the global sex-ratio, it calculates the weighted coefficient of overall variation (weighted average of the coefficients of variation by size, being the number of individuals the weighting factor of each group) and the number of individuals used in the calculation.

Maturity (size and age): generalized linear model (GLM) with binomial errors and connection function: logistics function. Adjusting log-maximum likelihood.

On the other hand, format and quality of data will be checked with the RDBFIS platform.

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ATSEA_AFRICA

MS : ESP

Region: Other regions (CECAF)

Sampling scheme identifier: ESP-IEO_P3_AtSea_Africa

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length and biological variables samples for the species listed in Table 1 of the EU MAP Delegated Decision, from at sea observations in NW Africa under Sustainable Fisheries Partnership Agreements (SFPAs).

Description of the population

Population targeted:

The primary sampling unit (PSU) is vessel*trip of bottom trawlers in NW Africa under SFPAs targeting shrimps, black hake and mix cephalopods and finfish.

Population sampled:

The entire target population is susceptible to sampling.

Sampling coverage in these areas highly depends on the signature of the SFPAs between the EU and coastal States. In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (limited space onboard, uncertainty of the fishing activity in response of changing protocol measures, etc.).

Stratification:

The information is broken down by technical criteria (métier):

- OTB_CRU_>=40_0_0 (freezer bottom shrimper trawlers)
- OTB_DEF_>=70_0_0 (bottom trawlers targeting black hake)
- OTB_MCF_>=70_0_0 (freezer trawlers targeting mix cephalopods and finfish)

Sampling coverage in these areas highly depends on the varying circumstances of the Protocols of the SFPAs between the EU and coastal States. These can involve changes in the fisheries conditions and accessibility or even the closure of certain fisheries or the introduction of new fisheries to be sampled. As a consequence, some of the planned objectives for 2022-2027 would not be adequately achieved or some new métiers could be added to sampling scheme in the future.

Sampling design and protocols

Sampling design description:

PSUs (vessel*trip) are selected either by the ship-owners association, trying to follow a rotation system (one vessel per fishing trip), allowing 100% coverage of the target population, nor opportunistically. In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (limited space onboard, uncertainty of the fishing activity in response of changing protocol measures, etc.).

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

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in NW Africa (internal reports). All this documentation can be reviewed at: http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in NW Africa (internal reports). All this documentation can be reviewed at: http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Along the year a monitoring of the coverage is carried out, adapting the sampling intensity when there are variations in fishing activity.

Sampling schemes are designed to collect the best data and information need for the assessment purposes required by CECAF. Any deviation are due to SFPAs, which are reasons that cannot be attributed to sampling intensity or methods used for collecting data and for estimating the parameters, therefore it is not feasible to adopt any mitigation measures.

Data capture

Means of data capture:

Lengths are collected with measuring board/tape for fish and cephalopods, and calliper for crustaceans Weights are collected with marine scales.

The data are recording or written directly on the sampling sheets designed specifically for it and the information is computerized as soon as possible.

Data capture documentation:

Specific sampling requirements are given in several scientific observation manuals which comprise observation guidelines and reference materials. All this documentation can be reviewed at: http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at RDB (Regional DataBase) and RDBES (Regional DataBase & Estimation Systeme) hosted and maintained by ICES.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, name of vessel, gear, name of species,...) must be selected from a dropdown.

Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples. No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments.

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ATSEA_CANARIAS

MS : ESP

Region: The Outermost regions

Sampling scheme identifier: ESP-IEO_P3_AtSea_Canarias

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples for the species listed in Table 1 of the EU MAP Delegated Decision, from at sea observations in Canary fishing grounds.

Description of the population

Population targeted:

The primary sampling unit (PSU) is vessel*trip of artisanal fleet targeting both, small pelagics and demersal species in Tenerife and Gran Canaria.

Population sampled

The entire target population is susceptible to sampling.

In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (e.g. limited space onboard, legal capacity to admit non-crew personnel).

Stratification:

The information is broken down by technical criteria (métier):

- PS_SPF_10-31_0_0 (artisanal purse seiners targeting small pelagics).
- MIS_MIS_0_0_0 (artisanal polyvalent and multi-specific fleet targeting demersal species with small gears (traps, hooks, nets).

Sampling design and protocols

Sampling design description:

PSUs (vessel*trip) are selected *ad-hoc* covering representative “type vessels” operating in the islands (Tenerife and Gran Canaria). In all cases, in sampling at sea schemes, difficulties might be expected, related to the collaboration of the fishing sector to have observers onboard. The degree of collaboration has been varying in the past, depending on the type of fleet and their specific circumstances (e.g. limited space onboard, legal capacity to admit non-crew personnel).

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

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the Scientific Observation Manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

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

Sampling schemes are designed to collect the best data and information need for the assessment purposes required by CECAF. Any deviations are due to collaboration of the sector, which are reasons that cannot be attributed to sampling intensity or methods used for collecting data.

Data capture

Means of data capture:

Lengths are collected with measuring board/tape for fish and cephalopods, and calliper for crustaceans Weights are collected with precision marine scales.

The data are recording or written directly on the sampling sheets designed specifically for it and the information is computerized as soon as possible.

Data capture documentation:

Specific sampling requirements are given in several scientific observation manuals which comprise observation guidelines and reference materials. All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at RDB (Regional DataBase) and RDBES (Regional DataBase & Estimation Systeme) hosted and maintained by ICES.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, name of vessel, gear, name of species,...) must be selected from a dropdown.

Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases ad hoc.

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments.

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE

MS : ESP

Region: Other regions (CECAF) & The Outermost regions

Sampling scheme identifier: ESP-IEO_P3_OnShore

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for the species listed in Table 1 of the EU MAP Delegated Decision. The scheme covers the Spanish fleet operating under Sustainable Fisheries Partnership Agreements (SFPAs) and the fleet operating in the EU waters of Canary Island (outermost regions).

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Population sampled is the main ports where the mentioned fleets land.

Stratification:

Population is stratified in several lots. Then the landed trips are selected by technical criteria (métier):

- Port of Barbate: hosting a 100% of landings in Spain from SFPAs (PS_SPF_>0_0_0).
- Port of Cádiz: hosting a 98% of fresh fish trawlers from SFPAs (OTB_DEF_70-119_0_0).
- Port of Vigo: hosting a 100% of landings in Spain from SFPAs (LLS_DEF_0_0_0).
- Ports from Canary Islands, covering 70% and 100% of the landing from PS_SPF_10-31_0_0 and MIS_MIS_0_0_0, respectively.

Circumstances related to the Protocol regulations, management measures in the Spanish fishing ground (closed seasons, TACs) or the abundance of the stocks in one fishing ground or another may affect the activity of the fleet.

Sampling design and protocols

Sampling design description:

The PSU selection is based on historical knowledge of the target fisheries, covering the main landing ports of the fleets considered.

The selection of the sampling day is not random, but depends on the availability of trips landed in port according to the seasonality of the fisheries and the fishing strategy of the metiers. Therefore, the method of selecting on-shore events for sampling is defined as Non-Probabilistic Judgement Sampling ("NPJS").

All fractions of landings are considered. The secondary sampling unit (SSU) is the trip landed from the métiers considered and it is selected randomly.

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

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Y. Monthly monitoring of data collected from the samplers. In the IEO laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with samplers to solve possible doubts.

Data capture

Means of data capture:

Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the sampler uses a recorder to collect the data, and after the visit of market he/she transcribes the information to the sampling sheets. Data are computerized to the IEO SIRENO database as soon as posible.

Data capture documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc.*

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at RDB (Regional DataBase) and RDBES (Regional DataBase & Estimation Systeme) hosted and maintained by ICES

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.
Sample storage
Storage description: This sampling scheme doesn't produce samples to store. Sample analysis: This sampling scheme doesn't produce samples. No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments
Data processing
Evaluation of data accuracy (bias and precision): N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized). **Editing and imputation methods:** N. Documentation is still ongoing (not yet finalized). **Quality document associated to a dataset:** N. Documentation on processes to evaluate quality is still ongoing (not yet finalized). **Validation of the final dataset:** Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_ONSHORE_STOCK SPECIFIC

MS : ESP

Region: Other regions (CECAF) & The Outermost regions

Sampling scheme identifier: ESP-IEO_P3_OnShore_stock specific

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings on-shore for selected commercial species landed in a port. The scheme covers the Spanish fleet operating under Sustainable Fisheries Partnership Agreements (SFPAs) and the fleet operating in the EU waters of Canary Island (outermost regions).

Description of the population

Population targeted:

The primary sampling unit (PSU) is the on-shore event, i.e. a combination of location and time (port*day).

Population sampled:

Population sampled is the main ports where the mentioned fleets land.

Stratification:

Population is stratified in several lots. Then the landed trips are selected by technical criteria (métier):

- Port of Barbate: hosting a 100% of landings in Spain from SFPAs (PS_SPF_>0_0_0).
- Port of Cádiz: hosting a 98% of fresh fish trawlers from SFPAs (OTB_DEF_70-119_0_0).
- Ports of Tenerife: covering 70% of the landing (PS_SPF_10-31_0_0).
- Ports of The Canary Islands: covering 100% of demersal species (MIS_MIS_0_0_0).

Circumstances related to the Protocol regulations, management measures in the Spanish fishing ground (closed seasons, TACs) or the abundance of the stocks in one fishing ground or another may affect the activity of the fleet.

Sampling design and protocols

Sampling design description:

The PSU selection is based on historical knowledge of the target fisheries, covering the main landing ports of the fleets considered.

The selection of the sampling day is not random, but depends on the availability of trips landed in port according to the seasonality of the fisheries and the fishing strategy of the metiers. Therefore, the method of selecting on-shore events for sampling is defined as Non-Probabilistic Judgement Sampling ("NPJS").

The Secondary Sampling Units (SSU = boxes of the selected species) are randomly selected from the target métiers. All fractions are considered for each stock as follows.

- Anchovy, (*Engraulis encrasicolus)* from PS_SPF_0_0_0
- Small pelagic: Atlantic chub mackerel, (*Scomber colias)*; Blue jack mackerel, (*Trachurus picturatus)*; Sardine, (*Sardina pilchardus)*; Round sardinella, (*Sardinella aurita*) from PS_SPF_10-31_0_0
- Benguela hake, (*Merluccius polli*) from OTB_DEF_70-19_0_0
- Parrotfish, (*Sparisoma cretense*) from MIS_DES_0_0_0

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

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

Y

Monitoring of sampling progress within the sampling year:

Y. Monthly monitoring of data collected from the samplers. In the IEO laboratories, technical staff checks the data collected and, if there are some problems or mistakes, speaks with samplers to solve possible doubts.

Data capture

Means of data capture:

Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

All data of the length sampling are captured and registered written directly on the sampling sheets designed specifically for it. Sometimes the sampler uses a recorder to collect the data, and after the visit of market he/she transcribes the information the sampling sheets. Data are computerized to the IEO SIRENO database as soon as possible

Data capture documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

Data are uploaded at RDB (Regional DataBase) and RDBES (Regional DataBase & Estimation Systeme) hosted and maintained by ICES

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Our data recording system (SIRENO) doesn´t allow the introduction of missing values/zeros for total length. All sampling information (métier, port, name of vessel, gear, name of species, commercial category...) must be selected from a dropdown.

The system compares the weight of the length sampling and the calculated weight with the length-weight relationship.

Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Sample storage

Storage description:

This sampling scheme doesn't produce samples to store.

Sample analysis:

This sampling scheme doesn't produce samples. No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

SAMPLING SCHEME IDENTIFIER: ESP-IEO_P3_BIOSPEC

MS: ESP

Region: Other regions (CECAF) & The Outermost regions

Sampling scheme identifier: ESP-IEO_P3_BioSpec

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (age, weight, sex and maturity variables) from commercial landings on-shore for the species included in table 2.2 of the WP. The scheme covers landings from the artisanal Spanish fleet operating under Sustainable Fisheries Partnership Agreements (SFPAs) and the fleet operating in the EU waters of Canary Island (outermost regions).

Description of the population

Population targeted:

The primary sampling unit (PSU) is the stock, from the national ports where the mentioned fleets land.

Circumstances related to the Protocol regulations, management measures in the Spanish fishing ground (closed seasons, TACs) or the abundance of the stocks in one fishing ground or another may affect the activity of the fleet

Population sampled:

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

Stratification:

Population targeted		Geographical Stratas	# Strata	Temporary Strata
Engraulis encrasicolus	34	34.1.11	1	Monthly
Scomber colias	34	34.1.2	1	Monthly
Sardina pilchardus	34	34.1.11/34.1.2	2	Monthly
Sardinella aurita	34	34.1.2	1	Monthly
Trachurus picturatus	34	34.1.2	1	Monthly
Sparisoma cretense	34	34.1.2	1	Monthly

Sampling design and protocols

Sampling design description:

The sample/subsample is selected randomly (SRS) from landing boxes. The selected sample is entirely biologically analyzed (several biological variables are collected on each sampled fish until the expected number of samples is reached).

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

N

Regional coordination:

N

Link to sampling design documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

N/A. The fraction of the landing to be sampled is purchased from a vendor

Monitoring of sampling progress within the sampling year:

Y. It is intended that all the sampling strata are well represented, intensifying the samplings in the worst represented strata.

Data capture

Means of data capture:

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

Individual weight and gonad weight are taken with precision weight scales. Length measurements of fish and cephalopods are taken with measuring boards, while calipers are used for crustaceans.

Maturity scales follow the agreements and recommendations of related workshops.

Data capture documentation:

All relevant information can be found in the sampling manuals written by the scientific staff supervising the fisheries in the area (internal reports). All this documentation can be reviewed at http://www.ieo.es/es_ES/web/ieo/pndb (section P3: Evaluación de recursos pesqueros del Atlántico centro-oriental)

Quality checks documentation:

N. Biological data is checked at the laboratory in order to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Data storage

National database:

All data are stored in the IEO data base (SIRENO, currently as national database), processed and analyzed by the IEO scientists to be used in the CECAF assessment WGs and/or Joint Scientific Committees of SFPAs, following the requirements of these data by end-users.

International database:

N/A

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage. Data sets, apart from SIRENO storage and processing, are also explored and checked by IEO scientific staff to detect errors and inconsistencies (outliers, trends, range of variables, dispersion) and eventually recorded in data bases *ad hoc*.

Sample storage

Storage description:

The otoliths of selected species are stored in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out. These pieces are stored systematically, without expiration date.

Sample analysis:

No tissues are taken (age structures, stomach, plankton or genetics). CECAF does not carry out age-based assessments.

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation on processes to evaluate accuracy is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Sampling levels and data quality are considered adequate, based on experience and DCF requirements, following quality levels (CV in previous technical reports), and the agreements achieved in the RCGs meetings. Documentation of the quality assurance framework is in progress and not available yet.

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ATSEA_ALL

MS: ESP

Region: Other Regions (ICCAT, IOTC, WCPFC. IATTC)

Sampling scheme identifier: ESP_IEO_P4_AtSea_all

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial and non-commercial catches at sea for all species listed in Table 1 of the Commission Delegated Decision (EU) 2021/1167. The scheme covers observations at sea in the Atlantic Ocean and adjacent Seas, Indian Ocean, Western Central Pacific and Eastern Central Pacific.

Description of the population

Population targeted:

The primary sampling units (PSU) are the fishing trips. The population targeted is the list of vessels with license to fish for each fishery under the MS flag.

Population sampled:

The entire target population is susceptible to sampling, excluding vessels without habitability for observers on board.

Stratification:

Stratification has been done according to species/metier/area of each fishery. The population was stratified in 15 strata (métier):

1. LLALB_MED_AtSea: drifting longlines targeting albacore in Mediterranean Sea.
2. LLBFT_MED_AtSea: drifting longlines targeting bluefin tuna in Mediterranean Sea.
3. LLSWO_MED_AtSea drifting longlines targeting swordfish in Mediterranean Sea.
4. LLLTA_MED_AtSea: drifting longlines targeting little tuna in Mediterranean Sea.
5. PS_MED_BFT_AtSea: purse seine in Mediterranean Sea.
6. LLSWO_ATL_AtSea: drifting longlines targeting swordfish in the Atlantic Ocean.
7. LLSWO_IND_AtSea: drifting longlines targeting swordfish in the Indian Ocean.
8. LLSWO_EPAC_AtSea: drifting longlines targeting swordfish in Eastern Pacific Ocean.
9. LLSWO_WPAC_AtSea: drifting longlines targeting swordfish in Western Pacific Ocean.
10. PS_EPAC_AtSea_IEO: purse seine in the Eastern Pacific Ocean.
11. PS_WPAC_AtSea_IEO: purse seine in the Western Pacific Ocean.
12. TRAP_MED_SmallTunas: stationary uncovered pound nets in the Mediterranean Sea.
13. TRAP_ATL_BFT: stationary uncovered pound nets in the Atlantic Ocean.

Sampling design and protocols

Sampling design description:

The PSU selected for sampling will be randomly selected from the list of vessels with a fishing license according to spatial and temporal strata.

The target coverage for tropical purse seine fisheries in Atlantic and Indian Oceans is 10% of the total trips and will be uniformly distributed along the year. For the IATTC area the intended coverage of purse seine fisheries is 100% of the annual primary sampling units (50% by IATTC observers and 50% by national observers).

There are three catch fractions depending on the fisheries involved in the sampling design: commercial target species (stored on board), bycatch (incidental catches) and discarded commercial species.

In the Mediterranean longline fishery, a number of trips are planned to assure the Spatio-temporal strata coverage (month, 5º x 5º grid, métier). The PSUs are selected randomly among those that target the month, area, and metier to be covered.

The observers on board collect data on catches (target and bycatch species) and also biological data from commercial fisheries, as well as information about the condition of the bycatch when discarded (death or alive). In the case of tropical purse seines, the observers on board collect information on the bycatch discards for all fishing sets. The activity related to floating objects is also recorded on board. The catch of purse seiners in the Mediterranean Sea is sent to a flattering cage.

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

N

Regional coordination:

Yes. The sampling design and protocols for the purse seiner fisheries landing in the Atlantic and Indian oceans are coordinated between the Spanish (IEO & AZTI) and French institutes. They were developed originally in an informal basis and later under agreements with IRD (Institut de Recherche pour le développement, France) and other no-MS as SFA (Seychelles Fishing Authority) and CRODT (Centre de Recherche Océanographique de Dakar Thiaroye). Currently, these agreements are not in place but all these institutions continue working together and following the same protocols.

In the case of the IATTC convention area, observers follow the protocols developed by the IATTC Secretariat in the framework of the Agreement on the International Dolphin Conservation Program (a legally-binding multilateral agreement which entered into force in February 1999, with 13 contracting parties, including the EU).

Link to sampling design documentation:

The sampling design follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

https://www.iattc.org/Downloads.htm/ (into the link goes to 'Red de cerco - Programa observadores/Manual completo2017')

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

The sampling protocols follow RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html;

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

https://www.iattc.org/Downloads.htm/ (into the link goes to 'Red de cerco - Programa observadores/Manual completo2017')

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

In the Atlantic and Indian Oceans purse seine sampling by scientific observers follows a specific and common methodology edited in a manual used by IRD, AZTI and IEO.

Compliance with international recommendations:

Y.

Sampling implementation

Recording of refusal rate:

Y.

Monitoring of sampling progress within the sampling year:

The coverage of the sampling progress is monitored monthly.

In the Mediterranean longline fishery, once the onboard observer sends the trip data to the laboratory, data are reviewed and validated by cross-checking it with data from sales notes and logbooks. If errors are detected in data collection, the observer is contacted to correct them. If there is a problem with the boat that compromises the coverage of a stratum, there is a list of boats that allows solving the problem. If the problem occurs with the observer, a list of specialized and trained observers is available that permits us to replace it.

In the purse seine fleet in the Atlantic and Indian Oceans the sampling is evenly distributed across vessels. The aim is covering one trip per vessel, and trying to distribute observer trips randomly throughout the year. In the case of the IATTC convention area, there is a mandatory observer coverage of 100% carried out in collaboration with the IATTC Secretariat. IATTC and Member State observers are generally deployed alternating each two trips.

Data capture

Means of data capture:

The size of the fish is measured using a measuring board, tape or calliper and weights are collected with scales or dynamometers, depending on the fish size. The sampling information is recorded on sheet forms and later is computerized.

In the case of purse seines fisheries, observers transfer the information collected on dedicated forms to databases using specific software. This software has been developed and supported by the IATTC technical staff (Observer, IATTC Secretariat, pers.com) and in the Atlantic and Indian Oceans, the development and support is carried out by IRD (ObServe, Cauquil *et al 2015*).

Data capture documentation:

The observers on board have protocols for collecting data that follow the recommendations of tuna-RFMOs sampling manuals. The links:

ICCAT. 2006-2016. Manual de ICCAT. Comisión internacional para la conservación del atún Atlántico. En: Publicaciones ICCAT [on line]. Actualizado 2016. ISBN (Edición electrónica): 978-92-990055-0-7, https://www.iccat.int/es/iccatmanual.html.

https://www.iotc.org/data-and-statistics.

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. (SCRS/2009/43).

https://gitlab.com/ultreiaio/ird-observe

http://ultreiaio.gitlab.io/ird-observe/

Cauquil P., Rabearisoa N., Sabarros P., Chavance P. and Bach P. (2015) ObServe: Database and operational software for longline and purse seine fishery data. 13th Working Party on Billfish. Indian Ocean Tuna Commission. Available online at: https://www.iotc.org/documents/observe-database-and-operational-software-longline-and-purse-seine-fishery-data

Quality checks documentation:

N. The observer data is carefully reviewed by the IEO staff in the laboratory in order to detect errors and inconsistencies in the recorded data before consolidating them. General quality indicators are also used for purse seiner observer's data coming from the three oceans, included in the software (https://gitlab.com/ultreiaio/ird-observe).

Data storage

National database:

The data collected by observers on board are stored into specific databases designed according to specificities of the fisheries and into the SIRENO database which is managed by the IEO.

In addition the observer's data obtained from the purse seiners in the Atlantic and Indian oceans are stored in a database called ObServe which has been developed by IRD and is used by IRD, AZTI and IEO.

In the Eastern Pacific Ocean the data from the observation on board EU purse seiners are stored in an IATTC_IEO shared database. The sampling by scientific observers follows a specific methodology that can be consulted in http://www.iattc.org/Downloads.htm

International database:

Aggregated data are stored on tuna-RFMOs databases:

ICCAT (International Commission for the Conservation of Atlantic Tunas): https://iccat.int/en/accesingdb.html

IOTC (Indian Ocean Tuna Commission): https://www.iotc.org/data/datasets

IATTC (Inter-American Tropical Tuna Commission): https://www.iattc.org/PublicDomainData/IATTC-Catch-by-species1.htm

WCPFC (Western and Central Pacific Fisheries Commission): https://www.wcpfc.int/data-catalogue

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Once the data on observed trips arrive at MS laboratory, these data are revised by experts to detect errors and cross-checked with both sales notes and logbooks records.

For purse seiners, at the end of each deployment, observers are debriefed for data validation following ad-hoc software tools developed for ObServe (Atlantic and Indian oceans) and Observer (Pacific ocean).

Sample storage

Storage description:

Samples for genetic (muscle tissue), reproduction (gonadal tissue), and age and growth (hard parts: otoliths and/or first ray of the first dorsal fin and second fin ray of the anal fin) are collected for the main tuna and tuna-like species and in swordfish respectively. The samples are stored in adequate fixative solutions, frozen or stored in boxes in the IEO laboratory store. Samples are stored till they are analyzed or sent to the laboratories in charge to analyze them. A subsample of each genetic or reproductive sample is stored in our laboratory indefinitely. Each sample has a code that includes the year, the species, the gear, the tissue type, and a specific number.

Sample analysis:

Due to logistics constraints in distant water fisheries, tissue samples are not systematically collected in the purse seine fishery. Eventually, some biological samples are taken in the framework of national or international projects. In these cases, the samples are stored in the research centre requested.

ICCAT SMT Research program: review 2018-21 SMTYP: SCRS/P/2021/036 (Lucena F., and Hazin F.), in 2022 for small tunas (LTA, BON & WAH).

Processing of samples for maturity and fecundity and ageing studies:

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2016). Contrasting batch fecundity estimates of albacore (*Thunnus alalunga*), an indeterminate spawner, by different laboratory techniques. FISHERIES RESEARCH. 176, 76-85.

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2015) Stereological comparison of oocyte recruitment and batch fecundity estimates from paraffin and resin sections using spawning albacore (*Thunnus alalunga*) ovaries as a case study. Journal of Sea Research JOURNAL OF SEA RESEARCH. Volumen: 95: 226-238.

Saber, S., Ortiz de Urbina, J., Gillespie K., Poisson F., Coelho R., Rosa D., Puerto, M.A., Macías, D. 2020. A preliminary analysis of the maturity of ICCAT swordfish stocks Collect. Vol. Sci. Pap. ICCAT, 77(3): 537-551.

Quelle, P. *et al*., 2011. A review of Mediterranean Albacore (*Thunnus alalunga*) biology and growth studies. Collect.Vol.Sci.Pap.ICCAT,66 (5):1882-1896

Quelle, P. *et al*., 2023. Progress in the standardization of direct ageing methodology of Swordfish (*Xiphias gladius*) using anal fin rays. Collect.Vol.Sci.Pap.ICCAT,80 (1):227-237

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Data sets are explored and checked by experts IEO scientific staff. Quality checking for data processing includes automatic analysis of databases producing tables with detected mistakes and a report containing the percentages of mistakes to be corrected.

Once the data arrive at the laboratory, the data are revised by experts to detect errors and cross-checked with both sales notes and logbooks registers. In the case of purse seiners an annual comparison between declared logbooks and estimated catches is made in order to correct species composition and catch based on T3 treatment, taking into account data from sampling at port. This methodology is common to IRD and IEO.

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P4_ONSHORE_ALL

MS : ESP

Region: Other Regions (ICCAT)

Sampling scheme identifier: ESP_IEO_P4_OnShore_all

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting length samples from commercial landings at fishing ports for all species listed in Table 1 of the Commission Delegated Decision (EU) 2021/1167. The scheme covers landings from the Atlantic Ocean and adjacent Seas.

Description of the population

Population targeted:

The primary sampling units (PSU) are the fishing trips. The population targeted is the list of vessels with license to fish for each fishery.

Population sampled:

The entire target population is susceptible to sampling. It will be sampled a representative number of trips of each of the fisheries.

Stratification:

Stratification has been done according to species/metier/area of each fishery. The population was stratified in 9 strata (métier):

1. LL_MED_Port: drifting longlines in the Mediterranean Sea.
2. BB_BFT_CantabrianSea_IEO_Port: baitboat targeting bluefin tuna in the Cantabrian Sea.
3. BB_BFT_Strait_Port: baitboat targeting bluefin tuna in the Strait of Gibraltar.
4. HAND_BFT_Strait_Port: handline targeting bluefin tuna in the Strait of Gibraltar.
5. BB_ALB_CantabrianSea_IEO_Port: baitboat targeting albacore in Cantabrian Sea
6. TROL_ALB_CantabrianSea_IEO_Port: trolling lines in Cantabrian Sea
7. LLSWO_ATL_Port: drifting longlines targeting swordfish in the Atlantic Ocean.
8. BB_MSP_Canary_Port: baitboat in Canary Islands
9. BB_TROP_Dakar_Port: baitboat landing in Dakar.

Sampling design and protocols

Sampling design description:

The PSU will be randomly selected for sampling by spatial and temporal strata. The sampling fraction is considered to be proportional to the total population. The catch fractions depending on the fisheries involved in the sampling design are the commercial landings.

For the baitboat fisheries, sampling will be tentatively covering all landings in the port of Dakar (Senegal). For every trip sampled, the freezing wells where tropical tunas are stored are considered as one.

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

N

Regional coordination:

Yes. The sampling design and protocols for the baitboat fishery landing in Dakar have been developed regionally under agreements with IRD (Institut de Recherche pour le développement, France) and other non-EU MS as SFA (Seychelles

Fishing Authority), CRO (Centre de Recherches Océanologiques in Abidjan) and CRODT (Centre de Recherche Océanographique de Dakar Thiaroye). Currently, these agreements are not in force but all these states go on working together and following the same protocols for sampling. The sampling activities are standardized for the MS of the EU purse seiner fishery in the central-east Atlantic and in the Indian ocean.

No, in the case of other metiers.

Link to sampling design documentation:

The sampling design follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html;

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines)

Compliance with international recommendations:

Y.

Link to sampling protocol documentation:

The sampling protocol follows RFMOs guidelines. These are the links where the documentation can be found:

https://www.iccat.int/es/iccatmanual.html;

https://www.iotc.org/documents/WPDCS/14/35-ROS_Standards

Sarralde *et al* 2009 Sampling procedures for tropical tuna in the Atlantic and Indian Oceans. SCRS/2009/43: http://www.ieo.es/es_ES/web/ieo/pndb (section P4: Evaluación de pesquerías de túnidos y afines).

Compliance with international recommendations:

Y.

Sampling implementation

Recording of refusal rate:

N.

Monitoring of sampling progress within the sampling year:

Monitoring of sampling is based on the annual activity of the commercial fleet by spatial and monthly time strata.

In the case of baitboat landing in Dakar (Senegal) the target sampling includes all landings in the main ports. Due to this coverage, no need for allocation of the PSU is needed. Sampling teams are required to provide data on a monthly basis and instructed to report any contingency as it occurs. The sampling of the secondary units (well) is aimed at optimizing the coverage of the different strata (geographical area, set type and month). Therefore, in exceptional circumstances, sampling will try to improve the coverage of undersampled strata.

Data capture

Means of data capture:

Fish are measured at market while landings. The size of the fish is measured using a measuring board, tape or calliper and weights are collected with scales or dynamometers, depending on the fish size. The sampling information is recorded on sheet forms and later is computerized in a specific DB application developed by the national authority in collaboration with the research centres.

For the baitboat fisheries landing in Dakar (Senegal), information will be collected by using the dedicated software AVDTH: "Acquisition et validation des données de pêche au thon tropical" (see Lechauve, 1999 for further detail: AVDTH98: acquisition et validation des données de pêche au thon tropical (ird.fr)".

Data capture documentation:

The protocol and means for collecting data are described in the port sampling manual of ICCAT. The links: https://www.iccat.int/es/iccatmanual.html.

Quality checks documentation:

N. The data is carefully reviewed by the IEO staff in the laboratory in order to detect errors and inconsistencies in the recorded data before consolidating them. Logbook data are cross-checked against the information provided by the Spanish Fisheries Secretariat and recorded through the ERS.

Our team carries out biannual surveys to the skippers of the longline fishery vessels to test the correct allocation of the trips to metier in the Mediterranean.

Length sampling hard copies are made available together with the keypunched data. In case of detection of anomalies, information is cross-checked between both sources.

Data storage

National database:

The data collected are stored into specific databases designed according to the specificities of the fisheries and into the SIRENO database which is managed by the IEO.

International database:

Agregated data are stored on ICCAT (International Commission for the Conservation of Atlantic Tunas): https://iccat.int/en/accesingdb.html.

Quality checks and data validation documentation:

Documents on quality checks are currently at the preparation stage.

Sample storage

Storage description:

Samples for genetic (muscle tissue), reproduction (gonadal tissue), and age and growth (hard parts: otoliths and/or first fin ray of the first dorsal fin and second fin ray of the anal fin) are collected for the main tuna and tuna-like species and in swordfish respectively. The samples are stored in adequate fixative solutions, frozen or stored in boxes in the IEO laboratory store. Samples are stored till they are analyzed or sent to the laboratories in charge to analyze them. A subsample of each genetic or reproductive sample is stored in our laboratory indefinitely. Each sample has a code that includes the year, the species, the gear, the tissue type, and a specific number.

Sample analysis:

Processing of samples for maturity and fecundity:

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2016). Contrasting batch fecundity estimates of albacore (*Thunnus alalunga*), an indeterminate spawner, by different laboratory techniques. FISHERIES RESEARCH. 176, 76-85.

Saber, D. Macías, J.M. Ortiz de Urbina, O.S. Kjesbu. (2015) Stereological comparison of oocyte recruitment and batch fecundity estimates from paraffin and resin sections using spawning albacore (*Thunnus alalunga*) ovaries as a case study. Journal of Sea Research JOURNAL OF SEA RESEARCH. Volumen: 95: 226-238.

Saber, S., Ortiz de Urbina, J., Gillespie K., Poisson F., Coelho R., Rosa D., Puerto, M.A., Macías, D. 2020. A preliminary analysis of the maturity of ICCAT swordfish stocks Collect. Vol. Sci. Pap. ICCAT, 77(3): 537-551.

Farley JH, Williams AJ, Hoyle SD, Davies CR, Nicol SJ (2013) Reproductive Dynamics and Potential Annual Fecundity of South Pacific Albacore Tuna (*Thunnus alalunga*). PLOS ONE 8(4): e60577. https://doi.org/10.1371/journal.pone.0060577

Processing of samples (otoliths/ fin ray) for aging:

Brown-Peterson N.J., Wyanski D.M., Saborido-Rey F., Macewicz B.J. and Lowerre-Barbieri S.K. 2011. A standardized terminology for describing reproductive development in fishes. Marine and Coastal Fisheries: Dynamics Management and Ecosystem Science 3, 52-70.

Campana, S. E. 2001. Accuracy, precision and quality control in age determination, including a review of the use and abuse of age validation methods. Journal of Fish Biology, 59, 197–242 doi:10.1006/jfbi.2001.1668.

Ortiz de Zárate, V, Valeiras, X., and Ruiz, M. 2007. Sampling protocol for skeletal structures of North Atlantic albacore tuna (Thunnus alalunga) and ageing interpretation. Col. Vol. Sci. Pap. ICCAT, 60(2): 492-506.

Ortiz de Zárate, V., E.A. Babcock. 2016. Estimating individual growth variability in albacore (*Thunnus alalunga*) from the North Atlantic stock: Aging for assessment purposes. Fisheries Research 180, 54–66.

Luque,P.L., Rodriguez-Marín,E., Landa,J., Ruiz,M., Quelle,P., Macias,D. and J.M. Ortiz de Urbina.2014.Direct ageing of *Thunnus thynnus* from eastern Atlantic and western Mediterranean Sea using dorsal fin spines. Journal of Fish Biology 84, 1876-1903.

Quelle, P *et al*., 2011. A review of Mediterranean Albacore (*Thunnus alalunga*) biology and growth studies. Collect.Vol.Sci.Pap.ICCAT,66 (5):1882-1896

Quelle, P. *et al*., 2023. Progress in the standardization of direct ageing methodology of Swordfish (*Xiphias gladius*) using anal fin rays. Collect.Vol.Sci.Pap.ICCAT,80 (1):227-237

Data processing

Evaluation of data accuracy (bias and precision):

N. Documentation is still ongoing (not yet finalized).

Editing and imputation methods:

N. Documentation is still ongoing (not yet finalized).

Quality document associated to a dataset:

N. Documentation on processes to evaluate quality is still ongoing (not yet finalized).

Validation of the final dataset:

Data sets are examined and checked by IEO experts scientific staff. Quality checking for data processing includes automatic analysis of databases producing tables with detected mistakes and a report containing the percentages of records to be corrected.

Once the data arrive at the laboratory, the data are revised by experts to detect errors and cross-checked with both sales notes and logbooks registers and contacting network sampling staff for improvement in collection of data.

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA

MS: ESP

Region: Other Regions (NAFO) & North-East Atlantic & North Sea and Eastern Arctic

Sampling scheme identifier: ESP_IEO_P5_AtSea

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

Sampling scheme aiming at collecting fishing data, catches composition (all fractions), length samples and biological parameters from commercial trips at sea operating in international waters of NEAFC & NAFO Regulatory Areas for all species listed in Table 1 of the EU MAP Delegated Decision annex.

Sampling is concurrent but observers priorize sampling of species listed in Table 2.1 of the Spanish Work Plan covered by a commercial sampling scheme for length and the sampling planned in Table 2.2 for biological variables.

Also, VME indicators data, incidental catches of sensitive species and marine litter data are collected.

Description of the population

Population targeted:

The primary sampling units (PSU) are all vessel trips of Spanish trawlers (OTB & OTM) operating in international waters of NEAFC & NAFO Regulatory Areas.

Population sampled:

The target population: is the total number of trips in a year carried out by the Spanish fleet targeting the stocks selected for sampling.

All fishing trips are susceptible to be sampled and sampling is tried to be distributed throughout the year and in all fisheries planned.

Stratification:

The target population includes commercial fleet with similar technical characteristics (freezer trawlers over 40 m length) operating in international waters of NEAFC & NAFO Regulatory Areas. In addition, these vessels operate with fishing licenses that allow them to fish in most of the target fisheries. Often, during the same trip (PSU), a vessel can operate in several areas and with several fishing gears.

For these reasons, the following sampled population have been stratified jointly with a similar sampling plan to be sampled annually:

Region	RFMO	Sampling frame identifier	Area
Other Regions	NAFO	OTB_MDD_40-60-130-280	NAFO Div. 3LMNO
North-East Atlantic	ICES	OTM_DEF_32-69	ICES 6a-7c
North Sea and Eastern Arctic	ICES	OTB_DEF_>=120	ICES 1-2

In addition, IEO staff that monitor these fisheries are the same for all population sampled which means that same sampling methodologies, implementation and data processing are performed.

Sampling design and protocols

Sampling design description:

The sampling frame is the list of vessels with license to fish in each target fishery.

The selection of the sampling frame is according to the scientific experience gained from the study of fisheries in the area.

Method of PSU selection: Each PSU is selected by a systematic non-random sampling from a list of vessels ranked by the effort of observation on board in previous years by fishery and updated every year. The selection is made by the fisheries authority which granted the fishing license.

The number of fishing trips to be sampled has been calculated based on data from previous years in order to keep the coverage enough to comply the requirements of end users.

The SSU is the fishing haul and is randomly selected.

The method to collect data from commercial fisheries is the concurrent sampling on board carried out by observers at-sea who remain on board throughout the period of the whole fishing trip (1-3 months).

Observers at sea collect data on unsorted catches and discards.

The Sex-ratio index is achieved at the same time of sampling of length which are randomly collected and not stratified. The biological parameters (Weight, Age, Maturity) come from a sampling design stratified by length class.

The data for the estimation of discards and catches structure consist on length data by sex and length-weight relationship collected by trip sampled. Raisings are done for each species by month and division. Finally, a raising is made to the total catch of the fishery.

The calculation to achieve other biological parameters will be estimated based on bootstrap procedures and fitting models with the tool INBIO 2.0* ("Estimation of biological parameters and their uncertainties through simulation techniques") developed in R environment by the IEO.

**Update of "Sampedro, P., Sainza, M. and Trujillo, V., 2005. A simple tool to calculate biological parameters'uncertainty. Working Document, In: Workshop on Sampling Desing for Fisheries Data (WKSDFD), Pasajes, Spain.*

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

Y

Regional coordination:

N

Link to sampling design documentation:

See above: Sampling design description

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

https://digital.csic.es/bitstream/10261/327457/7/MANUAL%20DEL%20OBSERVADOR%20repositorioIEO%20sep%202012.pdf

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Compliance with international recommendations:

N

Sampling implementation

Recording of refusal rate:

Y

The refusal rate in the last years has been zero because each fishing license is linked to the acceptance of scientific observer on board.

Monitoring of sampling progress within the sampling year:

For each trip sampled an observer on board is appointed preferably with experience in sampling on board in these fisheries.

The training of the observer on board is carried out by technicians from the scientific institute who instruct the observer to carry out the tasks on board.

The observer collects data on paper forms and records them daily on a laptop.

During each sampled trip, the data collected is monitored through periodic email communications between the observer and hers/his coordinator.

The data collected is checked weekly and doubts or sampling problems on board are received and resolved at any time.

Once the observer returns to port, there is an interview with the coordinator and the forms and recorded data are thoroughly reviewed.

All fishing trips are susceptible of being sampled and the goal is share the sampling throughout the year and in all planned fisheries. Sampling needs are reviewed monthly

Usually vessels operating in this area have permissions for fishing with several trawls on the same trip (PSU) for operating in several fisheries. Observers are allocated to vessels but prior there is no accurate information on the planning of vessel activity (gear, areas,). Thus, it is difficult to predict in advance which métiers going to be sampled during the same voyage. Therefore, different sampling targets are considered when the vessel operates with different métier.

The main cause of the deviation of the sampling planned is the lasting of the trips in these fisheries and the unpredictability of the permanence of observers in fishing areas due to the decisions taken by vessels' owners in the way of moving vessels among areas. Although the behaviour of the fleet is impossible to change, it is important to improve coordination with the sectors involved: owners and administration authorities.

Data capture

Means of data capture:

Data are captured by the observers at sea using specific recording paper forms for each haul or sampling:

- Fishing Forms.
- Catches Forms.
- Length Sampling Forms.
- Biological Sampling Forms.
- Others Forms (VME Indicators, Incidental Catches)

Length data is collected using a measuring board for fish and cephalopods species and using a digital caliper for crustaceans.

Weight data is collected using marine scales (up to 6 kg and 20 kg) mainly. If the scale does not run properly then observers use dynamometers.

Variables as sex, maturity data is collected “de visu” in according to the protocols.

Data are recorded daily by the observers at sea on a laptop using the software LEJANAS and Excel.

Pictures of VME indicators and incidental by catch are taken by observers using a camera for data validation at the Lab.

Data capture documentation:

https://digital.csic.es/bitstream/10261/327457/7/MANUAL%20DEL%20OBSERVADOR%20repositorioIEO%20sep%202012.pdf

Manual ESP_IEO_P5_AtSea_Recording (Spanish)

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

Manual ESP_IEO_P5_AtSea_VME Indicators (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas).

Quality checks documentation:

N

Documentation will not be available at the end of 2022.

Data of each trip, collected and recorded on board, are checked during and after the trip (in the laboratory) in order to detect errors and inconsistencies (detection of outliers, SOP of the length distributions, ranges of variables, etc.)

After the trip, the observer debugs all data, haul by haul and sampling by sampling. Finally, a random check of about 15% of the data is carried out to validate the quality of the results. Annually all sets of data for each fishery are checked previously to be used for assessment and other scientific tasks.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

RDB (Regional Data Base),

InterCatch (ICES areas)

Quality checks and data validation documentation:

Manual SIRENO

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Sample storage

Storage description:

Otoliths collected on board are kept duly labelled waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each sampled trip before reading.

Gonads collected on board are kept in micro-perforated duly labelled plastic bags that are fixed in formaldehyde solution using a special mask during sample handling.

At the lab, ovary samples are stored in 70º alcohol, in outdoor storage rooms located at CO of Vigo. Due to lack of space, only a sample of the gonads that may be of interest for further studies are kept. On the other hand, all of the histological sections and slides are stored. The collection is in the CO of Vigo.

Sample analysis:

Age

Otoliths reading and age estimation follow the agreements and recomendations of related workshops.

Maturity

To improve the quality of the maturity data, a workshop is held annually to review the different maturity stages of the main bony fish species, and of sharks and rays both oviparous and ovoviviparous. Maturity manuals for each of the species are available onboard to scientific observer. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes sampled. The gonad is shown inside the fish as seen in biological sampling, and also outside the fish and in detail.

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

ICES WK and WG documents related to biological parameters

http://ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

Data processing

Evaluation of data accuracy (bias and precision):

N

Documentation will be available at the end of 2022.

The refusal rate in the last years has been zero because each fishing license is linked to the acceptance of scientific observer on board.

The observer programs on board have manuals and protocols that define the objectives and tasks.

The methodology used to improve the data quality include the next tools:

- Exploratory data analysis to detect outliers and errors from hauls, catches, length and biological sampling.
- Plotting hauls positions: checking the allocation of geographic strata.
- Checks of CPUEs.

- Scatter plots of length and biological samplings.
- SOP factor of length / weight for biological samplings.
- SOP factor of sample weights to identify errors and quantify the quality of the sampling.
- Tools of the ESP_IEO_P5_AtSea software and script in R for the calculation of uncertainty for raising.
- Estimation of the biological parameters and their uncertainties carried out using the tool INBIO 2.0 ("Estimation of biological parameters and their uncertainties through simulation techniques"), developed in R environment by the IEO.

In addition, quality controls are also performed:

Implementation of sampling protocols for each species where the methodologies of sampling, processing and storage of samples are described.

Processing, debugging and periodic checking of data.

Standardization of the common criteria in assigning maturity and age of each species, in order to improve the accuracy

Attendance to workshops and/or exchanges between different scientific teams

Editing and imputation methods:

N

Documentation will be available at the end of 2022

Typing errors of sample data are corrected or excluded.

Outliers and poor quality sampling data are excluded.

Extrapolations to others temporal and geographical strata (months, areas,..) when data is lacking.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final length distribution of the population is checked with the comparison of SOP value of the length distribution and the landing weight for all sampling frames.

Biological parameters are checked in R INBIO 2.0.

In general, for each fishery, final datasets are validated taking into account the guidelines and formats of the data calls for the end users, mainly assessment Working Groups and NAFO, ICES and RCGs:

RFMO	Sampling frame identifier	Area	End User
NAFO	OTB_MDD_40-60-130-280	NAFO Div. 3LMNO	NAFO SC, RCG LDF
ICES	OTB_DEF_32-69	ICES 6a-7c	WGWIDE, RCG NANSEA
ICES	OTB_DEF_>=120	ICES 1-2	AFWG, RCG NANSEA

SAMPLING SCHEME IDENTIFIER: ESP_IEO_P5_ATSEA-CCAMLR

MS: ESP

Region: Other Regions (CCAMLR)

Sampling scheme identifier: ESP_IEO_P5_AtSea_CCAMLR

Sampling scheme type: Commercial and exploratory fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2022 until December 2027

Short description (max 100 words):

The sampling scheme aims to collect at sea fishing data, catch composition (all fractions) and biological parameters from exploratory and commercial trips operating in CCAMLR waters

Sampling is concurrent but observer's priority is to sample target species (*Dissostichus mawsoni* and *Dissostichus eleginoides*) and bycatch (Macrourids and others).

Observers record information on the gear configuration (including measures to reduce incidental mortality of seabirds and marine mammals), fishing operations (including catch composition), biological measurements of target and by-catch species, details of fish tagging and tag-recaptures, vessel sightings and data on indicators of vulnerable marine ecosystems. All of these data are submitted by observers to the CCAMLR Secretariat on standardised logbook forms designed for longline, trawl (finfish and krill) and pot (crabs and finfish) fisheries.

Description of the population

Population targeted:

The primary sampling unit (PSU) is the vessel trip, that is sampled onboard the Spanish logline fleet (LLS) operating in CCAMLR Regulatory Area.

Population sampled

The target population: Toothfish (Dissostichus spp) stocks in subareas 88.1 and 48.6.

Fishing trips occur in the austral summer (Nov-March) due to the ice condition, unsuitable in other periods.

Stratification:

For management purposes there are differentiate stocks in both subareas. Subarea 88.1 is an exploratory fishery while subarea 48.6 is a poor-data area therefore a research plan is needed. During the same trip (PSU), the vessel operates in several subareas.

For these reasons, the following sampled population have been described with a similar sampling plan:

Region	RFMO	Sampling frame identifier	Area
Other Regions	CCAMLR	ESP_IEO_P5_AtSea_CCAMLR	CCAMLR subarea 88.1
Other Regions	CCAMLR	ESP_IEO_P5_AtSea_CCAMLR	CCAMLR subarea 48.6

Sampling design and protocols

Sampling design description:

All fishing vessels have two observers onboard, one International and the other National. The International observer is selected following the SISO (Scheme of International Scientific Observation) protocol:

https://www.ccamlr.org/en/document/publications/text-ccamlr-scheme-international-scientific-observation.

Method of PSU selection: According to CCAMLR Conservation Measures, it is compulsory to sample all fishing vessels.

The SSU is the fishing haul and is randomly selected.

The method to collect data from commercial fisheries is the concurrent sampling on board carried out by two observers at-sea who remain on board throughout for the entire fishing trip (4-5 months).

Observers at sea collect data on unsorted catch, bycatch and discards following the SISO manual :

https://www.ccamlr.org/en/document/science/scientific-observers-manual-%E2%80%93-finfish-fisheries-%E2%80%93-version-2023

An Observer sampling requirements for *Dissostichu*s spp. can be found on the CCAMLR website:

https://www.ccamlr.org/en/science/observer-sampling-requirements-dissostichus-spp

The biological parameters (Weight, sex, Maturity) come from a randomly collected sampling design.

The data for the estimation of discards and catch structure consist on length data and weight sampled. Raisings are done for each species to the total catch of the fishery.

Tag/recapture data is essential for stock assessment using CASAL package developed in the R environment. A tagging rate is set, which is different depending on the area:

https://www.ccamlr.org/en/document/science/toothfish-and-skate-tagging-methods

Other biological parameters are estimated in the laboratories, such as the age estimation that is based on otolith readings from samples collected on board.

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

Y

Regional coordination:

N

Link to sampling design documentation:

https://www.ccamlr.org/en/document/science/scientific-observers-manual-%E2%80%93-finfish-fisheries-%E2%80%93-version-2023

Compliance with international recommendations:

Y

Link to sampling protocol documentation.

https://www.ccamlr.org/en/science/information-technical-coordinators-and-scientific-observers

https://www.ccamlr.org/en/document/publications/text-ccamlr-scheme-international-scientific-observation

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

There are two observers on board, following the SISO requirements, one of which is international while the other is national. Usually they work onboard in 12-hour shifts.

The training of the National observer is carried out by technicians from the IEO (Spanish Institute of Oceanography). The International observer is trained following the SISO programme.

A national coordinator is appointed by CCAMLKR from each Party.

Observers collect the data manually and process it on a laptop on a daily basis.

The data collected is monitored through periodic emails between observers and coordinators.

Once the observer returns to port, 5 working days are devoted to review the data and samples collected, codification of photographs and to finish the observer report.

Sampling needs are reviewed monthly.

The vessel operating in this area has permissions for fishing only with set bottom long line (PSU) for commercial and exploratory fishing. The sampling is planned in advance. Usually the number of samples from the research proposals in

subarea 48.6 is higher as the aim is to obtain the maximum data to be able to carry out the stock assessment as soon as possible.

They could be different causes of deviation of the sampling planned, being the main the “ice condition”. When the concentration of the ice is high the vessel cannot work. An additional cause of deviation could be that the vessel runs out of oil, having to shorten the campaign.

It is important to improve coordination with the sectors involved: owners and administration authorities.

Data capture

Means of data capture:

Data are recorded daily by the observers at sea on a laptop using the CCAMLR forms

- Fishing Forms.
- Catches Forms.
- Biological Sampling Forms.
- Tag and recovery forms
- Others Forms (VME Indicators, Incidental Catches)

Length data is collected using a measuring board for fish.

Weight data is collected using marine scales (20 kg) mainly.

Other parameters as sex and maturity data are collected “de visu” according with the SISO manual.

https://www.ccamlr.org/en/node/74773.

Pics of VME taxa indicators and incidental by catch are taken by observers using a camera.

A tagging protocol is in place.

Data capture documentation:

Longline fisheries data and cruise report forms

https://www.ccamlr.org/en/node/74773

Instructions for sampling protocols and methods

https://www.ccamlr.org/en/science/information-technical-coordinators-and-scientific-observers

CCAMLR data forms

https://www.ccamlr.org/en/data/forms

By-catch identification and educational material for use by observers on vessels

https://www.ccamlr.org/en/document/science/common-catch-species-ccamlr-longline-and-trawl-fisheries

https://www.ccamlr.org/en/document/publications/fishes-ross-sea-region-%E2%80%93-field-guide-common-species-caught-longline-fishery

https://www.ccamlr.org/en/document/science/dissostichus-eleginoides-gonade-maturity-guide

VME-taxa-classification-guide

https://www.ccamlr.org/en/document/publications/vme-taxa-classification-guide

Other training materials for observers

https://www.ccamlr.org/en/document/science/seabird-identification-%E2%80%93-photographic-guide-observers-sea-southern-indian-ocean

https://www.ccamlr.org/en/document/science/whale-depredation-%E2%80%93-data-collection-guidelines

https://www.ccamlr.org/en/science/observer-self-training-guide

Quality checks documentation:

Y

Data collected and recorded on board of each trip are checked during and after the trip (in the laboratory) in order to detect errors and inconsistencies (detection of outliers, SOP of the length distributions, ranges of variables, etc.)

After the trip, the observer debugs all data, haul by haul and samples. Finally, a random check of about 15% of the data is carried out to validate the quality of the results. Annually all sets of data for each fishery are checked to be used for assessment and other scientific tasks by members and CCAMLR Secretariat.

Data storage

National database:

NA

International database:

CCAMLR Secretariat hosts the Database:

https://www.ccamlr.org/en/data/data

Quality checks and data validation documentation:

CCAMLR Secretariat validates the data together with the National coordinators that are the owners of the data.

Sample storage

Storage description:

Otoliths collected on board are kept duly labelled in waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each sampled trip.

Sample analysis:

Age

There is a link to a otolith library with a repository of images in order to validate other readings:

https://www.ccamlr.org/en/science/otolith-library

Maturity

Maturity indexes are in the SISO manual. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes. The gonad is shown both inside the fish as seen in biological sampling and outside the fish.

Data processing

Evaluation of data accuracy (bias and precision):

N

Documentation will be available at the end of 2024-25 season.

The refusal rate in the past years is zero because each fishing license is linked to the acceptance of the two scientific observers on board.

The observer programs on board have manuals and protocols that define the objectives and working tasks.

The methodology used to improve the data quality include the next tools:

- Exploratory data analysis to detect outliers and errors from hauls, catches, length and biological sampling.
- Plotting hauls positions: checking the allocation of geographic strata.
- Checks of CPUEs.
- Checks of Species taxa.
- Scatter plots of length and biological samplings.
- SOP factor of length / weight for biological samplings.
- SOP factor of sample weights to identify errors and quantify the quality of the sampling.

Editing and imputation methods:

N

Documentation will be available at the end of 2024/25 season

Typing errors of sample data are corrected or excluded.

Outliers and poor quality sampling data are excluded.

Quality document associated to a dataset:

N

Validation of the final dataset:

The final validation is made between the CCAMLR Secretariat and the National coordinator. Every outlier/potential error is getting back to the coordinator who checks the data together with the observer.

SAMPLING SCHEME IDENTIFIER: ESP_SGP_PET_ATSEA

MS :ESP

Region: North-East Atlantic

Sampling scheme identifier: ESP_SGP_PET_AtSea

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: from January 2025 until December 2027

Short description (max 100 words):

Sampling scheme aiming at the observation and recording of the incidental catches of cetaceans, as well as the species included in the list of priority species provided by the WGBYC for the Bay of Biscay and the Iberian Peninsula. Data on the weight and length of these species are collected.

The fleet segments sampled are gillnet, trammel net, purse seine and pair trawl vessels operating in the Cantabrian-Northwestern National fishing ground (ICES Divisions 8c and 9a North) and in the waters of the Bay of Biscay (ICES Divisions 8abd), with the exception of the PTB_abd vessels based in the Basque Country, which are sampled by AZTI (AZTI_AtSea_Catch&ETP_ICES).

Description of the population

Population targeted:

The primary sampling unit (PSU) is vessel*trip. The target species of this study are incidentally caught marine mammals, sea turtles, chondrichthyans, protected bony fish, seabirds and marine invertebrates, in vessels that operate with gillnets, purse seines and pair trawls. The study area covers waters of the Cantabrian-Northwest National fishing ground and the waters of the Bay of Biscay.

Population sampled

Most of the target population is sampled, excluding vessels with a length of less than 12 metres and other vessels that present habitability problems where it is not possible to take an observer on board.

Target vessels are pair trawlers, purse seiners, vessel with set gillnet (“volanta” and “rasco”) and small-scale vessels.

Stratification:

The sampled population is stratified in eight technical strata (fleet/métier):

1. PAREJA_CN: Pair trawlers operating in areas 8c and 9a North.
2. ENMALLE_AC: Set gillnetters operating in areas 8a, 8b and 8d.
3. ENMALLE_CN: Set gillnetters operating in areas 8c and 9a North.
4. CERCO_CN: Purse seiners operating in areas 8c and 9a North.
5. AM_CN: Small scale fleet (set gillnetters and trammel nets) targeting operating in areas 8c and 9a North.

Sampling design and protocols

Sampling design description:

Sampling is Simple Random Sampling with Replacement (SRSWR). The sample is based on official lists of vessels with active fishing activity in each sampling stratum and a draw is made to proceed to the random selection of the vessel trips (PSU) to be carried out. After selection, the response given by the vessel is recorded, differentiating the sampled and rejected vessels trips.

In cases where not all the hauls (SSU) can be sampled, they are chosen systematically, distributed equally between day and night. This is the case of vessels trips carried out in the gillnet and trawl strata of the Bay of Biscay (Divisions 8abd), which usually last between 10 and 15 days.

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

Yes

Regional coordination:

The sampling design follows the best practice guidelines provided by WGBYC and WGCATCH expert groups.

Link to sampling design documentation:

No sampling design documentation available.

Compliance with international recommendations:

The sampling design is in line with international recommendations.

Link to sampling protocol documentation.

The sampling protocol is the same as the protocol used by AZTI in the pair trawlers in the Bay of Biscay. In this case, this protocol is used for the gears of this sampling scheme. Therefore, the link to the webpage where the sampling protocol can be found is the AZTI link:

https://www.azti.es/wp-content/uploads/2022/05/Protocolo-PETs-parejas.pdf

Compliance with international recommendations:

Yes

Sampling implementation

Recording of refusal rate:

Yes, refusals are recorded. When a vessel is not available to take on an observer, the reason is noted and the next vessel on the list is called.

Monitoring of sampling progress within the sampling year:

To monitor the progress of sampling throughout the year, a sampling matrix is used, composed of the planned and completed PSU (vessel trips) per month and for each stratum.

Sampling is considered for each month and a weekly follow-up is carried out comparing what was sampled and what was planned.

Data capture

Means of data capture:

To carry out biometric sampling of fishes, cetaceans, seabirds and turtles, measuring tapes of different sizes are used, and for crustaceans, calipers are used.

The data are computerized in a dedicated software.

Data capture documentation:

See the sampling protocol document at the link:

https://www.azti.es/wp-content/uploads/2022/05/Protocolo-PETs-parejas.pdf

Quality checks documentation:

Before proceeding to computerize the information, experts perform consistency analyses of the acquired data and, if necessary, consult observers. In addition, the software has controls for the correct recording of data (mandatory fields, text, numeric, master files, etc.). Subsequently, reports are generated in dedicated software and quality controls are applied to detect possible errors and correct them.

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos"(1) is the IEO fisheries and oceanographic Database.

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

International database:

Data are sent to the ICES WGBYC and RDBES (Regional DataBase & Estimation System).

Quality checks and data validation documentation:

NA.

Sample storage
Storage description: NA. **Sample analysis**: NA.
Data processing
Evaluation of data accuracy (bias and precision): There is not any evaluation documentation yet. **Editing and imputation methods:** NA. **Quality document associated to a dataset:** NA. **Validation of the final dataset:** NA.

RELATED TO TABLE 2.6, 2.2 AND TEXT BOX 2.6 (BIOLOGICAL SPECIFIC DATA COLLECTION)

SAMPLING SCHEME IDENTIFIER: IBWSS

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBWSS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from pelagic hauls used for echo-traces identification for the following pelagic fish species included in Table 2.2 of the WP: *Micromesistius poutassou.* Biological sampling is used to verify the species and length/age composition/structure of echo-traces during echo-integration. Length and weight are also recorded for other species susceptible of being acoustically assessed (*Trachurus trachurus, Scomber scombrus, and Merluccius merluccius)*

Description of the population

Population targeted:

The International Blue Whiting Spawning Stock Survey area corresponds to the spawning grounds west of the British Isles, Rockall Bank, Porcupine Bank and Porcupine Seabight. Five research vessels from different countries participated in the survey, coordinated by the "ICES International Pelagic Campaigns Working Group (WGIPS). These participants are Ireland, The Netherlands, Spain, Faroes Islands and Norway The Spanish part of this survey takes place in ICES subdivisions 7j-k.in the area called Porcupine Seabight, south of the study area and it is conducted in spring time (mid-March). The acoustic-trawl survey is aimed at the acoustic estimation of the abundance and biomass of the spawning fraction of the Blue Whiting northern stock (*Micromesistius poutassou*), and the hydrographic characterization of the area. In addition, an understanding of the companion species is pursued, especially in the mesopelagic fraction.

Population sampled:

This acoustic-trawl survey is aimed primarily at the spawning fraction of North Stock of Blue Whiting in spring. The sampled fractions of the target populations will be those ones inhabiting the waters between 450-600 m depth isobaths. The timing and spatial coverage of this survey has been defined to achieve containment of this specific stock on its northward migration along the northwestern coast of Europe. Containment is consistently achieved at the survey for the target specie which survey index is used in analytical stock assessment at WGWIDE.

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints.

Stratification:

In the total study area of the international Survey, the sampling design is stratified into areas, decided in advance and called strata. This pre-stratification of the study area is required by the software used to obtain the abundance index, 'StoX', which requires that the strata be as permanent as possible to standardize the indices year by year since these indices depend on the area of each stratum. The Spanish part of the survey takes place in one of these areas (Strata 7, Porcupine Seabight)

Sampling design and protocols

Sampling design description:

The sampling assignment is opportunistic since pelagic sets are made whenever changes in the echo-traces are detected and according to the time constraints of the survey. The sample for the size distribution is selected by a simple random sampling (SRS) of 50 to 100 individuals from the classified catch. The number of fishes to be sampled is determined when a clear pattern appears in the distribution. For biological sampling, 40 specimens are selected by simple random sampling.

Is the sampling design compliant with the4S principle?:

NA.

Regional coordination:

Yes. Sampling design and protocols were developed in the framework of the WGIPS. In addition, the survey is coordinated in real time by the survey coordinator (Norway)

Link to sampling design documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. Section 2.3

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=30298

Compliance with international recommendations:

Y. The Blue Whiting stocks are assessed by international group of experts (WGWIDE), and their recommendations are taken into consideration and implemented. All pelagic surveys in the Northeast Atlantic ICES areas are steered by WGIPS, Working Group of International Pelagic Surveys. The sampling schemes adopted by the IEO are standardised and coordinated by these ICES expert groups.

Link to sampling protocol documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=30298

ICES. 2021. Working Group of International Pelagic Surveys (WGIPS). ICES Scientific Reports. 3:40. 481pp

https://doi.org/10.17895/ices.pub.8055

Compliance with international recommendations:

Y. The Blue Whiting stocks are assesed by international group of experts (WGWADE), and their recommendations are taken into account and implemented. All pelagic surveys in the Northeast Atlantic ICES areas are reviewed by WGIPS. The sampling schemes adopted by the IEO are standardised and coordinated by these ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints.

Data capture

Means of data capture:

Sampling equipment:

All vessels employed a single midwater trawl for biological sampling. Acoustic equipment for data collection is a SIMRAD EK-80 scientific echosounder and post-processing is made with Echoview software. Survey abundance estimates are based on acoustic data collected from calibrated scientific echo sounders using an operating frequency of 38 kHz. All transducers are calibrated using a standardised sphere calibration (Demer et al. 2015) prior, during or directly after the survey. All the acoustic data are subsequently uploaded into Ices Acoustic Database and PGNAPES Database.

Biological sampling:

All components of the trawl haul catch are sorted and weighed; fish and other taxa are identified to species level. Size is measured with Ictiometers, weights using marine scales. All the data of the biological sampling are captured and registered written directly on the sampling sheets designed specifically for it, computerized on board and and subsequently uploaded into ICES Acoustic Database, PGNAPES Database and SIRENO IEO database.

Hydrographic sampling:

Hydrographic sampling (vertical CTD casts) was carried out by each vessel at predetermined locations. The equipment is a CTD SBE25. Depth was capped at a maximum depth of 1000 m in open water. The data is stored in PGNAPES Database.

Data capture documentation:

Demer, D. A., Berger, L., Bernasconi, M., Bethke, E., Boswell, K., Chu, D., Domokos, R., et al. 2015. Calibration of acoustic instruments. ICES Cooperative Research Report No. 326.

ICES. 2012. Report of the Workshop on implementing a new TS relationship for blue whiting abundance estimates (WKTSBLUES), 23–26 January 2012, ICES Headquarters, Copenhagen, Denmark. ICES CM 2012/SSGESST:01. 27 pp.

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

ICES. 2021. Working Group of International Pelagic Surveys (WGIPS). ICES Scientific Reports. 3:40. https://doi.org/10.17895/ices.pub.8055

Johnsen, E, Totland, A, Skålevik, Å, et al. StoX: An open source software for marine survey analyses. Methods Ecol Evol. 2019; 10: 1523– 1528.

https://doi.org/10.1111/2041-210X.13250

Jolly, G. M., and I. Hampton. 1990. A stratified random transect design for acoustic surveys of fish stocks. Canadian Journal of Fisheries and Aquatic Sciences 47(7): 1282-1291.

Quality checks documentation:

N. No documentation targeting quality checks.

There is a quality control of the data prior to loading it into the databases using an XSD 7(XML Schema).

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

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

ICES Acoustic Database and PGNAPES Database

Quality checks and data validation documentation:

ICES Acoustic Database: Data submitters can deliver either text files (CSV) or structured mark-up files (XML) for Acoustic and Biological trawl data. In the case of XML a template is released for the users to validate their data before submitting it to the ICES Acoustic Database. This is done by using an XSD 7(XML Schema). An Acoustic XSD schema and Trawl XSD schema are provided separately to facilitate independent submission of the two data types. All general alidation rules, quality control, constraint checking and statistical consistency are implemented by using Schematron 8as an ISO standard. In the case of CSV submitted file re converted into XML. Submitted data are as such be validated against the XSD and the Schematron rules and a report of ossible errors and warnings is produced. If no errors result, and the data submitter accepts all warnings, then the submitted data is ready to upload into the Acoustic database.

https://www.ices.dk/data/Documents/Specification%20of%20the%20acoustic%20database.pdf

Sample storage

Storage description:

The otoliths are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: Vigo and Santander. These pieces are stored systematically, without expiration date.

Sample analysis:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. Section 6

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=30298

Data processing

Evaluation of data accuracy (bias and precision):

Y. Acoustic data are analysed using the StoX software package (V3.0.5) and R-StoX packages software package (RStoX Framework 3.0.12, RStoX Base 1.3.8 and RStoX Data 1.1.3). A description of StoX software package is provided by Johnsen et. al. (2019). Estimation of abundance from acoustic surveys with StoX is carried out according to the stratified transect design model developed by Jolly and Hampton (1990). Baseline survey strata, established in 2017, were adjusted based on

survey effort and observations in 2021. Length and weight data from trawl samples were equally weighted and applied across all transects within a given stratum

Estimate of relative sampling error

For the baseline run, StoX estimates the number of individuals by length group which are further grouped into population characteristics such as numbers at age and sex.

A total length distribution is calculated, by transect, using all the trawl stations assigned to the individual transects. Conversion from NASC (by transect) to mean density by length group by stratum uses the calculated length distribution and a standard target strength equation with user defined parameters. Thereafter, the mean density by stratum is estimated by using a standard weighted mean function, where each transect density is weighted by transect distance. The number of individuals by stratum is given as the product of stratum area and area density.

The bootstrap procedure to estimate the coefficient of variance randomly replaces transects and trawl stations within a stratum on each successive run. The output of all runs is stored in a RData-file, which is used to calculate the relative sampling error.

Johnsen, E, Totland, A, Skålevik, Å, et al. StoX: An open source software for marine survey analyses. Methods Ecol Evol. 2019; 10: 1523– 1528.

https://doi.org/10.1111/2041-210X.13250

Editing and imputation methods:

N

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

Quality document associated to a dataset:

N

Validation of the final dataset:

April-May, prior of WGWADE meeting

SAMPLING SCHEME IDENTIFIER: IBTS_Q4

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBTS_Q4

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2025 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from bottom-trawl hauls used to provide information useful for the EU CFP to assess the relative abundance of the following demersal and benthic fish species included in Table 2.2 of the WP. (See Text Box 2.6).

The sampling design is random stratified with proportional allocation of fishing stations and swept-area method

Description of the population

Population targeted:

The survey area **ICES subdivisions 9a North and 8c**. It corresponds to the Spanish shelf waters off Galicia and the Cantabrian sea (70-500 m depth), and it is conducted in autumn, September-October. The bottom-trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main demersal and benthic fish inhabiting the Galician and Cantabrian shelf. The main assessed target species are those listed as sampled on Table 2.2 Biol variables.

The survey area **ICES subdivision 9a South**. It corresponds to the Spanish shelf waters of the Gulf of Cadiz (GoC, 20-800 m depth), and it is conducted in **autumn** time. The trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main small demersal fish (SPF) inhabiting the GoC neritic waters). The main assessed target species are: hake *Merluccius merluccius*, shrimp *Parapenaeus longirostris*, Nephrops norvegicus *Octopus vulgaris*, Squid *Loligo vulgaris*, Cuttlefish *Sepia officinalis*

The survey area **ICES subdivisions 7ck and 7b** >200 m. It corresponds to the Porcupine Bank, western Ireland (170-800 m depth), and it is conducted at the end of summer, mainly in September. The bottom-trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main demersal and benthic fish inhabiting the trawlable grounds on the Porcupine Bank. The main assessed target species are those listed as sampled on Table 2.2 Biol variables, hake, megrims, anglers and *Nephrops*.

Population sampled:

The timing and spatial coverage of this survey has been defined to assess abundance of the fish commercial species and the strength of the annual recruitment of species as hake, megrims or anglers.

This bottom-trawl survey is a multispecies one, surveying:

-the **8c9aN** demersal and benthic fish species in autumn. The sampled fractions of the target populations will be those ones inhabiting the grounds of the shelf between 70-500 m depth isobaths with few special shallower than 70 m and deep hauls reaching to 800 m deep, not weighted to the area since is not considered representative for the whole deep area.

-the **9aS** demersal and benthic fish species in autumn. The sampled fractions of the target populations will be those ones inhabiting the grounds of the shelf between 20-800 m depth isobaths, not weighted to the area since is not considered representative for the whole deep area.

-the **7ck** demersal and benthic fish species. The sampled fractions of the target populations will be those ones inhabiting the grounds of the Porcupine Bank between 170-800 m depth isobaths.

Stratification:

The sampling design is random stratified with proportional allocation of fishing stations and swept-area method

The areas stratified as follows:

ICES subdivisions 9a North and 8c: 5 geographical sectors (1: Miño river – Fisterra Cape, 2: Fisterra Cape – Estaca, 3: Estaca – Peñas, 4: Peñas – Ajo and 5: Ajo – Bidasoa river) and 3 bathymetric strata (A: 70-120 m, B: 121- 200 m, C: 201-500) with some special hauls shallower than 70 m and deeper than 500 m.

ICES subdivision 9a South: the whole area (7224 km2) has been separated into five depth strata (15-30, 31-100, 101-200, 201-500 and 501-800 m).

ICES subdivisions 7ck: two geographical sectors (designated as Northern and Southern) and 3 bathymetric strata (E: >300 m, F: 301- 450 m, G: 451-800).

Sampling design and protocols

Sampling design description:

Haul allocation is random avoiding sampling contiguous 5 nm squares, but number of hauls per strata is proportional to the area of the strata, area that is used to obtain abundance weighted to the area of the strata.

The sample/subsample of the catch is selected by a Simple Random Sampling (SRS) though size categories are used in species with large catches and skewed size distribution. Individuals of the selected samples are used to obtain various biological variables are collected until the expected number of samples per size range is reached).

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

NA.

Regional coordination:

Y. Sampling design and protocols are developed in the framework of the IBTSWG (ICES working group on Internation bottom trawl surveys).

PRT, FRA, IRL, GBR, DNK, BEL, DEU, NLD, NOR, SWE

Link to sampling design documentation:

The sampling design is described in the Section 7.5.1, Section 7.8.1 and Section 7.10.1 of the Survey manual

https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2015%20NeAtl%20IBTS%20Survey.pdf

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are considered and implemented. The sampling schemes adopted by the IEO are common within these species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

“Manual of the IBTS North Eastern Atlantic Surveys”

https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2015%20NeAtl%20IBTS%20Survey.pdf

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are considered and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Number of hauls is relatively constant though small variability due to weather events may occur.

Data capture

Means of data capture:

A complete report of the methodology and equipment used is available in the Manual of the International Bottom Trawl Surveys in the Western and Southern Areas section 7.8, 7.10, 7.5

Data capture documentation:

IBTS Western and Southern Areas Manual sections 3 and 7.8, 7.10, 7.5

Quality checks documentation:

IBTS Western and Southern Areas Manual section 7.5.4, 7.10

Data quality controls through filters are implemented in the software tools used, these include: 1. Haul position vs. geographical sector allocation and depths ranges vs. strata allocation; 2. Differences between speed vs. expected tow distance and positions; 3. Catch weight vs. estimated weight of the sampled length distribution using L-W regressions when available.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

ICES DATRAS.

Quality checks and data validation documentation:

No documentation targeting quality checks. Analysis and detection of outliers for biological parameters, their weight-length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R, etc.

Sample storage

Storage description:

The otoliths of almost all these species are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samplings have been carried out: A Coruña, Vigo and Santander. These pieces are stored systematically, without expiration date.

Sample analysis.

See Annex 1.1 ESP_IEO_P1_Biological_Specific.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N.

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

SAMPLING SCHEME IDENTIFIER: MEGS

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: MEGS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2025 until 2027

Short description (max 100 words):

The CAREVA, JUREVA and AZTI-MEGS surveys are part of the triennial surveys coordinated by the working group on mackerel and horse mackerel egg surveys (WGMEGS) to produce an index for the strength of the SSB of Atlantic mackerel (Scomber scombrus) and a relative abundance index of horse mackerel (Trachurus trachurus) spawning stocks in the Northeast Atlantic.

Description of the population

Population targeted:

The target species are mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*), and the survey core area comprises

ICES subdivisions 9a, 8c and 8b for the IEO surveys

ICES subdivisions 8abcd and 7hj for the AZTI survey

Population sampled:

The target populations are the pelagic species mackerel and horse mackerel, but as the spawning of these species coincides in time with other pelagic or semi-demersal populations in the area, data on spawning areas for species such as sardine, anchovy and hake are also obtained.

WGMEGS uses the daily egg production method (DEPM) for the estimation of horse mackerel biomass. DEPM involves collecting samples at the peak of spawning. Jack mackerel's peak spawning does not coincide in time and space with the Spanish surveys. Therefore, Spain does not collect horse mackerel samples. However, Spain (IEO and AZTI) do participate in the analysis of the jack mackerel samples collected by the other MEGS participants, including histological processing, screening of histological sections, batch fecundity analysis and ageing of POFs.

Stratification:

As part of the International Mackerel and Horse Mackerel Egg Survey (triennial), three surveys are carried out every three years

MEGS-CAREVA: Area 9a North, 8c, 8b and d South. Period March-April carried out by IEO

MEGS-JUREVA: Area 9a North, 8c, 8b and d South. Period April-May carried out by IEO

MEGS-AZTI-tiennial: Area 8abcd and 7hj. March April-May carried out by AZTI

MEGS-AZTI-Triennial: Area 8abcd. May carried out by AZTI

Sampling design and protocols

Sampling design description:

Sampling design and protocols are described at SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. Section 3. http://doi.org/10.17895/ices.pub.5140 and SISP 5 - Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel. Series of ICES Survey Protocols SISP 5. 89 pp. https://doi.org/10.17895/ices.pub.5139

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

NA

Regional coordination:

Sampling design and protocols are developed in the framework of the WGMEGS (ICES working group on mackerel and horse mackerel egg surveys). During the last group in 2021, participants were originally from the following countries: Spain, The Netherlands, Scotland, Ireland, Norway, Germany, Portugal, Faroe Islands, Denmark, and UK.

At each working group meeting as well as during the workshops on egg staging and fecundity estimation, the manual is discussed and updated where necessary, and incorporated in the working group and workshop reports as an annex document. Other methods necessary for adequate storage and preservation of the samples, sorting, identification and staging of fish eggs are described in sections of the different workshops and working group meetings.

Link to sampling design documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. Section 3. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation'(https://doi.org/10.17895/ices.pub.5139).

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation'(https://doi.org/10.17895/ices.pub.5139).

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The sampling design and protocols are developed in the framework of the WGMEGS (ICES working group on mackerel and horse mackerel egg surveys). During the survey year, the researchers responsible for the surveys and sample analysis are in real-time contact with the WGMEGS participants. In case of problems derived from bad weather, ship/laboratory equipment breakdowns, etc., the rest of participants in the remaining surveys / laboratories try to take actions such as to cover the unsampled area or complete unfinished the analysis of the samples, in such a way as to cause the least possible effect on the index derived from the surveys.

Data capture

Means of data capture:

For the collection of biological data during the survey, the weight of fish is recorded using a POLS (currently: MAREL) marine scale and the length with an ichthyo-meter. Otoliths are collected in plates and fixed with eukitt mounting medium (AZTI) or in labelled paper envelopes (IEO). Samples for fecundity are collected on board following the WG manual (SIPS 5).

The following material is used for the analysis of the samples in the laboratory:

1. For histology: Automatic processor; paraffin dispenser; microtome; termofin bath; cold plate; automatic stainer; oven and HEMA (2-hydroxyethyl methacrylate) resine, microtome, thermostatic plate, hematoxylin-eosin staining, eukitt mounting medium.
2. For reading histological sections and whole mount samples: Microscopes with camera; the open software 'ImageJ' is used for fecundity and atresia analysis, following the protocol agreed by the group and described in SIPS 5.
3. For studying simple eggs on board: Stereo microscopes; mobile suction and filtration units.
4. For egg analysis in the laboratory: Binocular microscopes. Folsom plankton sub-sampler
5. For image exchange, a high-precision scanner

The results of the egg and fecundity analysis should be submitted to the survey data coordinators, using the updated excel spread sheets, within a month of the end of each cruise. These excel templates for the data entry of the plankton and fecundity data will be distributed by the survey coordinators prior to the surveys commencing.

Data capture documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation'(https://doi.org/10.17895/ices.pub.5139).

Quality checks documentation:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140. Section 9.

SISP 5- Manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation'(https://doi.org/10.17895/ices.pub.5139).

Data storage

National database:

There is no specific national database for egg and larvae data nor for fecundity data

International database:

https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx#:~:text=The%20Eggs%20and%20Larvae%20database,to%20the%20ichthyoplankton%20survey%20data.

ICES fecundity database will be available soon.

Quality checks and data validation documentation:

https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx#:~:text=The%20Eggs%20and%20Larvae%20database,to%20the%20ichthyoplankton%20survey%20data.

Sample storage

Storage description:

The standard **plankton samples** collected for the SSB estimates will be handled carefully and preserved as soon as practicable. The recommended procedure will be as follows:

a) Remove the end bag used on the station before washing down the net.

b) Attach a clean end bag and gently wash down the net from both ends of the sampler, taking care to wash the lower surface of the net just in front of the end bucket.

c) Always wash down from the nose cone.

d) Make sure the net is clean, using more than one end bag if necessary.

e) Make doubly sure that a clean end bag is left on the sampler ready for the next station.

f) Wash the plankton from the end bags into a jar with the 4% formaldehyde solution in a wash bottle.

g) Top up the jar with 4% formaldehyde, making sure that the volume of plankton does not exceed 50% of the volume of the jar.

h) Any excess sample should be fixed separately in additional jars.

i) Label jars with station details and put labels containing same details in pencil into all jars.

The standard fixative for use on these surveys will be a 4% solution of buffered (pH 7 - 8) formaldehyde in either distilled or freshwater. (420g of sodium acetate trihydrate is dissolved in 10 litres of 4% formaldehyde, ICES, 2001). The sample should be directly fixed with the addition of the 4% formaldehyde solution and should not come into contact with formaldehyde strength in excess of 4%. The volume of plankton in the sample jar must never exceed 50% of the volume of the jar. Excess sample should be fixed separately in additional jars.

The store is the ICES warehouse at the IEO Vigo oceanographic centre and and in AZTI Pasaia warehouse in closed and labeled plastic jars placed on shelves in labeled boxes (plankton samples preserved in formaldehyde 4%)

The sampling protocol as well as the egg analysis criteria is defined in the SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

Mackerel ovary samples are collected and immediately preserved in formaldehyde solution in containers properly tagged. In the laboratory, a section of the ovary is cut for histology and the remaining ovarian tissue is retained until the end of the collection

year. After the analysis, oocyte whole mount subsamples are stored for 3 (AZTI) or 5 (IEO) years in 3.6% formaldehyde. Later, a portion of ovary from a selection of samples is stored as a permanent collection. These samples are stored in 3.6% formaldehyde in closed and labeled plastic jars placed on shelves in labeled cardboard boxes. Histological sections and cassettes of all individuals analyzed are also kept permanently. The store is the ICES warehouse at the IEO Vigo oceanographic centre and at AZTI Pasaia centre's warehouse.

Sample analysis.

The sampling protocol as well as the analysis criteria is defined in the 'SISP 5- manual for mackerel and horse mackerel egg surveys (MEGS): AEPM and DEPM fecundity and atresia estimation'

Data processing

Evaluation of data accuracy (bias and precision):

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel. Series of ICES Survey Protocols SISP 5. 89 pp.(https://doi.org/10.17895/ices.pub.5139).

Editing and imputation methods

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel. Series of ICES Survey Protocols SISP 5. 89 pp.(https://doi.org/10.17895/ices.pub.5139).

Quality document associated to a dataset:

SISP 6- Manual for mackerel and horse mackerel egg surveys, sampling at sea. Series of ICES Survey Protocols. 82 pp. http://doi.org/10.17895/ices.pub.5140

SISP 5- Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel. Series of ICES Survey Protocols SISP 5. 89 pp.(https://doi.org/10.17895/ices.pub.5139).

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

SAMPLING SCHEME IDENTIFIER: SAHMAS

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: SAHMAS

Sampling scheme type: SciObsAtSea

Observation type: Research Survey at Sea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at recording the speciphic length and weight composition of the pelagic hauls used for echo-traces identification for the following pelagic fish species: *Sardina pilchardus, Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Micromesistius poutassou, Boops boops, Capros aper, Scomber colias*, and other species susceptible of being acoustically assessed. In addition, biological samplings of the target species are carried out (see WP Table 2.2 and ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2).

Description of the population

Population targeted:

The main target species are: *Sardina pilchardus, Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Micromesistius poutassou, Scomber colias, Boops boops* and *Capros aper*. (See Text Box 2.6). The survey area corresponds to the Northern of the Iberian Peninsula shelf waters (ICES Sub-Divisions 9aN and Division 8c).

Population sampled:

This acoustic-trawl survey is a multispecies one surveying the Northern Iberian Peninsula species in Spring. The sampled fractions of the target populations will be those ones inhabiting the shelf waters. The timing and spatial coverage of this SAHMAS spring survey have been defined to achieve containment of the target population at the survey mesoscale, which is achieved for the target species: sardine, blue whiting, boarfish and chub macherel. Not synoptic coverage and/or lack of biological information for some stock components such as anchovy, Atlantic mackerel or horse mackerel, because because they are distributed in waters of the continental slope not sampled by survey. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2).

Stratification:

The study area is stratified in 6 geographical strata: Eastern Cantabrian (8cEe), Central Cantabrian (up to the *Peñas* Cape), Western Cantabrian (up to *Estaca de Bares*), Artabre Gulf (8cW), *Rias Baixas* (9aN), and *Rias Baixas* shelf (9aN) waters.

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic since the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS). Fishes from the target species (see table 2.2) are biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached). Then, the other individuals are measured until a representative length distribution is obtained for each species. (See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2).

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

NA.

Regional coordination:

Y. Sampling design and protocols were developed in the framework of the WGACEGG.

Link to sampling design documentation:

See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.2).

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into consideration and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into consideration and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number and location of hauls result in a relatively high sampling coverage of the Northern Iberian Peninsula SPF community.

Data capture

Means of data capture:

Length distributions are carried out by means of a measuring board. Weights of both the catches and the individual specimens are taken from marine scales, which register a maximum weight of 60, 12 and 2 kg respectively; accurately: ± 100 ± 10 and ± 2g respectively).

Biological samples are collected and stored onboard. Data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized onboard.

Data capture documentation:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.3

Quality checks documentation:

Data quality control (QC) checks and validations are performed for all spring surveys. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , section 2.1.6)

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

NA.

Quality checks and data validation documentation:

No documentation targeting quality checks.

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

Sample storage

Storage description:

The otoliths of almost all these species, are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres where the samples will be processed: Coruña, Vigo, and Santander. These pieces are stored systematically, without expiration date.

When the histological processing of the gonads is necessary, both the gonadal tissue samples included in paraffin blocks, as the slides with their respective histological sections, are also carefully kept and systematically stored in their respective places, where they remain indefinitely.

Sample analysis:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , sections 2.1.3 & 2.1.4.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of any species such as mackerel or horse mackerel for maturity ogives, missing maturity percentages are imputed from historical data.

Quality document associated to a dataset:

N

Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user?

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462 , sections 2.1.6.

SAMPLING SCHEME IDENTIFIER: SDEPM

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: SDEPM

Sampling scheme type: SciObsAtSea

Observation type: Research survey at sea

Time period of validity: from 2022 until 2027

Short description (max 100 words).

Adaptive sampling scheme aiming at collecting ichthyoplankton samples with PairoVET and CUFES samplers in a pre-defined grid of sampling stations along transects perpendicular to the coast for next pelagic species included in Table 2.2 of the WP: ***Sardina pilchardus*** (target species), *Engraulis encrasicolus, Scomber scombrus, Trachurus trachurus.* Simultaneously to Ichthyoplankton samples, CTDF casts, and fishing hauls are undertaken over the entire spawning region. The survey is coordinated with PELACUS acoustic survey during which the fishing hauls to estimate the adult parameters (sex ratio, female weight, batch fecundity and spawning fraction) needed to apply the DEPM are carried out.

Description of the population

Population targeted:

The main target specie from a survey perspective is *Sardine pilchardus* and the main survey area is ICES divisions 8.c and 9.a North -Cantabrian Sea and Atlantic Iberian waters- for the sardine stock pil 27.8c9a.The Spanish survey (National name SAREVA) covers the northern area of the stock from the Spanish-Portuguese northern border to the Spanish-French Atlantic waters limit.

Population sampled:

The target population will be sampled in a triennial basis. To obtain spawning stock biomass of sardine, the SDEPM survey is directed at egg abundance and spawning area definition for daily egg production determination and at adult sampling for daily fecundity calculation. Timing for surveying is the peak spawning period of the targeted specie; accordingly, the survey is carried out in March/April in northern Spanish waters. All surveys covered under the auspices of ICES WGACEGG (Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic) are considered ecosystem surveys and data collection is not limited to the target species alone.

Stratification:

As part of the Iberian DEPM survey for sardine (*Sardina pilchardus*), two surveys are carried out every three years by Portugal (IPMA; PT-DEMP-PIL) and Spain (IEO; SAREVA). The total spawning biomass from the two DEPM surveys is used in the assessment such as fishery independent index for the sardine stock pil.27.8c9a (ICES divisions 8.c and 9.a -Cantabrian Sea and Atlantic Iberian waters).

Three geographical strata are considered for the sardine stock pil.27.8c9a data analyses according to biological/ecological reasons: i) South (9a S), from the Strait of Gibraltar to Cape St. Vicente; ii) West (9a W), from Cape St. Vicente to the border between northern Portugal and Spain (Minho river) and iii) North (9a N & 8c), from the Spanish-Portuguese northern border to the Spanish-French Atlantic waters limit.

Sampling design and protocols

Sampling design description:

The sampling allocation is defined according to the life cycle component of the specie to be sampled:

For the ichthyoplankton component of the population, a grid of transects along which the fixed stations of (PairoVET) sampling are located and an adaptive design has also been applied with the aid of the auxiliary CUFES, the use of which helps in delimiting sardine spawning areas and adapting the sampling intensity and the offshore limit of PairoVET sampling.

For the adult component of the population; fishing hauls are undertaken for the estimation of adult parameters (sex ratio, female weight, batch fecundity, and spawning fraction) within the mature component of the sardine population. Surveying for adults takes place simultaneously with ichthyoplankton sampling. Fishing hauls should be distributed over the surveyed region according to fish abundance distribution. The number of samples and their spatial distribution is thus organized to ensure good and homogeneous coverage of the survey area and an adequate representation of population demography and distribution. Fishing hauls are conducted by pelagic trawling, following the detection of species schools by echosounder.

For logistical reasons, the adult samples for the DEPM that would correspond to SAREVA survey will be taken in the PELACUS survey, which coincides in time and space. In addition, complementary fish market sampling will be carried out.

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

NA

Regional coordination:

The sardine DEPM surveys have been carried out triennially since 1999 in a collaborative work between Portugal (Instituto Portugués do Mar e da Atmosfera, IPMA) and Spain (Instituto Español de Oceanografía, IEO) what led to increased coordination and standardisation of the surveys and analytical methodologies.

Link to sampling design documentation:

SDEPM survey sampling design is described in ICES Cooperative Research Report 332. Section 2.1.2.

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

Compliance with international recommendations:

Y. The sampling design of the SDEPM is in line with international recommendations. Survey is planned and coordinated under the framework of the ICES WGACEGG (Working Group on Acoustic and Egg Surveys for Small Pelagic Fish in NE Atlantic)

Link to sampling protocol documentation:

SDEPM survey sampling protocol is described in ICES Cooperative Research Report 332:

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

Compliance with international recommendations:

Y. The sampling protocol documentation of the SDEPM is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGACEGG.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

The adaptive design applied to ichthyoplankton sampling, the fact that the surveying for adults takes place simultaneously with ichthyoplankton sampling and the fishing hauls should be distributed over the surveyed region according to fish abundance distribution, should guarantee an adequate sampling for the application of the DEPM.

Data capture

Means of data capture:

For the fixed stations of ichthyoplankton (PairoVET), date, time, position (GPS), sampling and bottom depth data, cable released and flowmeter readings are registered on paper and transcribed to spreadsheet as soon as possible. Data for the CUFES sampling is registered electronically with a tailored software/hardware system connected to GPS and data are subsequently uploaded to the spreadsheet database.

Specific software consists of modular, menu-driven routines for acquisition, display, processing, and archiving of oceanographic data acquired with Sea-Bird equipment is used for the profiles of temperature, salinity and fluorescence.

Data for fishing hauls undertaken from PELACUS are captured on paper and transcribed to the IEO SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") database as soon as possible.

Data capture documentation:

SDEPM survey data capture is described in ICES Cooperative Research Report 332:

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

Quality checks documentation:

No documentation targeting quality checks. Analysis and detection of errors in data acquisition are carried out graphically using expert judgment, creating common graphs such as maps, scatter plots, histograms, box plots in R with (ggplot2

package), etc. Checks are usually carried out at the end of the sampling and also by analyzing certain relationships between parameters.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

Oceanographic data: IODE/SeaDataNet

To achieve the combination at a regional scale of the data from the DEPM and acoustic surveys, the ichthyoplankton and oceanographic data for each survey are block-averaged on a common spatial grid. On this grid it is possible to represent all variables (environmental parameters, egg and fish concentrations, top predators, plankton, etc.) and to structure a common database. A series of gridded data files are created by blocking the raw data from each survey institution, and available parameter.

Gridded data files are stored and available for download from the ICES website via the WGACEGG page or using the following link:

https://community.ices.dk/ExpertGroups/wgacegg/SitePages/HomePage.aspx?RootFolder=%2FExpertGroups%2Fwgacegg%2F2020%20Meeting%20Documents%2F06%2E%20Data&FolderCTID=0x012000F34CB92CB4CD3D4EA424ADBDEF7439AC&View=%7B3F76DBAE%2DB730%2D4E27%2DADE7%2D87D6C20FE3C5%7D

Quality checks and data validation documentation:.

Documentation for gridded data files can be found in ICES Cooperative Research Report 332.

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

Sample storage

Storage description:

Ichthyoplankton samples (PairoVET and CUFES) are preserved in buffered formaldehyde at 4% (sodium tetraborate) and stored in appropriately labelled containers. Once at the laboratory, after samples having been sorted, indentified and quantified, samples are preserved in individual containers with folmaldehyde at 4%, labelled and stored on the shelves of the ICES warehouse at the IEO Vigo oceanographic center. Ichthyoplankton samples are kept permanently.

Sardine otoliths, extracted on board PELACUS survey, after having been photographed for aging, are stored in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO Vigo oceanographic center i. These pieces are stored systematically without expiration data.

Sardine gonads (the two lobes of the ovary) collected on PELACUS survey are immediately preserved in formaldehyde solution in individual containers properly tagged. In the laboratory ovary sections are taken for histological processing and 3 subsamples (0.75 mg) extracted for fecundity calculation. The remaining ovary tissue is retained until the end of the year. A piece of ovary from selected samples is stored in 3.6% formaldehyde in closed and labeled plastic jars placed on shelves in labeled cardboard boxes and kept as a permanent collection. Histological sections and cassettes of all individuals studied are also kept permanently. The store place is the ICES warehouse at the IEO Vigo oceanographic centre.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

A description for ichthyoplankton and adults sample analysis can be found in ICES Cooperative Research Report 332.

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

Data processing

Evaluation of data accuracy (bias and precision):

N. Compare acoustic and DEPM biomass estimates of anchovy and sardine and evaluate their respective bias and precision with a view to providing improved data to stock assessment WGs, is included as a term of reference on the ICES WGACEGG and it is expected to be implemented on the next two years.

Editing and imputation methods:

N.

Quality document associated to a dataset

N

Validation of the final dataset:

Datasets are checked before providing to end-user analysing and detecting errors with a protocol for data exploration using packages and routines from R software (http://www.R-project.org).

SAMPLING SCHEME IDENTIFIER: UWTV30

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: UWTV30

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words)

The main objective of UWTV30 survey is the estimation of Norway lobster (*Nephrops norvegicus*) abundance using a sled with an Ultra HD camera and based on the identification and quantification of *Nephrops* burrow density from underwater footage over a known area of the species distribution. Survey design follows a randomized isometric grid of stations at 3,5 nm spacing. Transects have 10 minutes long that correspond to about 200 m swept.

Description of the population

Population targeted:

The target specie from the UWTV30 survey is the Norway lobster (*Nephrops norvegicus*) and the main survey area is ICES Division 9.a, FU 30 (Gulf of Cadiz) for the stock nep.fu.30. The UWTV30 survey (ISUNEPCA) covers the *Nephrops* distribution on the Spanish waters in the Gulf of Cadiz from 130 to 650 m of depth approximately.

Population sampled:

The target population will be sampled in a yearly basis. The UWTV30 survey is directed at *Nephrops norvergicus*. Timing for surveying is June. It can be considered an ecosystem survey because underwater images are used to collecting ancillary information about other benthic mega-fauna species, litter and trawl marks. In addition, oceanographic data are also collected using a CTD using a CTD on the sled. In addition, opportunistic sampling to beam trawl and dredge box-corer if the timing is available in order to verify different species on the footages and know the type of sediment on the area, respectively.

Stratification:

No stratification is considered.

Sampling design and protocols

Sampling design description:

The UWTV designs followed a randomized isometric grid. The distance between stations and the Nephrops ground perimeter was updated in 2023. The Andalusia Regional Government monitoring system (2009) toghether with the sales notes, information obtained from the bottom trawl survey index time series (SpSGFS-cspr-WIBTS-Q1 (G7511) and SpGFS-caut-WIBTS-Q4 (G4309)) (1994-2020 period), beam trawl and sediment samples obtained in the ISUNEPCA UWTV survey (U9111) during 2017–2019, as well as, the more detailed seabed morphology information and new information about the relationship between sediments and habitats in the Gulf of Cadiz were used to delimit the border of the Nephrops distribution. The area coverage is 2332,13 Km2. The sampling grid with stations spacing 3.5 nm is used to ensure good coverage and accurate burrow surfaces.

The sled, once stable on the seabed, is towed at between 0.6-0.7 knots in order to obtain the best possible conditions for counting burrows and 10 good minutes are recorded. This time corresponds to 200 m swept, approximately. HiPAP transponder on the sled is used to obtain the sled position. The distance over ground estimate (DOG) is calculated using the sled position and the field of view of the video footage is 75 cm (FOV), which is confirmed using fun lasers.

Is the sampling design compliant with the 4S principle

NA

Regional coordination:

N.

Link to sampling design documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp. Section 3.1.1 & Annex 1.

https://doi.org/10.17895/ices.pub.8014.

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370

Compliance with international recommendations:

Y. The sampling design of the UWTV30 survey is in line with international recommendations. Survey is planned and coordinated under the framework of the ICES WGNEPS (Working Group on *Nephrops* Surveys).

Link to sampling protocol documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

https://doi.org/10.17895/ices.pub.8014

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370.

Compliance with international recommendations:

Y. The sampling protocol documentation of the UWTV30 survey is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGNEPS.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA.

Data capture

Means of data capture:

The sled used to collect underwater images is a stainless-steel structure AISI 316L where all equipments are mounted. This equipment has a HD life camera, 4K UHD recording camera in a angle of 45°, 2 photo cameras (20 Mpixel) which can be use in order to obtain the same scene since two different angles, 4 spotlights with independent intensity control, 3 point lasers forming a triangle of 70 mm side inside of the recording camera cylinder and 2 fun lasers on the structure to confirm the field of view (FOV) whose distance can be graduated between 30 cm and 1 m (FOV used 75 cm), battery to power the equipments, CTD, altimeter and a desk unit in order to control the whole of system (see figure 1).







Figure 1. Sled and desk unit used in UWTV30 surveys.

For each station, date, time, vessel position (GPS), sled position (HiPAP) and depth are recorded during the track (10 minutes) by the software/hardware system in the desk unit. In addition, initial and final data are register also on paper. Footage and data files are downloaded in a hard disc drive after each dive. Oceanographic data is recorded during the track and stored by the CTD. CTD data are downloaded in a hard disc drive after each dive.

Footages are viewed with a laptop and Ultra HD screen using VLC media player software. *Nephrops* burrows counts and ancillary information is recorded on paper and computerizes as soon as possible.

Data capture documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

https://doi.org/10.17895/ices.pub.8014

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370.

Quality checks documentation:

Y.

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp. Sections 3.1.8, 3.2.7

https://doi.org/10.17895/ices.pub.8014

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370.

Data storage

National database:

There is no specific national database for *Nephrops* UWTV surveys data.

International database:

There is no specific international database for *Nephrops* UWTV surveys data.

ICES WGNEPS recently includes a ToR about the needed to develop of an international database for *Nephrops* UWTV surveys data which will hold burrow counts, ground shape files and associated data. The first steps just have been given.

Quality checks and data validation documentation:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

https://doi.org/10.17895/ices.pub.8014

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370.

Sample storage

Storage description:

Footages, telemetry and CTD data are stored in two hard disc drives during the survey and in a network attached storage (NAS) drive in the lab when the survey is finalized.

Sample analysis:

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp. Section 5.

https://doi.org/10.17895/ices.pub.8014

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370.

Data processing

Evaluation of data accuracy (bias and precision):

Dobby, H., Doyle, J., Jónasson, J., Jonsson, P., Leocádio, A., Lordan, C., Weetman, A., and Wieland, K. 2021. ICES Survey Protocols – Manual for *Nephrops* underwater TV surveys, coordinated under ICES Working Group on *Nephrops* Surveys (WGNEPS). ICES Techniques in Marine Environmental Sciences Vol. 65. 44 pp.

https://doi.org/10.17895/ices.pub.8014

Leocádio, A., Weetman, A., and Wieland, K. (Eds). 2018. Using UWTV surveys to assess and advise on *Nephrops* stocks. ICES Cooperative Research Report No. 340. 49 pp.

https://doi.org/10.17895/ices.pub.4370.

Editing and imputation methods:

N

Quality document associated to a dataset:

N

Validation of the final dataset:

Using the quality checks of the ICES UWTV surveys

SAMPLING SCHEME IDENTIFIER: FCGS

MS: ESP

Region: Other Regions

Sampling scheme identifier: FCGS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The objective of the survey is to know the stock status of target species: their abundance, biomass and demographic structure and the hydrographical and environmental conditions on the Flemish Cap Bank (NAFO Division 3M).

Description of the population

Population targeted:

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

Area: Flemish Cap Bank (NAFO Regulatory Area Division 3M). Flemish Cap is entirely outside any 200-mile EEZ, and the exploitation of its resources is regulated by the NAFO.

Dates: The survey starts in the second half of June, and needs 35 days at sea.

Population sampled:

All fish, cephalopods, shrimp and non-commercial invertebrates.

Flemish Cap is an isolated bank on the American continental shelf, with an approximated surface of 17 000 squared nautical miles within the 1460 m (800 fathoms) isobath and 10 555 within the 730 m (400 fathoms). Flemish Pass, an area deeper than 1000 m, separates it from the Newfoundland Grand Bank and gives it its isolated character by limiting the migration of many species, particularly those occurring in the shallowest zones.

The trawling gear used is the Lofoten and the cod-end mesh size is 35 mm. An auxiliary net bag of 10 mm mesh size is used to retain the youngest individuals of shrimp escaping throw a small square of the cod-end

Stratification:

Random stratified survey of the Flemish Cap area until 1460 m (800 fathoms) depth, making 181 bottom trawl hauls with a Lofoten fishing gear, at daytime: between 6:00 and 22:00, and 30 minutes effective fishing time.

The adopted stratification of Flemish Cap (Table 1) considers 19 strata up to 730 m (400 fathoms) depth. Stratification was later extended to cover up to 1460 m (800 fathoms) depth, considering 39 strata. Two strata of this bank (numbers 26 and 27) have fishing grounds unsuitable for trawling due to the huge abundance of sponges, and the same goes for the five strata belonging to the Beothuk Knoll (numbers 35–39) due, presumably, to the massive presence of corals.

All these strata have been removed from the survey, resulting in the current 32 strata surveyed. Each stratum is divided in rectangles of equal area. i.e. the number of rectangles is proportional to the stratum area. A total of 478 rectangles are therefore considered in the current survey design. Each rectangle is in turn divided in 10 fishing units of equal area, leading to 4780 possible bottom trawl fishing hauls.

Table 1. Specification and characteristics of the survey area, and number of selected hauls.

	Area sq. miles	Strata	Rectangles	Fishing units	Selected hauls
depth < 730 m	10 555	19	309	3 090	120
depth: 730–1 460 m	5 515	13	169	1 690	61
Total	16 070	32	478	4 780	181

Sampling design and protocols

Sampling design description:

Type of survey

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

Trawl station methodology

181 hauls will be selected at random, 120 of them in less than 730 m depth.

The selection of the hauls is set with the following conditions:

- The number of hauls in each stratum is fixed, distributed proportionately to the number of units, and ensuring at least two hauls by stratum.
- Hauls (fishing units) are randomly chosen within each stratum with the following constrains: only one haul can be selected within a given rectangle, and two hauls cannot coincide in adjacent fishing units.
- Information from previous surveys and commercial fishing is used to eliminate hauls in unsuitable fishing grounds.
- The allocation of the hauls into each fishing unit could be made more accurate using the bathymetry of the area obtained by the NEREIDA project, reducing the risks of snagging in the bottom.

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

NA

Regional coordination:

No. There is not signed agreement about task sharing.

The survey is carried out by Spain and Portugal and annually there is a joint coordination meeting ad hoc for this survey. (FCCM)

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

Link to sampling design documentation:

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

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 2-13)

Compliance with international recommendations:

Y

Link to sampling protocol documentation

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

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 2-13)

Compliance with international recommendations:

Y

The results of the survey are used by the NAFO Scientific Council to make an assessment on the state of the resources, which is the key tool for the NAFO Commission to take the appropriate management measures.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The criterion used to change the position of a previously selected random haul has always been the information from the commercial fishing and from previous surveys about the suitability of the bottom trawling. This information is contrasted with the more detailed bathymetric charts of the bottom that have been developed in the project NEREIDA.

Criteria for rejecting a haul:

- Snag of the trawling gear in the bottom.
- Damages in the cod-end or severe damages in large sections of the wings or belly.

- Less than 20 minutes of effective trawling time.
- Gear malfunction, i.e., when it is considered that gear contact with bottom was not correct, or the geometry of the gear was not maintained properly through the whole trawl.

Rejected fishing hauls means that, because standard conditions were not achieved, such station cannot be used to quantify the biomass and abundance neither to determine the structure of the population. However, the specimens caught in any non-valid hauls can be used to make all kind of biological sampling.

The order of execution of selected stations is determined during the survey, setting each day the hauls to be held the next day, trying to minimize the routes between stations.

A detailed plan of the order of the stations is impractical because it is necessary to make changes due to unforeseen malfunction of the gear (e.g. obstruction, breakages…).

The distance travelled in each haul is the geographical distance between the GPS positions of the start of the haul (when the gear comes into contact with the bottom and it acquires its characteristic shape) and the start of the haulin (when cable starts to be recovered).

The development of the survey depends on the weather conditions and other factors (breakdowns, gear damages, etc.), so that the final fishing plan is decided on board day to day in order to optimize the use of the working day.

Every year, issues about logistic, sampling plan and protocols are discussed in the coordination meeting (FCCM) (Mar-Apr) previously to the survey (Jun-Jul)

Data capture

Means of data capture:

Trawl hauls

The trawling gear used is the Lofoten and the the cod-end mesh size is 35 mm. An auxiliary net bag of 10 mm mesh size is used to retain the youngest individuals of shrimp escaping throw an small square of the cod-end.

ScanMar and, ITI sensors are used to monitor the gear.

Fishing hauls and Catch Record. A haul's data form is filled in each set. It will contain information gathered in the bridge during and immediately after finishing the haul, as well as catch information by species. This form is available in the sampling area before sorting the catch starts. There are two forms, one for depth < 700 m. and another one for > 700 m. There is a space reserved for sums and calculations. Catch record. All fish species, as well the commercial cephalopods and crustacean are recorded.

Biological data

Length sampling. The length frequency of each species is recorded in separated data forms. Length measurements are made by at least two persons, so that always a person measure and other records. The lengths shall be recorded in the appropriate data form for this purpose After the measurement, it is clearly indicated the beginning and end of the size range and measures are counted and registered the total number of individuals measured by size. For species with sex discrimination, frequencies are recorded in separate columns with indication of the sex on headings.

Biological sampling. In each haul a full biological sampling is done for the most of target species by two observers and always a person measure and other writes down data in the form. Control sheets for each species are available at the beginning of each day based on data collected from previous hauls.

Length data is collected using a measuring board for fish and cephalopods species. For crustaceans, sampling is made using a digital caliper connected to a laptop that records length data automatically to an Excel file.

Weight data is collected using marine scales.

Stomach contents

Stomach sampling. This sampling is done every two years as a minimum, and it is under the exclusive task of two observers that always a person measure and other records data in a specific form. Sampling data is recorded in a specific software of the Trophic Relationships.

Benthos in the trawl

Benthonic invertebrates. Non-commercial invertebrates, sponges and corals among them, are recorded in a specific data form. Catch records are written down in a specific data form where weight and number of each best identified group is noted, as well as any observation. A photographic record is made of the whole invertebrate catch.

Litter items

Marine litter data is registered and written down in the haul´s form for their classification according to the established code. In addition, a photographic record of it is made.

Hydrography-CTD

Temperature and salinity profile using a CTD. The files generated in each station * .hex must be checked and converted to ASCII files by means of the SBD data processing program.

All survey data are captured using specific recording specific paper forms.

All data recorded during the survey are entered in a computer as soon as possible, as data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc software called ARGO. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data capture documentation:

Protocols of the EU bottom trawl survey of Flemish Cap (2014)

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

Survey Plan FCGS 2023

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 2-13)

Quality checks documentation:

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

(See: Validation of Survey Results, pg 14)

All data recorded during the survey are entered in a computer as soon as possible, data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc program, ARGO. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data storage

National database:

National Database: SIRENO (IEO)

Survey Database: ARGO (IIM-CSIC)

Sstomach contents: DataBase Trophic Relationships (IEO)

International database:

VME Indicators: ICES VME database (http://vme.ices.dk)

Hydrography-CTD: IODE/SeaDataNet

Quality checks and data validation documentation:

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

(See: Validation of Survey Results, pg 14)

All data recorded during the survey are entered in a computer as soon as possible, as data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in an ad hoc program, ARGO. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Sample storage

Storage description:

Age

Otoliths collected on board are kept duly labelled waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each species before reading.

Maturity

Gonads collected on board are kept in micro-perforated duly labelled plastic bags that are fixed in formaldehyde solution using a special mask during sample handling. Gonads on board are kept in containers by species.

At the lab, ovary samples are stored in 70º alcohol, in outdoor storage rooms located at labs. . Due to lack of space, only a sample of the gonads that may be of interest for further studies are kept. On the other hand, all of the histological sections and slides are stored.

The samples of otoliths and gonads are stored in the three Institutes of MS participants: IEO and IIM-CSIC (Vigo, Spain) and IPMA (Lisbon, Portugal) in according of the task sharing by species.

Shrimp (*Pandalus borealis*) samples

Additional samples are taken for study in laboratory to calculate the length-weight relationship. These samples are frozen on board. Samples are taken from all strata. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) until they are sampled.

Benthonic invertebrates

All specimens of less frequent species are retained, particularly those from species not included in the invertebrates' identification cards or those with uncertain or incomplete classification. Samples are stored in plastic bags, labelled with survey, haul and species, and they are preserved in the appropriate conservation media. (alcohol and formalin).

Taxonomy

If some species are not identified on board, individuals are labelled, frozen and stored in boxes for their study in the lab. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) until they are identified by experts.

Sample analysis:

To improve the quality of the maturity data, a workshop is held prior to the surveys in NAFO waters to review the different maturity stages of the main bony fish species, and of sharks and rays both oviparous and ovoviviparous.

Maturity manuals for each of the species are available onboard to scientific staff for each species. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes sampled in the study area. The gonad is shown inside the fish as seen in biological sampling, and also outside the fish and in detail. Those stages for which photographs of individuals captured in the study area are not available are illustrated with photographs of the reports of the ICES maturity workshops that were carried out for the correspondent species.

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

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo22-281.pdf

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Survey Plan FCGS 2023

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 2-13)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Data processing

Evaluation of data accuracy (bias and precision):

Y

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

(See: Data analysis, pg 13)

Editing and imputation methods:

Y

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

(See: Data analysis, pg 13)

Quality document associated to a dataset:

N

Validation of the final dataset:

Final datasets are validated taking into account the guidelines and formats of SC- NAFO.

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

(See: Validation of Survey Results, pg 14)

SAMPLING SCHEME IDENTIFIER: PLATUXA_ESP

MS: ESP

Region: Other Regions

Sampling scheme identifier: PLATUXA_ESP

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The main objectives of the survey are the estimation of abundance and biomass index of the target species, as well as the knowledge of their population demographic structure and the oceanographic conditions on the Grand Bank (NAFO Regulatory Area Div. 3NO and 3L).

The survey is divided in two parts:

- 1st part Div 3NO. National Name of the research survey: Platuxa
- 2nd part Div 3L. National Name of the research survey: Fletán Negro 3L

Description of the population

Population targeted:

1st part Div 3NO: Platuxa

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

Area: NAFO Regulatory Area Div. 3NO.

Dates: The survey starts in the second half of May, and needs 30 days at sea including sailing days.

2nd part Div 3L: Fletán Negro 3L

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

Area: NAFO Regulatory Area Division 3L (Flemish Pass).

Dates: The survey starts in the second half of July, and needs 28 days at sea including sailing days

The area of both surveys is entirely outside any 200-mile EEZ, and the exploitation of its resources is regulated by the NAFO.

Population sampled:

All fishes, cephalopods, shrimp and non-commercial invertebrates.

The 1st part of the survey (Platuxa) is carried out between the lines of the Canadian EEZ and 46º 00´N and 46º 30´W. The depth range of the fishing hauls is from 57 to 1281 m.

The 2nd part of the survey (Fletán Negro 3L) is carried out between the lines of the Canadian EEZ and 46º 00´N and 48º 30´W. The depth range of the fishing hauls is from 93 to 1463 m.

The trawling gear used is a Campelen 1800 type and the cod-end mesh size is 44 mm.

Stratification:

Apart from the geographical and temporal stratification described in the section “Population targeted”

The stratification reflects the bathymetric profile of the Bank, with large strata in the shallow area and very narrow strata in the cliff. The strata are divided into units with an approximate area of 35 nm2, which in turn are divided into 10 cells of about 3 nm2. These cells are the units on which the sampling is based.

Depending on the extent of each stratum, between 2 and 20 cells per stratum are randomly selected for fishing hauls. For the subsequent statistical analysis of the data, it is essential that there be a minimum of two hauls per stratum.

Sampling design and protocols

Sampling design description:

Type of survey

Stratified random sampling scheme, diurnal Bottom trawl fishing hauls from 6 am to 9.30 pm with an average hauling time of 30 minutes. The trawling gear used is the 'Campelen 1800'. Hydrographic profiles by haul are taken with a CTD.

Trawl station methodology

The selection of the hauls is set with the following conditions:

- The number of hauls in each stratum is fixed, distributed proportionately to the number of units, and ensuring at least two hauls by stratum.
- Hauls (fishing units) are randomly chosen within each stratum with the following constrains: only one haul can be selected within a given rectangle, and two hauls cannot coincide in adjacent fishing units.
- Information from previous surveys and commercial fishing is used to eliminate hauls in unsuitable fishing grounds.
- The allocation of the hauls into each fishing unit could be made more accurate using the bathymetry of the area obtained by the NEREIDA project, reducing the risks of snagging in the bottom.

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

NA

Regional coordination:

No

Link to sampling design documentation:

Manual:

https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan:

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo22-281.pdf

Compliance with international recommendations:

Y

The results of the survey are used by the NAFO Scientific Council to make an assessment on the state of the resources, which is the key tool for the NAFO Commission to take the appropriate management measures.

Link to sampling protocol documentation:

Manual:

https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan:

https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

Compliance with international recommendations:

Y

The results of the FCGS are used by the NAFO Scientific Council to make an assessment on the state of the resources, which is the key tool for the NAFO Commission to take the appropriate management measures.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The fishing hauls plan to be carried out during each annual survey is planned prior to it. However, the progress of the survey may require some changes in the planned hauls.

Moving any of the hauls initially planned in the fishing plan is acceptable as long as the number of hauls per stratum is maintained. For statistical reasons, in extreme situations that impede the normal development of the survey and force the elimination of hauls, it is necessary to try to achieve a minimum of two hauls per stratum, being preferable to leave some strata unsampled rather than having only one sample per stratum. If the situation permits, the elimination of strata from the fishing plan should consider the hauls in previous years in these strata, so that the strata eliminated are those with the least annual variability.

The fishing hauls are standardized, and to be valid they require a speed of 3.0 knots and an effective trawl duration of 30 minutes, controlled by the sensors located on the rig and the doors (SCANMAR and ITI). The start point is defined as the point when the vertical and horizontal openings of the gear stabilize after having made firm. Fishing ends when the gear loses contact with the bottom.

Criteria for rejecting a haul:

- Snag of the trawling gear in the bottom.
- Damages in the cod-end or severe damages in large sections of the wings or belly.
- Less than 20 minutes of effective trawling time.
- Gear malfunction

The development of the survey depends on the weather conditions and other factors (breakdowns, gear damages, etc.), so that the final fishing plan is decided on board day to day in order to optimize the use of the working day.

Data capture

Means of data capture:

Trawl hauls

The trawling gear used is the Campelen 1800 type and the cod-end mesh size is 44 mm ScanMar and, ITI sensors are used to monitor the gear.

Fishing hauls and Catch Record. A haul's data form is filled in each set. It will contain information gathered in the bridge during and immediately after finishing the haul, as well as catch information by species. This form is available in the sampling area before sorting the catch starts. Catch record. All fish species, as well the commercial cephalopods and crustacean are recorded.

Biological data

Length sampling. The length frequency of each species is recorded in separated data forms. Length measurements are made by at least two persons, so that always a person measure and other records. The lengths shall be recorded in the appropriate data form for this purpose After the measurement, it is clearly indicated the beginning and end of the size range and measures are counted and registered the total number of individuals measured by size. For species with sex discrimination, frequencies are recorded in separate columns with indication of the sex on headings.

Biological sampling. In each haul a full biological sampling is done for the most of target species by two observers and always a person measure and other writes down data in the form.

Control sheets for each species are available at the beginning of each day based on data collected from previous hauls.

Length data is collected using a measuring board for fish and cephalopods species. For crustaceans, sampling is made using a digital caliper connected to a laptop that records length data automatically to an Excel file.

Weight data is collected using marine scales.

Stomach contents

Stomach sampling. This sampling is done every two years as a minimum, and it is under the exclusive task of two observers that always a person measure and other records data in a specific form. Sampling data is recorded in specific software of the Trophic Relationships.

Benthos in the trawl

Benthonic invertebrates. Non-commercial invertebrates, sponges and corals among them, are recorded in a specific data form. Catch records are written down in a specific data form where weight and number of each best identified group is noted, as well as any observation. A photographic record is made of the whole invertebrate catch.

Litter items

Marine litter data is registered and written down in the haul´s form for their classification according to the established code. In addition, a photographic record of it is made.

Hydrography-CTD

Temperature and salinity profile using a CTD. The files generated in each station * .hex must be checked and converted to ASCII files by means of the SBD data processing program.

All survey data are captured using specific recording specific paper forms.

All data recorded during the survey are entered in a computer as soon as possible, as data is validated and potential errors corrected in an easy way. The data collected each day is always inputted before the next day work starts, to allow updating control of samples already taken.

After stored, data from each fishing haul will be printed to verify that the stored information is equal to that in the forms. Printing formats should be similar to that of the forms in use.

Data are stored and initially managed in ad-hoc software called LEJANAS.CAM. The system provides a reliable way of data storage and elaboration of results, as well as the possibility of transferring data to any other programs.

Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data capture documentation:

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Quality checks documentation:

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

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Once they are corrected, they are transferred to the shared database SIRENO, which is managed by the IEO.

Data storage

National database:

National Database: SIRENO (IEO)

Survey Database: ARGO (IIM-CSIC)

Sstomach contents: DataBase Trophic Relationships (IEO)

International database:

VME Indicators: ICES VME database (http://vme.ices.dk)

Hydrography-CTD: IODE/SeaDataNet

Quality checks and data validation documentation:

All data collected is recorded on specific paper forms and then it is recorded in the computer system as described previously. The verification of the stored data follows the following steps:

1. The data of each fishing haul, once recorded, are listed to verify that the data indicated is the same as that which appears in the forms. For this, complete lists with formats similar to each of the forms will be available.

2. At the end of the survey: the length-weight ratio of each species is updated and possible discrepancies between length and weight are checked. If the discrepancy is due to a rectifiable error, it will be corrected in the original form in another colour, to recognize the original item and the corrected.

3. For each species, using the best available length-to-weight ratio, the weight of the sample corresponding to each of the length measurements is recalculated. The discrepancies between the indicated sample weight and the recalculated weight cannot be greater than 15%.

The results of the survey are presented annually to the NAFO Scientific Council in several documents.

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Sample storage

Storage description:

Age

Otoliths collected on board are kept duly labelled waxed paper envelopes and later in the laboratory they are classified and stored in boxes for each species before reading.

Maturity

Gonads collected on board are kept in micro-perforated duly labelled plastic bags that are fixed in formaldehyde solution using a special mask during sample handling. Gonads on board are kept in containers by species.

At the lab, ovary samples are stored in 70º alcohol, in outdoor storage rooms located at labs. Due to lack of space, only a sample of the gonads that may be of interest for further studies are kept. On the other hand, all of the histological sections and slides are stored.

The samples of otoliths and gonads are stored in the lab (IEO: C.O. Vigo)

Shrimp (*Pandalus borealis*) samples

Additional samples are taken for study in laboratory to calculate the length-weight relationship. These samples are frozen on board. Samples are taken from all strata. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) until they are sampled.

Benthonic invertebrates

All specimens of less frequent species are retained, particularly those from species not included in the invertebrates' identification cards or those with uncertain or incomplete classification. Samples are stored in plastic bags, labelled with survey, haul and species, and they are preserved in the appropriate conservation media (alcohol and formalin) and kept in containers. The samples are stored in the lab (IEO: C.O. Vigo) to be sampled by experts.

Taxonomy

If some species are not identified on board, individuals are labelled, frozen and stored in boxes for their study in the lab. After the survey samples are stored in freezers at the lab (IEO: C.O. Vigo) to be sampled by experts.

Sample analysis:

To improve the quality of the maturity data, a workshop is held prior to the surveys in NAFO waters to review the different maturity stages of the main bony fish species, and of sharks and rays both oviparous and ovoviviparous.

Maturity manuals for each of the species are available onboard to scientific staff for each species. Each maturity stage characteristics are explained and illustrated with photographs taken of individuals of different sizes sampled in the study area.

The gonad is shown inside the fish as seen in biological sampling, and also outside the fish and in detail. Those stages for which photographs of individuals captured in the study area are not available are illustrated with photographs of the reports of the ICES maturity workshops that were carried out for the correspondent species.

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Manual ESP_IEO_P5_AtSea_Maturity (Spanish)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Data processing

Evaluation of data accuracy (bias and precision):

Y

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Editing and imputation methods:

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

Quality document associated to a dataset:

No

Validation of the final dataset:

Final datasets are validated taking into consideration the guidelines and formats of SC- NAFO.

Manual: https://digital.csic.es/bitstream/10261/328269/8/PROTOCOLO%20CAMPANIA%203LNO%20GROUNDFISH%20SURVEY_v2-revision%20enero%202013%20%282%29.pdf (Spanish).

2023 Survey Plan: https://www.nafo.int/Portals/0/PDFs/Fisheries/ResearchVessel/nafo23-051.pdf (pag. 14-41)

http://www.ieo.es/es_ES/web/ieo/pndb (section P5: Prospección y evaluación de recursos pesqueros en aguas lejanas)

SAMPLING SCHEME IDENTIFIER: BIOMAN

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: BIOMAN

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words).

BIOMAN survey, carried out annually in May since 1987, follows and adaptative sampling scheme to collect ichthyoplankton (PairoVET & CUFES samplers) and adult samples (pelagic trawl) as well as hydrographic data (CTDF) to estimate total biomass index for anchovy and sardine in the Bay of Biscay applying the DEPM. Eggs and adults' parameters are estimated to apply this method. Those results are used in the assessment of these species. Moreover, ecosystem variables are obtained to produce indicators following the Marine Strategy Directive for an ecosystem survey approach such as: zooplankton distribution and abundances (size and spp), eDNA water analysis, sightings, microplastics abundances and distribution.

Description of the population

Population targeted:

The target species are anchovy and sardine. The main survey area are ICES subdivisions 8abcd

Population sampled:

The pelagic species anchovy and sardine are the target species and the stock within the Bay of Biscay (ICES 8abcd) is surveyed.

Stratification:

NA

Sampling design and protocols

Sampling design description:

In 1987 a study was done for the egg sampling design (Petitgas et al 1987). Since then, the strategy of egg sampling was identical, i.e. a systematic central sampling scheme with random origin and sampling intensity depending on the egg abundance found (Motos, 1994). Stations were located at intervals of 3 nm along 15 nm apart transects, perpendicular to the coast. In areas of high abundances of eggs, the transects were 7.5 nm apart.

The adult samples are obtained on board R/V Emma Bardán (pelagic trawler) coinciding in space and time with the plankton sampling. When the plankton vessel encountered areas with anchovy or sardine eggs, the R/V Emma Bardán was directed to those areas to fish. In the area near the slope, in the north-west of the French shelf, few samples are collected aboard the R/V Vizconde de Eza, which is responsible for collecting the plankton samples and onboard the R/V Thalassa

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

NA

Regional coordination:

The BIOMAN surveys have been carried out since 1987. In WGACEGG since 19_ coordination and standardization of the DEPM surveys and analytical methodologies within this WG was carried out. The protocol can be found at (see link below)

Link to sampling design documentation:

BIOMAN survey sampling is described in ICES Cooperative Research Report 332.

https://doi.org/10.17895/ices.pub.4599

Compliance with international recommendations:.

Y. The sampling design of BIOMAN survey is in line with international recommendations. Survey is planned and coordinated under the framework of the ICES WGACEGG (Working Group on Acoustic and Egg Surveys for small pelagic fish in NE Atlantic)

Link to sampling protocol documentation:

BIOMAN survey sampling protocol is described in ICES Cooperative Research Report 332:

https://doi.org/10.17895/ices.pub.4599

Compliance with international recommendations:

Yes. The sampling protocol documentation of BIOMAN survey is in line with international recommendations. Survey sampling protocol is standardized under the framework of the ICES WGACEGG.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

An adequate sampling for the application of the DEPM is guaranteed due to the adaptative sampling carried out. For ichthyoplankton to guarantee the sampling of the spawning area, the transects are extended in the oceanic zone until no anchovy or sardine egg is encountered at least during 9 nm. In the Cantabric coast the west limit is considered when a complete transect is found with 0 eggs. To the North the limit is the 8a limit (48ºN). For the adults, the pelagic trawler coincides in space and time with the plankton sampling. When areas with anchovy or sardine eggs are encountered by the vessel sampling ichthyoplankton, the pelagic trawler is directed to those areas to fish. In that manner, the fishing trawls are distributed over the survey area according to fish abundance distribution. When the vessel fishing adults due to different issues can not fish in some areas, is the ichthyoplankton vessel that fish and in some years, some samples are obtained from the R/V Thalassa or samples from the purse seine fleet are used.

Data capture

Means of data capture:

Ichthyoplankton data:

- For PairoVET stations, date, time, position (GPS), sampling and bottom depth data, cable released, and flowmeter readings are registered on a paper and transcribed to a spreadsheet as soon as possible. Sample depth, temperature, salinity, and fluorescence profiles were obtained at each sampling station using a CTD RBR-XR420 coupled to the PairoVET. Those data are downloaded directly to the computer.
- The CUFES system had a CTD to record simultaneously temperature and salinity at 3 m depth, a flowmeter to measure the volume of the filtered water, a fluorimeter, and a GPS (Geographical Position System) to provide sampling position and time. All these data are registered at real time using the integrated EDAS (Environmental Data Acquisition System) with custom software.

For adult data:

- The fishing hauls data are registered on a paper and transcribed to a spreadsheet as soon as possible.

For sightings:

- data are registered on a paper and transcribed to a spreadsheet as soon as possible

For neuston net (microplastics), eDNA, chlorophyll or other nets, data are registered on a paper and transcribed to a spreadsheet as soon as possible.

For acoustics:

- data are recorded directly on the computer and later saved on a hard disk

For zooplankton:

- data are recorded automatically in the computer after pass the sample through the flowcam macro system

Data capture documentation:

BIOMAN survey data capture is described in:

https://doi.org/10.17895/ices.pub.4599

and

Santos, M, Uriarte, A., Ibaibarriaga, L., 2011. Spawning Stock Biomass estimates of the Bay of Biscay anchovy (Engraulis encrasicolus, L.) in 2010 applying the Daily Egg Production Method. 18(5): 76-91.

The maturity scale for anchovy and sardine is based on the one adopted at WKSPMAT (ICES Working Group, Report 20078)

The eDNA procedures can be seen at: Canals, O., Mendibil, I., Santos, M., Irigoien, X. and Rodríguez-Ezpeleta, N. 2021. Vertical stratification of environmental DNA in the open ocean captures ecological patterns and behavior of deep-sea fishes. Limnology and Oceanography Letters. doi: 10.1002/lol2.10213

The procedures for sightings can be seen at Louzao, M., García-Barón, I., Rubio, A., Martínez, U., Vázquez, J.A., Murcia, J.L., Nogueira, E., Boyra, G. 2019. Understanding pelagic seabird 3D environment from multidisciplinary oceanographic cruises to advance ecosystem-based monitoring. Marine Ecology Progress Series 617-618: 199-219.

Quality checks documentation:

No documentation targeting quality checks. Analysis and detection of errors in data acquisition are carried out graphically using expert judgment, creating common graphs such as maps, scatter plots, histograms, box plots in R with (ggplot2 package), etc. Checks are usually carried out at the end of the sampling by analyzing certain relationships between parameters.

Data storage

National database:

NA

International database:

To achieve the combination at a regional scale of the data from the DEPM and acoustic surveys, the ichthyoplankton and oceanographic data for each survey are block-averaged on a common spatial grid. On this grid it is possible to represent all variables (environmental parameters, egg and fish concentrations, top predators, plankton, etc.) and to structure a common database. A series of gridded data files are created by blocking the raw data from each survey institution, and available parameters.

Gridded data files are stored and available at ICES WGACEGG sharepoint:

Quality checks and data validation documentation:

Documentation for gridded data files can be found at ICES Cooperative Research Report 332.

https://doi.org/10.17895/ices.pub.4599

Sample storage

Storage description:

At sea, plankton samples (PairoVET and CUFES) are preserved in buffered formaldehyde at 4% (sodium tetraborate) and stored in labelled containers. At sea eggs are sorted, identified (anchovy, sardine, *Maurolicus muelleri* and the rest of the eggs) and quantified. Once on land at AZTI Pasaia laboratory, plankton samples and eggs are stored on the shelves at AZTI Pasaia warehouses. Ichthyoplankton samples are kept permanently. Samples from 1987 to 2024 are kept atAZTI Pasaia.

At sea anchovy and sardine are measure, weight, sex and the otoliths are extracted. These are kept in black plaques by pairs. Once on land at AZTI Pasaia laboratory, otoliths are fixed and read and afterwards stored at the laboratory. They are stored without expiration date

At sea anchovy and sardine ovaries (the two lobes) are preserved in buffered formaldehyde at 4% (sodium tetraborate) in individual labelled containers. Once on land at AZTI Pasaia, in the laboratory ovary sections are taken for histological processing to estimate the Spawning fraction (S) and 3 subsamples (0.05 g) extracted for batch fecundity estimation. The remaining ovary tissues and cassettes of all individuals studied are kept for 3 years. Afterwards are discarded. Histological sections are store permanently at the laboratory at AZTI Pasaia

Sample analysis:

A description for ichthyoplankton and adults sample analysis can be found in ICES Cooperative Research Report 332.

https://doi.org/10.17895/ices.pub.4599

Data processing
Evaluation of data accuracy (bias and precision): Y. In each working document Santos et al and the year, at the WGACEGG report of each year, the values of the Standard error and coefficient of variation are calculated for each parameter estimate to obtain the total biomasfor anchovy and sardine. i.e: DOI: 10.13140/RG.2.2.10327.24485 **Editing and imputation methods:**. The documentation will be available each year in November at the ices site and in research gate ie: for 2023, DOI: 10.13140/RG.2.2.10327.24485 **Quality document associated to a dataset:** Not yet **Validation of the final dataset:** The datasets are validated at the ICES WGACEGG before sending the data to the assessment WGHANSA

SAMPLING SCHEME IDENTIFIER: JUVENA_ESP

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: JUVENA_ESP

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The project JUVENA aims at estimating the abundance of the pelagic community, with emphasis on anchovy juvenile population as an early estimator of recruitment, with trawl-acoustic methodology in the Bay of Biscay at the end of the summer every year. The survey is coordinated between AZTI and IEO. AZTI leads the assessment studies and IEO leads the ecological studies. The methodology used to estimate the abundance of juvenile anchovy is the acoustic-trawl methodology. Details of the methodology of the JUVENA surveys were described by Boyra et al (2013).

References: Boyra, G., Martınez, U., Cotano, U., Santos, M., Irigoien, X., and Uriarte, A. 2013. Acoustic surveys for juvenile anchovy in the Bay of Biscay: abundance estimate as an indicator of the next year's recruitment and spatial distribution patterns. ICES Journal of Marine Science, 70: 1354–1368.

Description of the population

Population targeted:

The sampling area coverS the waters of the Bay of Biscay (being 7º15' W and 47º50' N the limits, Figure 1), ICES subdivision 8 a, b, c and d2. Main target species is juvenile anchovy (*Engraules encrasicolus*). Other target species include adult anchovy, and the rest of the pelagic community in the Bay of Biscay: sardine *Sardina pilchardus* and chub mackerel *Scomber colias,* mackerel *Scomber scombrus,* horse mackerel *Trachurus trachurus,* Mediterranean horse mackerel *Trachurus mediterraneus*, and bogue *Boops boops*. blue whiting *Micromesistius poutassou*, boarfish *Capros aper*, and pearlside *Maurolicus muelleri*.

Population sampled:

This acoustic-trawl survey is a multispecies one surveying the Bay of Biscay neritic small pelagic fish species in Autumn. The sampled fractions of the target populations will be those ones inhabiting the shelf and slope waters coinciding with distribution of juvenile anchovy, i.e., tipically between 20-2000 m depth isobaths. The water column is sampled from 10 m to 500 m depth. Pelagic hauls providing biological samples are performed whenever changes are detected in echo-traces, and according to the survey time constraints (Doray *et al*., 2021).

Stratification:

At size- and at-age-abundance and biomass estimates are calculated in post-stratification regions, which are defined as areas with homogeneous species and size composition.

Sampling design and protocols

Sampling design description:

The acoustic sampling is performed during the daytime in two oceanographic vessels. The vessels follow parallel transects, spaced 15 n.mi., perpendicular to the coast along the sampling area, taking into consideration the expected spatial distribution of anchovy juveniles for these dates, that is, crossing the continental shelf in their way to the coast from offshore waters (Uriarte et al. 2001; Boyra et al., 2016). The transects cover fully the continental shelf and are enlarged in a semi-adaptive sampling design until at least 9 nautical miles (half the inter-transect distance) empty of anchovy is achieved.

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

NA.

Regional coordination:

Y. The JUVENA survey sampling design and methodology is coordinated every year under the ICES WGACEGG.

Link to sampling design documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462.

Compliance with international recommendations:

Yes. The JUVENA survey sampling design and methodology is coordinated and supervised every year under the ICES WGACEGG Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462.

Compliance with international recommendations:

Yes. The JUVENA survey sampling protocol is coordinated and supervised every year under the ICES WGACEGG Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints.

Data capture

Means of data capture:

Survey data are collected by research vessels equipped with downward-facing echosounders (Simrad EK60 ir EK80 of 38 kHz frequency) mounted on the ship's hull, on a drop keel, or on a pole mounted on the side of the vessel. In situ on-axis calibration of the echosounders is performed before or after each survey, using standard methodology (Demer et al., 2015).

Midwater trawling (using a Hampidjan Gloria HOD 352 midwater pelagic trawl) is performed to identify acoustic targets and to assess the species and length composition of echotraces. In order to monitor the net opening, fishing depth, and fishing efficiency, all pelagic trawls are equipped with a net sounder (Marport Trawl Eye or Simrad FS70 systems) and door sensors. Trawl vertical opening varies from 10 to 15 m and minimum mesh size is 4 mm. The typical towing speed ranges from 3.5 to 4.5 knots through water. Trawl catches do not allow for the identification of single schools but are generally considered representative of fish schools observed over 2–3 nautical mile portions of the linear transects. Sampling levels for target species comprise weight, otolith, maturity and gender for anchovy (10 individuals per length class per haul), and length for all the species (100 individuals or until clear modes are obtained) using measuring board (0.5 cm resolution for anchovy and pearlside; 1 cm for the rest).

Data capture documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462.

Quality checks documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp.

https://doi.org/10.17895/ices.pub.7462.

Data storage

National database:

JUVENA data will be stored in the ICES acoustic database in December 2021.

International database:

https://www.ices.dk/data/data-portals/Pages/acoustic.aspx

Quality checks and data validation documentation:

https://www.ices.dk/data/data-portals/Pages/acoustic.aspx

Sample storage

Storage description:

The otoliths of almost all these species are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of AZTI where the samplings have been carried out: Pasaia and Sukarrieta. These pieces are stored systematically, without expiration date.

Sample analysis:

Data processing

Evaluation of data accuracy (bias and precision):

No.

Editing and imputation methods:

No.

Quality document associated to a dataset:

No

Validation of the final dataset:

Using the quality checks of the ICES acoustic database.

SAMPLING SCHEME IDENTIFIER: PALPRO_ESP

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: PALPRO_ESP

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Research Survey at Sea aiming at collecting data on biodiversity and biomass estimates and biological samples of the most deep-water representative species. It also tests the suitability of the commercial longline fishing gear (for dee-water sharks) modified for scientific surveys. The DST sensors installed in the main line allows to set an accurate soak time for each haul and are used to calculate fishing effort and CPUE by haul.

Description of the population

Population targeted:

As the objective is to collect information about the biodiversity of the continental shelf (ICES Division 8c) around the Basque Country, target species include all the fauna present in the area at depths between 650 and 2250 meters, with special attention on sharks and teleost fishes.

Population sampled:

All species caught in the hooks are sampled. Nevertheless, the gear uses a big hook (Mustad Model 7690-9/0) and therefore only big fishes are caught and sampled. As the gear is deployed at depths higher than 650 meters not too much individuals are expected, so every single individual arriving onboard is sampled.

Stratification:

The Bay of Biscay is located in the North-east Atlantic Ocean, in waters belonging to Spain and France. Below 4500m depth, there is an abyssal plain with some submarine mountains that rise up, often aligned in an east–west direction, reaching a height of 2000 m above the abyssal plains. The sampling stations

are located in an area 10.5 km north of Cape Matxitxako in a narrow canyon of about 28 km long that progressively decreases in depth from 500 to 2500 m. The hauls cover the whole depth range along the canyon valley in four 400 m strata: 650–1050 m, 1051–1450 m, 1451–1850m and 1851–2250m.

The stratification is based on 400m intervals following the profile of the canyon valley.

Sampling design and protocols

Sampling design description:

The experimental design is implemented to estimate and assess the inter-annual variation of the abundance and biomass indices of the deep-water ichthyofauna in the area of study. To get homogeneous and comparable data series, the hauls are carried out every year in the same position and period, covering depths from 650 to 2400 m. The stratification is based on 400m intervals following the profile of the canyon valley. A modified former commercial bottom longline fishing gear, specific

for deep-water sharks, is adapted for the survey. The gear uses 300 hooks (Mustad Model 7690-9/0), and the soak time is set at 4 h (STECF, 2013). The fishing gear consists of 150 hooks in contact with the bottom, and 150 hooks in a floating section, all of them baited with a third of Atlantic mackerel (*Scomber scombrus*)

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

NA

Regional coordination:

N

Link to sampling design documentation:

A description of the sampling design and the results of previous surveys are available in: Diez G, Arregi L, Basterretxea M, Cuende E, Oyarzabal I (2021). Preliminary observations on abundance and distribution of fish fauna in a canyon of the Bay of Biscay (ICES Division 8c). Journal of the Marine Biological Association of the United Kingdom 101, 169–178.

Compliance with international recommendations:

Y (ICES WGEF)

Link to sampling protocol documentation:

In 2020, 2021, 2023 and 2024 it was presented a Working Document in the ICES WGEF summarizing the biomass and abundance index.

In 2024 it was presented a Working Document in the ICES WGDEEP summarizing the biomass and abundance index.

Compliance with international recommendations:

Y (ICES WGEF)

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

NA

Data capture

Means of data capture:

Sampled fishes are measured with a measuring board and biological samples are collected and stored in a freezer onboard.

There is a specific software for the data collected by the DST sensors, which is analysed onboard.

Data capture documentation:

Results of previous surveys are available through of the annual report which is available upon request:

G. Díez, L. A. Errazkin ,M. Basterretxea, I Oyarzabal, E. Cuendes,A. Maceira, A. Abaroa,. 2019. Campaña piloto de palangre de profundidad para la estima de abundancia de tiburones y otras especies en la 8c (PALPROF 2020).

They can also be found in Diez et al. 2021

Quality checks documentation:

No

Data storage

National database:

NA

International database:

The series of data haave been presented and included in the Report of the ICES WGEF 2020 for the 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 2020 to data.call@ices.dk for answering the Joint OSPAR and NEAFC Request for data and metadata to be used as the basis to answer the for advice on deep sea sharks, rays and chimaeras. The aim of this request was intended to localize and record data across all countries with records on species from annex 1 from national or international coordinated surveys in order to to provide valuable information before the WKSHARK-6 meeting hold in January 2020.

Quality checks and data validation documentation:

The quality of collected data is checked with expert knowledge and comparing with data from previous years.

Sample storage

Storage description:

Biological samples (soft tissues) are stored in a freezer, inside plastic bags.

Sample analysis:

Data processing

Evaluation of data accuracy (bias and precision):

No

Editing and imputation methods:

NA

Quality document associated to a dataset:

Yes

Diez et al, 2021

Validation of the final dataset:

NA

SAMPLING SCHEME IDENTIFIER: MEDIAS

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: MEDIAS

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The main objective of the research survey at sea MEDIAS (Mediterranean International Acoustic Survey) is to evaluate the abundance, biomass and distribution of small pelagic stocks by means of scientific echosounders (direct method), independently of the data provided by commercial fisheries (indirect method).

Description of the population

Population targeted:

The population targeted are sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) small pelagic stocks in GSAs 1, 5 and 6.

See MEDIAS handbook (April 2021)

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

Population sampled:

The species object of study and data collection are sardine and anchovy, although the accompanying pelagic community detected with scientific echo sounders is also studied

See MEDIAS handbook(April 2021)

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

Stratification:

The level of stratification is geographic strata according to GSAs (1, 5 and 6), covering the continental shelf area (from 30 to 250 m depth).

Sampling design and protocols

Sampling design description:

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

A calibrated EK80 (Simrad) scientific echosounder is used, equiped with five frequencies (18, 38, 70, 120 and 200 kHz), for the collection of acoustic data. The frequency for assessment is 38 kHz, while the 18, 70, 120 and 200 kHz operate as complementary frequencies. The elementary distance sampling unit (EDSU) is 1 nautical mile. The fish density values are obtained as NASC (Nautical Acoustic Scattering Coefficient) (m2/mn2) values.

Opportunistic pelagic hauls are carried out in order to ground truth the fish echotraces detected by the echosounder. Target species of the MEDIAS surveys are anchovy and sardine, for wich abundance (nº individuals), biomass (tons) are estimated by length, sex and age but biological data for all species in the pelagic community regarding length frequency distribution and length-weight relationships are also acquired. Hidrological variables are collected by CTD's.

See MEDIAS handbook(April 2021)/fish sampling

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

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

NA

Regional coordination:

Y. MS participating are Spain, France, Greece, Croatia, Italy, Malta and Slovenia.

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Link to sampling design documentation:

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Compliance with international recommendations:

Y

Link to sampling protocol documentation

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

During the survey, hauls are adaptive, only when echotraces (schools) appear and need to be identified.

MEDIAS handbook(April 2021) http://www.medias-project.eu/medias/website/

Data capture

Means of data capture:

Biological data (pelagic hauls) are acquired by means of pelagic gears *63.5/51* and *63.5/54*; vertical opening: 16-18 m; with a cod-end mesh size of 20 mm.

The netsonder FS20/25 (Simrad) is used to monitor the correct shape of the net's mouth as well as the entering of schools through the net mouth.

The MARPORT system is used to monitor the arrival and departure of the net from near the seabed, to estimate its horizontal and vertical openings, water temperature and salinity as well as to confirm the arrival of schools to the fishing net codend.

MEDIAS handbook (April 2021) http://www.medias-project.eu/medias/website/

All data of the haul (positions, depth and velocity, as well as species list, length distributions and biological data of species in the catch) are captured on paper. All data are keyed on board into the excel database.

The treatment of catches are detailed in the MEDIAS handbook (April 2021) http://www.medias-project.eu/medias/website/

Weight of all species in the caught, as well as for individuals of the MEDIAS reference list of target species, are registered with marine scales. Length measurements of fish and cephalopods are taken with ichtyometers, while calipers are used for crustaceans.

Data capture documentation:

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

Quality checks documentation:

Y

First, the information collected on paper is computerized by two people who do a first check of the data, correcting errors on the paper and comparing the information. Then, a cross-validation is carried out by a different pair to detect any failures in the data entry. Finally, the data is refined and filtered by an expert scientist to detect possible outliers.

Data storage

National database:

There is no specific national database

International database:

There is no specific international database.

Quality checks and data validation documentation:

The data validation is carried out once the initial data (paper) have been computerized and double checked. The data validation process consists of identifying outliers through exploratory statistical analyzes such as box-plot and verifying that the estimated biological parameters (height, weight, sex ratio ...) are within the dynamic confidence intervals established for the historical series of surveys.

Sample storage

Storage description:

The otoliths are stored in black plastic plates, mounted on non-plastic transparent resin (Eukitt or similar), duly labelled. The pieces are stored systematically in boxes made by hand expressly for each survey, where the plates can be placed vertically, preventing the dust from deteriorating the samples, without expiration date.

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

Sample analysis:

Otoliths reading of Engraulis encrasicolus and Sardina pilchardus:

-Villamor, B, Navarro, M.R., Hernández, C, Riveiro, I., Meixide, M., Landa, J., Dueñas, C., Antolinez, A., Barrado, J., Peleteiro, M.E., Otero, R., Loureiro, I., Lopez, E. 2014. Age determination procedures on small and medium pelagic species in Spanish Institute of Oceanography (IEO). Int. Doc. IEO, 40 pp.

-ICES. 2010. Report of the Workshop on Age reading of European anchovy (WKARA), 9-13 November 2009, Sicily, Italy. ICES CM 2009/ACOM:43. 122 pp

-WKARA 2008/2/ACOM43. Criteria for age estimation of anchovy otoliths in the Alborán Sea (Western Mediterranean Sea) based on the monitoring of the hyaline edge formation. [WKARA]

Mazara del Vallo, Italy, 9–14 November 2009

-ICES. 2017. Report of the Workshop on Age estimation of European anchovy (Engraulis encrasicolus). WKARA2 2016 Report 28 November - 2 December 2016. Pasaia, Spain. ICES CM 2016/SSGIEOM:17. 223 pp.

-ICES. 2014. Workshop on micro increment daily growth in European Anchovy and Sardine (WKMIAS), 21-25 October 2013, Mazara del Vallo, Sicily. ICES CM 2013/ACOM:51. 153 pp.

-ICES. 2011. Report of the Workshop on Age Reading of European Atlantic Sardine (WKARAS), 14-18 February 2011, Lisbon, Portugal. ICES CM 2011/ACOM:42. 91 pp.

-ICES. 2019. Workshop on Age Reading of European Sardine (Sardina pilchardus) (NE Atlantic and Mediterranean) (WKARAS2). ICES Scientific Reports. 1:70. 83 pp.

http://doi.org/10.17895/ices.pub.5678

Data processing

Evaluation of data accuracy (bias and precision):

A script in R to calculate geostatistical CV associated with biomass estimates from acoustic survey, based on Walline et al. (2007), has been created by Marco Barra (CNR) and tested by all MEDIAS groups. This procedure is considered mandatory to calculate geostatistical CV to be provided along with acoustic estimates.

See MEDIAS handbook(April 2021)/survey design http://www.medias-project.eu/medias/website/

Editing and imputation methods:

NA

Quality document associated to a dataset:

N

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/

SAMPLING SCHEME IDENTIFIER: MEDITS

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: MEDITS

Sampling scheme type: Research survey at sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The main objective of the research survey at sea MEDITS is to evaluate the abundance and distribution of demersal stocks, independently of the data provided by commercial fisheries, and to assess the impact of the fishing activity on the environment.

Description of the population

Population targeted:

The population targeted are demersal fishes, decapods crustaceans and cephalopods in GSAs 1, 2, 5 and 6.

See MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Population sampled:

Since 2012, the MEDITS reference list of target species includes 82 demersal species, 32 of them are elasmobranches.

See Annex VI of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Stratification:

Two levels of stratification: (1srt) geographic strata according to GSAs and, within some of them, zones limited by lines more or less perpendicular to the coast, depending on the geographical characteristics of each area; (2on) five bathymetric strata within each GSA or zone (10-50 m, 51-100 m, 101-200 m, 201-500 m and 501-800 m).

See Annex II of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Sampling design and protocols

Sampling design description:

The hauls are positioned following a depth stratified sampling scheme with random drawing of the positions within each stratum. The number of positions in each stratum is proportional to the area of these strata. Except in the case of peculiar problems (e.g. damages noted in previous years), the hauls are made in the same position from year to year.

See Section 2.3 of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

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

NA

Regional coordination:

Y. MS participating are Albania, Cyprus, Spain, France, Greece, Croatia, Italy, Malta, Montenegro and Slovenia.

See Table 1 and Annex I of MEDITS handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Link to sampling design documentation:

MEDITS Handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

MEDITS Handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Compliance with international recommendations: Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination

groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

If needed, the sampling re-allocations are made to adjacent fishing grounds of the bottom trawl fleet in the GSAs 1, 2, 5 and 6, mapped from Satellite-based Vessel Monitoring System (VMS).

Data capture

Means of data capture:

The gear GOC-73 is a bottom trawl designed for experimental fishing, with a cod-end mesh size of 20 mm. The MARPORT system is used to monitor the arrival and departure of the net from the seabed and to estimate its horizontal and vertical openings. The bottom water temperature and salinity is recorded with the use of a CTD SBE-37, coupled to the flotsam of the net.

See Section 1 and Annex XVI of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm.

All data of the haul (positions, depth and velocity, as well as species list, length distributions and biological data of species in the catch) are captured on paper. All data are keyed on board into the SIRENO database.

The treatment of catches are detailed in the MEDITS Handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm.

Weight of all species in the caught, as well as for individuals of the MEDITS reference list of target species, are registered with marine scales. Length measurements of fish and cephalopods are taken with ichtyometers, while calipers are used for crustaceans.

Data capture documentation:

MEDITS Handbook v.9 (2017): http://www.sibm.it/MEDITS%202011/principale%20project.htm

Quality checks documentation:

Y. Firstly, the information collected on paper is compared with the keyed data on board. Secondly, the ROME software is used for checking the data compiled in the 5 files types used to store and exchange MEDITS data: TA, TB, TC, TE and TL.

See Sections 5.2 and 5.3 of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm

The ROME software to perform multiple check of MEDITS data can be download from:

http://www.coispa.it/index.php?option=com_content&view=article&id=34&Itemid=119&lang=it#block

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

There is no specific international database.

Quality checks and data validation documentation:

The ROME software to perform multiple check of MEDITS data can be download from:

http://www.coispa.it/index.php?option=com_content&view=article&id=34&Itemid=119&lang=it#block

Sample storage

Storage description:

The otoliths and ilicia are stored dry in boxes, duly labelled, at the IEO oceanographic centers where age reading is carried out: Centro Oceanográfico de Málaga, Centro Oceanográfico de Murcia and Centro Oceanográfico de Baleares. These pieces are stored systematically, without expiration date.

See Annex XIV of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm

Stomach contents sampling is made on board and at the Laboratory. In that case, individual stomachs are preserved in ethanol and whole specimens are stored frozen.

Specimens of taxonomic interest are deposited in the Marine Fauna Collection based at the Centro Oceanográfico de Málaga (IEO): http://www.ma.ieo.es/cfm/

Sample analysis:

Otoliths reading of *Mullus barbatus* and *M. surmuletus*:

Mahé, K., Elleboode, R., Charilaou, C., Ligas, A., Carbonara, P. and Intini, S. 2012. Striped red mullet (Mullus surmuletus) and red mullet (M. barbatus) otolith and scale exchange 2011, 30 pp.

http://www.coispa.it/docs/Red%20mullet%202012.pdf.

Mahé K., Anastasopoulou A., Bekas P., Carbonara P., Casciaro L., Charilaou C., Elleboode R., Gonzalez N., Guijarro B., Indennidate A., Kousteni V., Massaro A., Mytilineou C., Ordines F., Palmisano M., Panfili M. and Pesci P., 2016. Report of the Striped red mullet (Mullus surmuletus) and Red mullet (Mullus barbatus) Exchange 2016, 21pp.

https://archimer.ifremer.fr/doc/00348/45922/45615.pdf.

Carbonara P., W. Zupa, A. Anastasopoulou, A. Bellodi, I. Bitetto, C. Charilaou, A. Chatzispyrou, R. Elleboode, A. Esteban, M.C. Follesa, I. Isajlovic, A. Jadaud, C. García-Ruiz, A. Giannakaki, B. Guijarro, S.E. Kiparissis, A. Ligas, K. Mahé, A. Massaro, D. Medvesek, C. Mytilineou, F. Ordines, P. Pesci, C. Porcu, P. Peristeraki, I. Thasitis, P. Torres, M.T. Spedicato, A. Tursi and L. Sion.- 2019. Explorative analysis on red mullet (Mullus barbatus) ageing data variability in the Mediterranean. Scientia Marina, 83S1: 271-279.

https://doi.org/10.3989/scimar.04999.19A.

OTOLITHS READING OF MERLUCCIUS MERLUCCIUS:

Report of the Workshop on Age Validation Studies of Gadoids (WKAVSG), 2013:

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKAVSG/WKAVSG%202013.pdf

ILICIA READING OF LOPHIUS BUDEGASSA AND L. PISCATORIUS:

Anglerfish Illicia/Otoliths Ageing Workshop, 2011

https://www.ices.dk/community/Documents/PGCCDBS/Anglerfish%20(Lophius%20piscaorius)%20illicia%20and%20otoliths%20exchange%202011_.pdf

Data processing

Evaluation of data accuracy (bias and precision):

N

Editing and imputation methods:

NA

Quality document associated to a dataset:

N

Validation of the final dataset:

The ROME software is used for checking the data compiled in the 5 files types used to store and exchange MEDITS data: TA, TB, TC, TE and TL.

See Sections 5.2 and 5.3 of MEDITS handbook v.9 (2017):

http://www.sibm.it/MEDITS%202011/principale%20project.htm.

The ROME software to perform multiple check of MEDITS data can be download from:

http://www.coispa.it/index.php?option=com_content&view=article&id=34&Itemid=119&lang=it#block

SAMPLING SCHEME IDENTIFIER: IBTS_Q1

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBTS_Q1

Sampling scheme type: Research survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

The Southern Spanish Groundfish Survey on the Gulf of Cádiz (SP-GCGFS) is con-ducted in the southern part of ICES Division 9a, the Gulf of Cádiz. The covered area extends from 15 m to 800 m depth, during spring (March).

Description of the population

Population targeted:

The survey area corresponds to the Spanish shelf waters of the Gulf of Cadiz (GoC, 20-800 m depth), ICES subdivision 9a South, and it is conducted in **spring** time. The trawl survey is aimed at the estimation of the abundance and biomass of the populations of the main small demersal fish (SPF) inhabiting the GoC neritic waters). The main assessed target species are: hake *Merluccius merluccius*, shrimp *Parapenaeus longirostris*, Octopus *Octopus vulgaris*, Squid *Loligo vulgaris*, Cuttlefish *Sepia officinalis*

Population sampled:

This bottom-trawl survey is a multispecies one surveying the 9aS demersal and benthic fish species in autumn. The sampled fractions of the target populations will be those ones inhabiting the grounds of the shelf between 20-800 m depth isobaths, not weighted to the area since is not considered representative for the whole deep area. The timing and spatial coverage of this survey has been defined to assess abundance of the fish commercial species and the strength of the annual recruitment of species as hake, megrims or anglers.

Stratification:

Then, the whole area (7224 km2) has been separated into five depth strata (15-30, 31-100, 101-200, 201-500 and 501-800 m). The sampling design is random stratified with proportional allocation with a total of 45 fishing stations and swept-area method.

Sampling design and protocols

Sampling design description:

Haul allocation is random avoiding sampling contiguous 5 nm squares, but number of hauls per strata is proportional to the area of the strata, area that is used to obtain abundance weighted to the area of the strata.

The sample/subsample of the catch is selected by a Simple Random Sampling (SRS) though size categories are used in species with large catches and skewed size distribution. Individuals of the selected samples are used to obtain various biological variables are collected until the expected number of samples per size range is reached).

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

NA

Regional coordination:

Y. Sampling design and protocols are developed in the framework of the IBTSWG (ICES working group on International bottom trawl surveys).

PRT, FRA, IRL, GBR, DNK, BEL, DEU, NLD, NOR, SWE

Link to sampling design documentation:

The sampling design is available in the Manual for the International Bottom Trawl Surveys, Section 7.10.1

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

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into consideration and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Manual for the International Bottom Trawl Surveys

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

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into consideration and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

Trawl hauls providing biological samples and the total of muddy and sandy bottoms. The number of trawls (45) in a relatively high sampling coverage of the GoC SPF community.

Data capture

Means of data capture:

A complete report of the methodology and equipment used is available in the Manual of the International Bottom Trawl Surveys in the Western and Southern Areas sections 3 and 7.10

Data capture documentation:

IBTS Western and Southern Areas Manual sections 3 and 7.10

Quality checks documentation:

IBTS Western and Southern Areas Manual section 7.10

Data storage

National database:

SIRENO ("Seguimiento Informático de los Recursos Naturales Oceánicos") is the IEO fisheries and oceanographic Database.

International database:

DATRAS (ICES)

Quality checks and data validation documentation:

No documentation targeting quality checks. Analysis and detection of outliers for biological parameters, their weight-length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with ggplot2 package, etc.

Sample storage

Storage description:

The otoliths are kept in vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres of Cádiz where the samplings are carried out. These pieces are stored systematically, without expiration date.

Sample analysis:

See Annex 1.1 ESP_IEO_P1_Biological_Specific.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement.

Quality document associated to a dataset:

N.

Validation of the final dataset:

The validation of the final information is checked through specific routines developed in R.

SAMPLING SCHEME IDENTIFIER: ECOCADIZ-RECLUTAS

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: ECOCADIZ-RECLUTAS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at collecting biological samples (length, age, weight, sex and maturity variables) from pelagic hauls used for echo-traces identification for the following pelagic fish species included in Table 2.2 of the WP: *Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus and Trachurus mediterraneus.* Age is sampled for anchovy, sardine and chub mackerel only. Biological sampling is used to verify the species and length/age composition/structure of echo-traces during echo-integration. Priority in the biological sampling is given to anchovy, sardine and chub mackerel. Biological sampling is extended. Biological sampling is extended to other species such as *T. picturatus* and *Boops boops*. Length and weight are also recorded for other species susceptible of being acoustically assessed.

Description of the population

Population targeted.

The survey area corresponds to the Portuguese and Spanish shelf waters of the gulf of Cadiz (GoC, 20-200 m depth), ICES subdivision 9a South, and it is conducted in autumn time (in the recent years during the first 20 days in October). The acoustic-trawl survey is aimed at the acoustic estimation of the abundance and biomass of the populations of the main small pelagic fish (SPF) inhabiting the GoC neritic waters, with special emphasis in the anchovy and sardine recruitment (age 0 juvenile fish). The main assessed target species are: anchovy *Engraulis encrasicolus,* sardine *Sardina pilchardus* and chub mackerel *Scomber colias.* The list of assessed target species is extended to: mackerel *Scomber scombrus,* horse mackerel *Trachurus trachurus,* Mediterranean horse mackerel *Trachurus mediterraneus*, blue jack mackerel *Trachurus picturatus* and bogue *Boops boops*. Round sardinella *Sardinella aurita*, blue whiting *Micromesistius poutassou*, boarfish *Capros aper*, long snipefish *Macrorhamphosus scolopax* and pearlside *Maurolicus muelleri* are also acoustically assessed when present.

Population sampled:

This acoustic-trawl survey is a multispecies (recruitment) one surveying the GoC neritic SPF species in autumn. The sampled fractions of the target populations will be those ones inhabiting the shelf waters between 20-200 m depth isobaths. The timing and spatial coverage of this autumn survey has been defined to achieve stock containment of target species at the mesoscale of the survey (and stocks) (Doray *et al*., 2021). Containment is consistently achieved at the survey mesoscale for target species whose survey indices are used in analytical stock assessment (anchovy and sardine). ECOCADIZ_RECLUTAS does not capture the full summer distribution of blue jack mackerel, blue whiting, boarfish, horse mackerel, mackerel, pearlside, and snipefish when present because either the population or at least a component of the population of these species (e.g. larger fish) are distributed in upper continental slope waters not sampled by the survey.

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number (20-25 hauls on average) and location of these hauls results in a relatively high sampling coverage of the GoC SPF community (0.06 hauls per surveyed nautical mile; Doray *et al*., 2021).

Stratification:

The sampling design is not stratified, as SPF species can potentially be distributed over the whole sampling area. Post-stratification regions, where species/size compositions and echo-integrals are assumed to be homogeneous, are further defined for each species to estimate total fish biomass. Acoustic estimates and biological information are usually provided for the Portuguese, Spanish and the whole GoC waters.

Sampling design and protocols

Sampling design description:

The sampling allocation is opportunistic since the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS) of 50

individuals from the sorted catch. The selected sample is entirely biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached).

Is the sampling design compliant with the4S principle?:

NA.

Regional coordination:

Y. Sampling design and protocols were developed in the framework of the WGACEGG.

Link to sampling design documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp. Section 3.1.2

https://doi. org/10.17895/ices.pub.7462.

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. *ICES Techniques in Marine Environmental Sciences* Vol. 64. 100 pp. Section 3.1.3

https://doi. org/10.17895/ices.pub.7462

Compliance with international recommendations:

Y. Most of these species are evaluated by international groups of experts, and their recommendations are taken into account and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA. Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number (20-25 hauls on average) and location of these hauls results in a relatively high sampling coverage of the GoC SPF community.

Data capture

Means of data capture:

Biological data from GoC Engraulis encrasicolus, Sardina pilchardus, Scomber scombrus, Scomber colias, Trachurus trachurus, Trachurus mediterraneus, Trachurus picturatus and Boops boops (from SRS samples of 50 individuals from the catch of pelagic hauls) are captured electronically with a tailored software/hardware system (icrOS) and data are subsequently uploaded to the IEO SIRENO database. The icrOS system simplest hardware setup comprises one or more sampling kiosks and a server connected in a local network. Each of those sampling kiosks is formed by a computer screen, a Raspberry Pi board, a waterproof keyboard and a mouse (**Figure 1**).

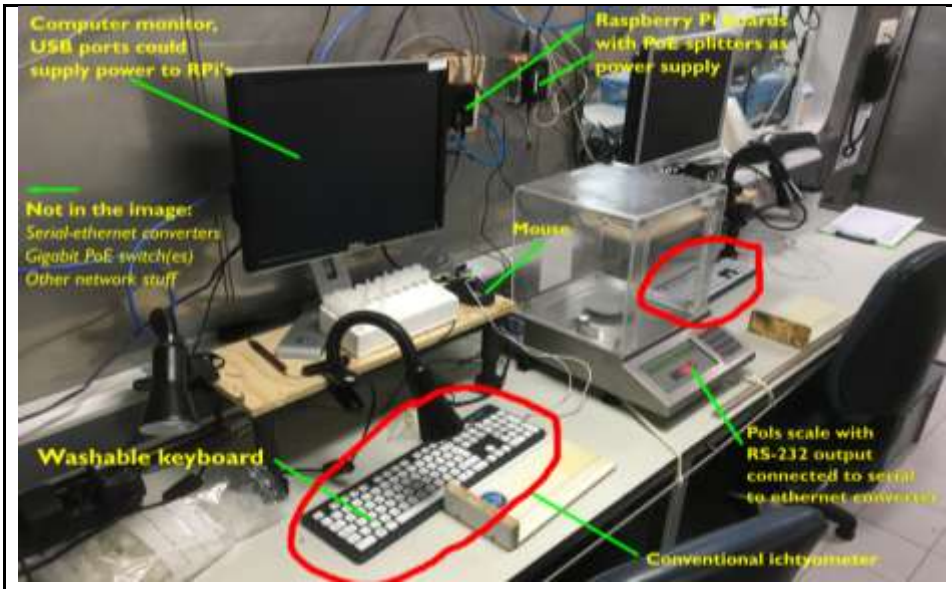


Figure 1. Typical icrOS sampling kiosks setup at R/V Ramón Margalef.

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

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

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

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

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

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

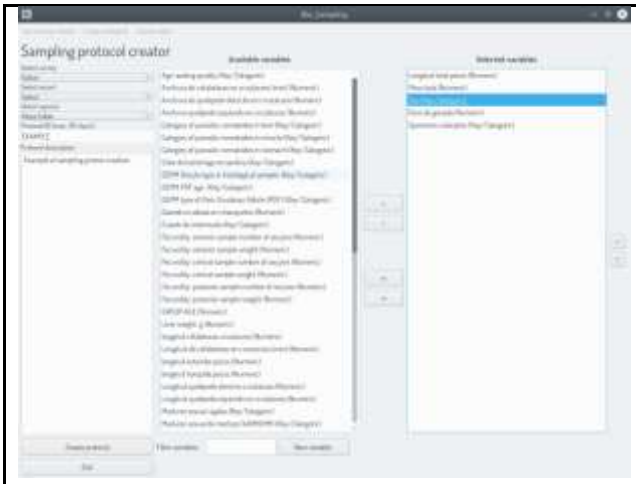


Figure 2. Sampling protocol creator.

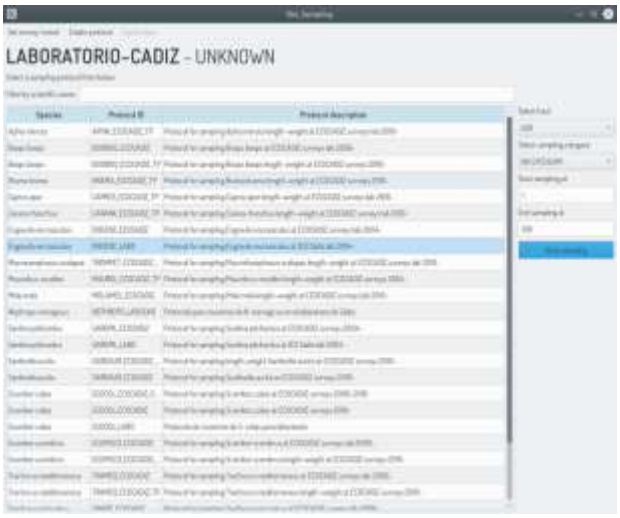


Figure 3. Selection of the sampling protocol.

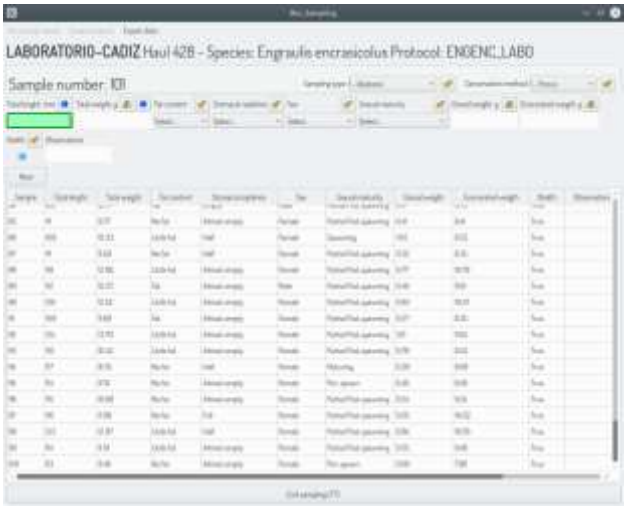


Figure 4. Biological sampling.

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

Data capture documentation:

For the icrOS software/hardware system a first description of the system can be found at ICES WKSEATEC (Workshop on Technical Development to Support Fisheries Data Collection) 2017 Report, pages 16-34 available at

(https://www.ices.dk/publications/library/Pages/default.aspx#Default={%22k%22:%22wkseatec%22,%22r%22:[{%22n%22:%22owstaxIdPublicationYear%22,%22t%22:[%22\%22%C7%82%C7%824c307c233038373263363262652d353934352d343662362d396663642d6565626466664383030666666617c32303137\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null},{%22n%22:%22ReportAcronymOWSCHCS%22,%22t%22:[%22\%22%C7%82%C7%82574b534541544543\%22%22],%22o%22:%22and%22,%22k%22:false,%22m%22:null}]}

However, most recent description of the system can be found in the RCG NANSEA RCG Baltic 2021. Part I Report. 'New data sources and technology'. icrOS. Pgs 38-39. (https://datacollection.jrc.ec.europa.eu/docs/rcg).

Quality checks documentation:

No documentation targeting quality checks.

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

COST.

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

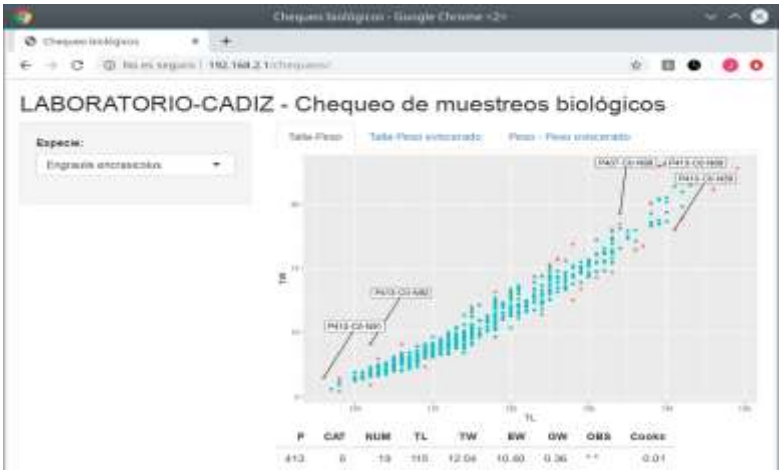


Figure 5. Application for data checking from biological sampling.

Data storage

National database:

SIRENO ("*Seguimiento Informático de los Recursos Naturales Oceánicos*") is the IEO fisheries and oceanographic Database.

International database:

NA.

Quality checks and data validation documentation:

No documentation targeting quality checks.

The icrOS system (GoC SPF species in 9a S), the icrOS system doesn't allow the occurrence of missing values/zeros in those variables defined as mandatory, i.e., total length or total weight. Analysis and detection of outliers for biological parameters, their weight–length relationships and ranges are carried out graphically using expert judgment, creating common graphs such as scatter plots, histograms, box plots in R with (ggplot2 package), etc.

Sample storage

Storage description:

The otoliths are kept in envelopes or vials, these placed in boxes duly labeled and stored on the shelves of the growth warehouses of the IEO oceanographic centres of Cádiz. These pieces are stored systematically, without expiration date.

Data processing

Evaluation of data accuracy (bias and precision):

N

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. In addition, in the case of maturity of anchovy from the Gulf of Cádiz, for maturity ogives, missing maturity percentages are imputed from historical data.

Quality document associated to a dataset:

N

Validation of the final dataset:

Using the quality checks of the ICES acoustic database.

SAMPLING SCHEME IDENTIFIER: BFT-INDEX

MS : SPAIN

Region: North-East Atlantic

Sampling scheme identifier: ESP_AZTI_BFT INDEX

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

AZTI-BFT INDEX survey, carried out annually, is a systematic active acoustics survey aimed at detecting the bluefin schools present along its transects and estimating the number of individuals in each of them, for developing a fishery-independent abundance index for bluefin tuna in the Bay of Biscay.

Description of the population

Population targeted:.

The target species is the Atlantic bluefin tuna (*Thunnus thynnus*) and the survey area comprises ICES subdivisions 8cd, where a 960 nm zig-zag type systematic transect is performed.

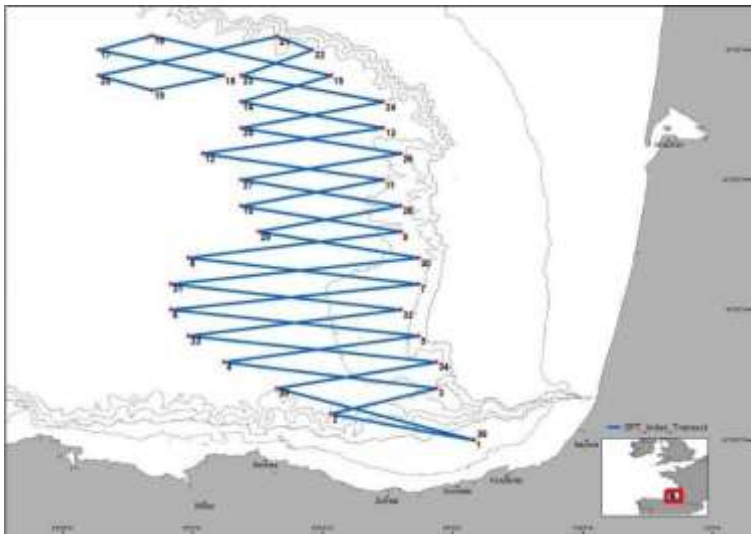


Figure 1: survey area and transects

Population sampled:

The part of the target population aimed at is the bluefin tuna present in the Bay of Biscay every summer in the framework of their annual feeding migration to this region, especially the juvenile cohorts (ages 1 to 4).

Stratification:.

NA

Sampling design and protocols

Sampling design description:

No PSU applying. The sampling is adaptive, i.e. the survey sampling unit is each tuna detection occurring along the survey transects.

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

NA

Regional coordination:

Sampling design and protocols were originally developed for the BFT Index survey, which is the only survey of its type so far, i.e. direct acoustic survey directed to bluefin tuna in the Bay of Biscay. Sampling design, protocols and first results have been

presented in the ICCAT working group on bluefin tuna since 2015 (SCRS bluefin tuna species group meetings and bluefin tuna intersession meeting).

Link to sampling design documentation:.

Goñi N., Uranga J., Arregui I., Onandia I., Martinez U., Boyra G., Melvin G.D., Godard I., and Arrizabalaga H. (2019) Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the Bay of Biscay: results from the first five surveys. Document SCRS/2019/185

https://iccat.int/Documents/CVSP/CV076_2019/n_2/CV076020455.pdf

Compliance with international recommendations:

Y

Link to sampling protocol documentation:.

Goñi N., Uranga J., Arregui I., Onandia I., Martinez U., Boyra G., Melvin G.D., Godard I., and Arrizabalaga H. (2019) Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the Bay of Biscay: results from the first five surveys. Document SCRS/2019/185

https://iccat.int/Documents/CVSP/CV076_2019/n_2/CV076020455.pdf

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

NA

Data capture

Means of data capture:

The vessel hired for the survey sails along the defined transects (total length 960 nm). For the collection of acoustic records onboard, we use a MAQ omnidirectional sonar, set at a 320m range and 8º tilt angle, for tuna school detection. A scientific EK80 echosounder working at a combination of at least 3 frequencies mounted horizontally and vertically is recording acoustic backscattering during the whole survey. At each detection, the vessel approaches the school, and throws live bait for catching tuna by pole-and-line. Caught individuals are measured (fork-length) and immediately released. In complement of the physical size-sampling, a multibeam sonar (SIMRAD M3) is used for size-measurements of the tunas. EK80 recordings are then processed to estimate school dimension and number of individuals in each detected school.



Figure 2: Example of detection of a bluefin tuna school by omnidirectional sonar (right part of the sonar screen).

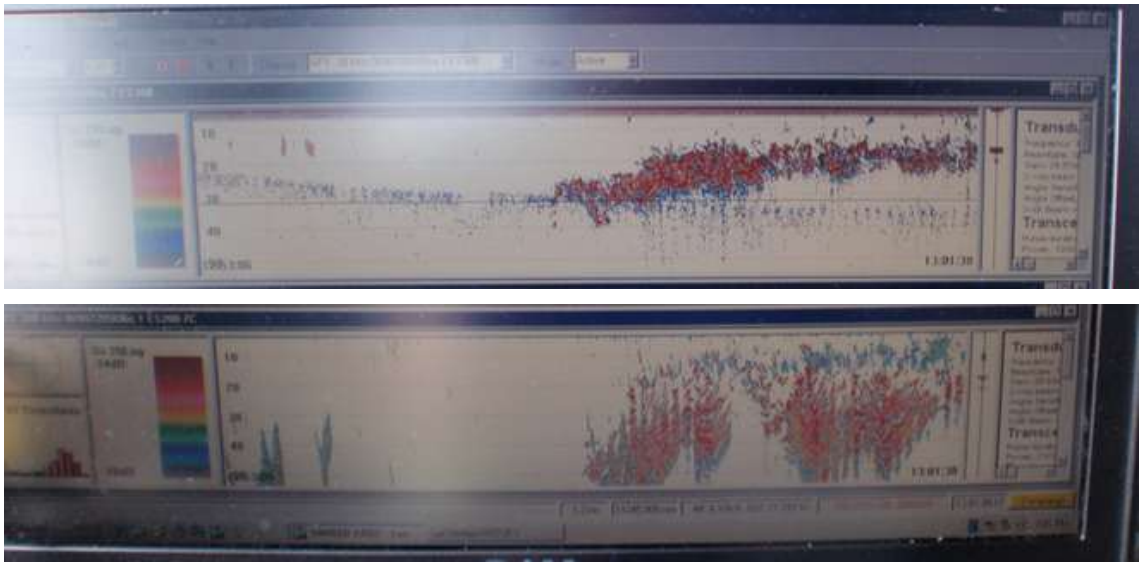


Figure 3: Example of bluefin tuna school detected by the EK80 echosounder, at 38 kHz mounted vertically (upper panel) and at 200 kHz mounted horizontally (lower panel).



Figure 4: M3 mutibeam sonar used for complementary size measurements

Data capture documentation:

Goñi N., Uranga J., Arregui I., Onandia I., Martinez U., Boyra G., Melvin G.D., Godard I., and Arrizabalaga H. (2019) Acoustic-based fishery-independent abundance index of juvenile bluefin tunas in the Bay of Biscay: results from the first five surveys. Document SCRS/2019/185

https://iccat.int/Documents/CVSP/CV076_2019/n_2/CV076020455.pdf

Quality checks documentation:

N (2023)

SAMPLING SCHEME IDENTIFIER: IBERAS

MS: ESP

Region: North-East Atlantic

Sampling scheme identifier: IBERAS

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Sampling scheme aiming at first recording ecograms from multifrequency echosounder (e.g. 38 kHz, main frequency) to assess the strength of the Ibero-Atlantic sardine stock recruitment; and secondly, to perform pelagic hauls to get biological information for the following pelagic fish species: Sardina pilchardus, Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Boops boops, Capros aper, Scomber colias, and other species susceptible of being acoustically assessed and also for echo-trace identification. In addition, biological samplings of the target species are carried out (see WP Table 2.2 and ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. ICES Techniques in Marine Environmental Sciences Vol. 64. 100 pp https://doi.org/10.17895/ices.pub.7462, section 2.2.2).

Description of the population

Population targeted:

The main target species are the Young of the Year (YOY) of Sardina pilchardus in the main recruitment area located in the north western area of the Iberian Peninsula (9a Central North -from Nazaré to River Minho; 9a North -Cape Fisterra to River Minho; and 9a Central South, form Nazaré to Sines). Additionally, *Engraulis encrasicolus, Trachurus trachurus Scomber scombrus, Scomber colias, Boops boops* and *Capros aper* individuals will be sampled (depending on time availability).

Population sampled:

This acoustic-trawl survey is mainly focussed on sardine recruitment of the Ibero-Atlantic Stock, covering only the main expected recruitment area, although the rest of the pelagic fish species located in this area, including adult sardine is also assessed. Therefore, sampled fractions of the target populations will be those ones inhabiting the shelf waters. The timing and spatial coverage of this SAHMAS autumn survey (IBERAS) has been defined to achieve a recruitment index able to be used for both the assessment model, and for short-term forecasting. Although recruitment take place in other areas, the bulk of the young of the year are mainly located on the surveyed area of this survey and the index is consistent with the spring survey targeting on SSB. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.2.2).).

Stratification:

The study area is stratified in 3 geographical strata: 9aN, 9aCN and 9aCS, up to the North Sines.

Sampling design and protocols

Sampling design description:

Acoustic sampling: tracks are systematically placed at 6-8 nmi apart, with random start, from shoreline up to 100/150 depth depending of the area. Trawl hauls are opportunistically placed the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS). Fishes from the target species (see table 2.2) are biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached). Then, the other individuals are measured until a representative length distribution is obtained for each species. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3).

Is the sampling design compliant with the 4S principle?

NA

Regional coordination:

N.

Link to sampling design documentation:

See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3.

Compliance with international recommendations:

Y. Ibero-Atlantic sardine is evaluated by international groups of experts, and their recommendations are considered and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. ICES Techniques in Marine Environmental Sciences Vol. 64. 100 pp.

Compliance with international recommendations:

Y. Sardine is evaluated by international groups of experts, and their recommendations are considered and implemented. The sampling protocols adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

Acoustic tracks are place systematically while pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number and location of hauls result in a relatively high sampling coverage over the main sardine recruitment area.

Data capture

Means of data capture:

Length distributions are carried out by means of a measuring board. Weights of both the catches and the individual specimens are taken from marine scales, which register a maximum weight of 60, 12 and 2 kg respectively; accurately: ± 100 ± 10 and ± 2g respectively).

Biological samples are collected and stored onboard. Data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized onboard.

Acoustic records are recorded in raw files for further post-processing using specific software.

Data capture documentation:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3

Quality checks documentation:

Data quality control (QC) checks and validations are performed for all autumn surveys. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.6)

Data storage

National database:

SIRENO, the IEO database, is currently taking over the functions of the Spanish database, which has not yet finished development, together with this, IPMA has also his own database International database:

International database:

NA. However, it is also expected that in medium term, database will be also hosted at the (https://www.ices.dk/data/data-portals/Pages/acoustic.aspx).

Quality checks and data validation documentation:

No documentation targeting quality checks.

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

Sample storage
Storage description: The otoliths of almost all these species, are kept in envelopes or vials, these placed in boxes duly labelled and stored on the shelves of the growth warehouses of the IEO oceanographic centres and IPMA where the samples will be processed: Coruña, Vigo, Santander, Porto and Lisbon. These pieces are stored systematically, without expiration date. Acoustic data are post-processed and scrutinized by both IEO and IPMA experts. **Sample analysis**: ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, sections 2.2.3 & 2.2.4.
Data processing
Evaluation of data accuracy (bias and precision): N. **Editing and imputation methods:** Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors. Age length key (ALK) of the commercial sampling is completed with the age-length survey data and the missing values are completed by an age expert judgement. **Quality document associated to a dataset:** N **Validation of the final dataset:** ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, sections 2.2.6.

SAMPLING SCHEME IDENTIFIER: PECAN

MS: ESP

Region: Other regions

Sampling scheme identifier: PECAN

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2025 until 2027

Short description (max 100 words):

Sampling scheme aiming at first recording ecograms from multifrequency echosounder to Acoustic estimation of the abundance and biomass of the target species stock; and secondly, to perform pelagic hauls to get biological information for the following pelagic fish species: Scomber colias, Trachurus picturatus, Sardinella aurita, Sardina pilchardus and other species susceptible of being acoustically assessed and also for echo-trace identification. In addition, biological samplings of the target species are carried out (see WP Table 2.2). Length and weight are also recorded for other species susceptible of being acoustically assessed).

Description of the population

Population targeted:

The survey area corresponds to the Canary Island shelf waters (20-1000 m depth), and it is conducted in spring time (in March/April). The acoustic-trawl survey is aimed at the acoustic estimation of the abundance and biomass of the populations of the main small pelagic fish (SPF) in the area. The main assessed target species are: Scomber colias, Trachurus picturatus, Sardinella aurita, and Sardina pilchardus. Additionally, Engraulis encrasicolus, Sardinella maderensis, Trachurus trachurus, Atherina presbyter and Boops boops).

Population sampled:

This acoustic-trawl survey is a multispecies one surveying the Canary Islands neritic SPF species in spring. The sampled fractions of the target populations will be those inhabiting coastal waters between the 20-1000 m depth isobaths, in 5 of the seven Canary Islands (La Gomera, Tenerife, Gran Canaria, Fuerteventura and Lanzarote). The timing of this spring survey has been defined to coincide with the time of the highest volume of landings of the target species by the artisanal fleet in the study area. Mainly those of Scomber colias and Trachurus picturatus, which are the most caught species.

Pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints

Stratification:

The sampling design is not stratified, as SPF species can potentially be distributed over the whole sampling area.

Sampling design and protocols

Sampling design description:

Acoustic sampling: tracks are systematically placed at 4-8 nmi apart. Trawl hauls are opportunistically placed the pelagic hauls are performed whenever changes are detected in echo-traces, and according to the survey time constraints. The sample/subsample is selected by a Simple Random Sampling (SRS) of 50 individuals from the sorted catch. Fishes from the target species (see WP table 2.2) are biologically analyzed (various biological variables are collected on each sampled fish until the expected number of samples is reached). (See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3).

Is the sampling design compliant with the 4S principle?

NA

Regional coordination:

N.

Link to sampling design documentation:

See ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3.

Compliance with international recommendations:

Y. Canary Islands SPF stocks are evaluated by international groups of experts (FAO Working Group on the Assessment of Small Pelagic Fish-North), and their recommendations are considered and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups.

Link to sampling protocol documentation:

Doray, M., Boyra, G., and van der Kooij, J. (Eds.). 2021. ICES Survey Protocols – Manual for acoustic surveys coordinated under the ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). 1st Edition. ICES Techniques in Marine Environmental Sciences Vol. 64. 100 pp.

Compliance with international recommendations:

Y. Canary Islands SPF stocks are evaluated by international groups of experts (FAO Working Group on the Assessment of Small Pelagic Fish-North), and their recommendations are considered and implemented. The sampling schemes adopted by the IEO are common within this SPF species group and standardised and coordinated by ICES expert groups

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

Acoustic tracks are place systematically while pelagic hauls providing biological samples are opportunistic and are performed whenever changes are detected in echo-traces, and according to the survey time constraints. Nevertheless, the final number and location of hauls result in a relatively high sampling coverage over the main sardine recruitment area.

Data capture

Means of data capture:

Length distributions are carried out by means of a measuring board. Weights of both the catches and the individual specimens are taken from marine scales, which register a maximum weight of 60, 12 and 2 kg respectively; accurately: ± 100 ± 10 and ± 2g respectively).

Biological samples are collected and stored onboard. Data from samplings are captured and registered written directly on the sampling sheets designed specifically for it and computerized onboard.

Acoustic records are recorded in raw files for further post-processing using specific software.

Data capture documentation:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.3

Quality checks documentation:

Data quality control (QC) checks and validations are performed for all autumn surveys. (see ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, section 2.2.6)

Data storage

National database:

SIRENO, the IEO database, is currently taking over the functions of the Spanish database.

International database:

NA.

Quality checks and data validation documentation:

No documentation targeting quality checks.

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

Sample storage

Storage description:

The otoliths of some of these species are kept in envelopes or vials, these are placed in properly labeled boxes and stored on the shelves of the growth warehouses of the Oceanographic Center of the Canary Islands (IEO).

Sample analysis:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, sections 2.2.3 & 2.2.4.

Data processing

Evaluation of data accuracy (bias and precision):

N.

Editing and imputation methods:

Y. Depending on the error it could be tackled correcting the sample data (like some typing errors), while others are excluded from output/calculations or marked as outliers/errors.

Quality document associated to a dataset:

N

Validation of the final dataset:

ICES Manual for acoustic surveys (WGACEGG) https://doi.org/10.17895/ices.pub.7462, sections 2.2.6.

SAMPLING SCHEME IDENTIFIER: TUNIBAL

MS: ESP

Region: Mediterranean and Black Sea

Sampling scheme identifier: TUNIBAL

Sampling scheme type: Research Survey at Sea

Observation type: SciObsAtSea

Time period of validity: from 2022 until 2027

Short description (max 100 words):

Survey to estimate the abundance of tuna spp (mainly Thunnus thynnus (BFT) and Thunnus alalunga (ALB) larvae. In all stations an oblique plankton haul between 0 and 30 meters, with Bongo 20 (meshes of 55 and 200 microns) mounted above the structure of a Bongo 90 (meshes of 500 microns) is conducted. All networks are equipped with flow meters and an Acoustic Positioning System. 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 with Niskin bottles to sampled water in standard stations. In stations with high abundance of larvae or presence larger larvae additional surface sampling with Bongo 90 with black 1 mm mesh size was carried.

Description of the population

Population targeted:

The surveys are focus on the study of the summer larval assemblages around the Balearic Islands, mainly the *Thunnus thynus* (BFT), *Thunnus alalunga* (ALB) and *Auxis rochei* (BLT) to obtain larval index used by the Intertational Commision for the Conservation of Atlantic Tuna (ICCAT) for the estimation of variations interannual changes in the relative biomass of spawners of the eastern Atlantic blue fin tuna (BFT) and albacore tuna (ALB) stocks. These indices are at date the only indices independent to the fishery accepted by ICCAT SCRS groups since 2017 to estimate stock reproductive biomass. Likewise, the TUNIBAL survey provides larval samples for the development the GBYP ICATT- BFT CKMR (Close–Kin Mark-Recapture)

Population sampled:

The target species are BFT and ALB in their larval stages and obtaining oceanographic data in the Balearic region, spawning area of these two species. Ichthyoplankton and zooplankton survey on pelagic domain, CTD profiles to quantification hydrographic variables, water samples to laboratory nutrients analysis, microzooplankton and mesozooplankton biomasses and environmental DNA (e DNA). Data collection with Ek80 echo sounder to evaluate acoustic methods to spatial distribution of tuna larvae as well as their predators and prey on the Balearic area

Stratification:

TUNIBAL surveys targeted the peak time of reproduction of Atlantic bluefin tuna (Thunnus thynnus) and albacore (Thunnus alalunga) in their main spawning ground located in the waters around the Balearic Islands.

Sampling design and protocols

Sampling design description:

The annual cruise targets the peak of reproduction at their main spawning ground for the Eastern stock of Atlantic bluefin tuna and Mediterranean albacore in the area around the Balearic Islands (NW-Mediterranean). Environmental descriptors of the habitat specific for the year of sampling are sampled and included in the estimations of the indicators. The duration and timing of the survey coincides with the time of reproduction of the two species.

Bluefin tuna albacore samples are collected using oblique hauls from 0-30 m depth using a Bongo net of 90 cm mouth diameter and a mesh size of 500 μm together with hydrographic measurements using CTDs to include environmental variability in the estimation of the index

Is the sampling design compliant with the 4S principle?

NA

Regional coordination:

N.

Link to sampling design documentation:

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)

Reglero, P., L, Ciannelli., D, Alvarez-Berastegui, R, Balbín.,J.L.,Lopez-Jurado., F.Alemany.2012.Geographically and Environmentally driven spawning distribution of tuna species in the Western Mediterranean Sea.Mar.Eol.Pro.Ser.vol 463; 273-284. (doi:10.3354/meps09800)

Álvarez-Berastegui, D., et al., 2023. Informe de campaña del programa de monitorización de los estadíos tempranos de túnidos y escenario hidrográfico en el Mar Balear. (TUNIBAL,2023) https://doi.org/10.20350/digitalCSIC/16263

Anonymous. 2023. Report of the 2023 ICCAT GBYP Workshop on Atlantic Bluefin Tuna larval Indices. SCRS/2023/042.Collect.Vol.Sci.Pap.ICCAT,80(9):1-24(2023).
https://www.iccat.int/Documents/CVSP/CV080_2023/n_9/CV080090001.pdf

Compliance with international recommendations:

Y. The methods are standardized with NOAA and University of Miami (USA).

Link to sampling protocol documentation:

Álvarez-Berastegui, D., et al., 2023. Informe de campaña del programa de monitorización de los estadíos tempranos de túnidos y escenario hidrográfico en el Mar Balear. (TUNIBAL,2023) https://doi.org/10.20350/digitalCSIC/16263

Compliance with international recommendations:

Y.

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

The annual cruise targets the peak of reproduction at their main spawning ground for the Eastern stock of Atlantic bluefin tuna and Mediterranean albacore in the area around the Balearic Islands (NW-Mediterranean). Environmental descriptors of the habitat specific for the year of sampling are sampled and included in the estimations of the indicators. The duration and timing of the survey coincides with the time of reproduction of the two species.

Data capture

Means of data capture:

We sampled bluefin tuna larvae using oblique hauls from 0-30 m depth using a Bongo net of 90 cm mouth diameter and a mesh size of 500 μm within a systematic grid of stations (Figure 1). One replicate sample is preserved in 4% buffered formalin in seawater, and the second replicate in ethanol. Meso- and microzooplankton were sampled with a Bongo net of 20 cm mouth diameter and mesh sizes of 200 and 53 μm, respectively. These Bongo nets were attached above the Bongo-90 (Figure 2).

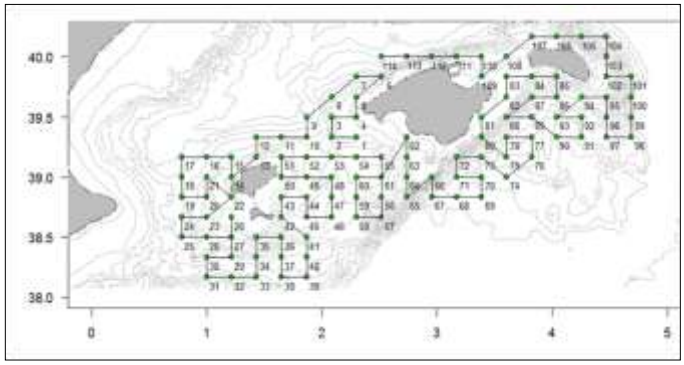


Figure 1. Systematic grid of stations sampled during TUNIBAL0623 covering the major spawning area of tuna species in the Balearic Sea.



Figure 2. Bongo 90 and 20 samplers used in TUNIBAL cruises.

In each station, hydrography is profiled using a hydrographic rosette equipped with a CTD (SBE9/11) down to 350 and 650 meters depth. Niskin bottles are used to collect water samples at depths of 5, 25, deep chlorophyll maximum, 200, 500, the LIW (maximum salinity) (Figure 3)

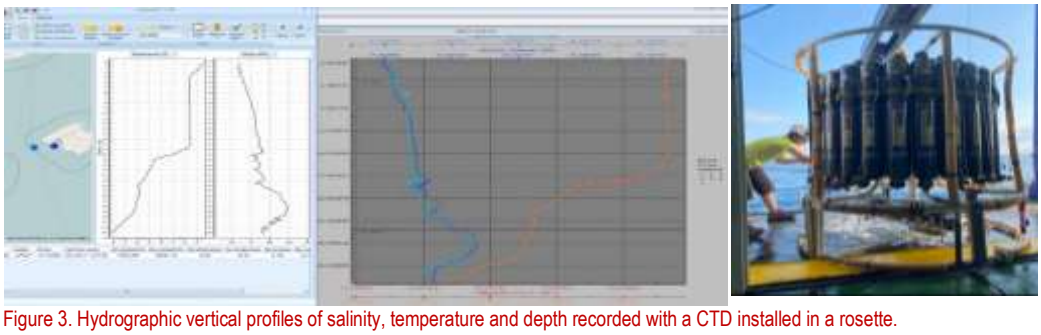


Figure 3. Hydrographic vertical profiles of salinity, temperature and depth recorded with a CTD installed in a rosette.

Once in the laboratory, fish larvae from the Bongo-90 samples are sorted under a stereoscopic microscope, and bluefin tuna and albacore larvae identified and counted using determination keys for the area (Alemany 1997). The larvae are photographed using a microscope with a camera and Image-pro software ®, assigned to stage of development (Blanco et al. 2019), and measured for standard length (Figure 4).



Figure 4. Photography and measurement of bluefin tuna larvae

Data capture documentation:

The methodology used for sampling has been published in different JRC scientific articles and presented in numerous ICCAT documents. See for example:

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)

Quality checks documentation:

For 2 years, scientific advice on Atlantic bluefin tuna has been carried out based on a MSE model. Exceptional circumstances must be assessed each year while the management procedure is in operation. In the analyses of exceptional circumstances in Atlantic bluefin tuna, different aspects are taken into account (annex EC protocols, Rec.23-076), including the review of the abundance index independent from the fishery provided from the TUNIBAL campaign. The larval abudance index for Bluefin tuna (Thunnus thynnus) is updated and provided to the SCRS bluefin tuna as well as the index for albacore. See for example the following documents and presentations in SCRS in 2024:

D. Alvarez-Berastegui, Martin-Quetglas M, Perez-Torres A, Tugores P, Casaucao A, Ottmann D, Reglero P. Western Med: Larval abundance indices and advances on the integration of environmental variability on monitoring bluefin tuna. SCRS/P/2024/020

D.Alvarez-Berastegui, Tugores P., Asvin P., Melissa M., Reglero P., 2024, Correction for the WMed Larval index 2022 and preliminary results on 2023 TUNIBAL campaign, ICCAT SCRS/P/2024/124

M.P. Tugores., A.P. Torres, M. Martín, R. Balbín, I. Alvarez, M. Santandreu, P. Reglero D. Alvarez-Berastegui, Actualization of albacore (thunnus alalunga) retro-calculated larval abundances in the Western Mediterranean sea (2001-2022),ICCAT SCRS/2024/069, Collect. Vol. Sci. Pap. ICCAT, 81(3), SCRS/2024/069: 1-19 (2024), https://www.iccat.int/Documents/CVSP/CV081_2024/n_3/CV08103069.pdf

D. Alvarez-Berastegui, M.P. Tugores, A.P. Torres,, I. Alvarez, A. Casaucao, P. Reglero, S. Saber, Assessing the adequacy of survey strategies in the Balearic sea (Western Mediterranean) for monitoring abundances of the albacore tuna (Thunnus alalunga) during early life stages, ICCAT SCRS/2024/070, Collect. Vol. Sci. Pap. ICCAT, 81(3), SCRS/2024/070: 1-10 (2024), https://www.iccat.int/Documents/CVSP/CV081_2024/n_3/CV08103070.pdf

The methodology used for the sampling and estimation of indices is agreed with experts from other international institutions as can be seen in the 2023 ICCAT GBYP Workshop on Atlantic Bluefin tuna larval indices SCRS/2023/042, Collect Vol Sci Pap ICCAT 80(9) 1-24 (2023) and presentations therein as for example: Bluefin tuna larval abundance indices in the Balearic Sea: History, methods, results, impacts (Dr. Diego Alvarez), Estimation of offspring fitness in Atlantic bluefin tuna: a potential recruitment index (Dr. Patricia Reglero), Tuna larvae trophic ecology: implications for survival (Dr. Raul Laiz)

Data storage

National database:

Plankton data/ tuna larvae data: 'NA' Internal database

Hydrographical data: available in IBAMar Regional Database coordinated at the Spanish Institute of Oceanography in the Balearic Islands. See https://ibamardatabase.wordpress.com/

International database:

NA.

Quality checks and data validation documentation:

No documentation targeting quality checks.

Sample storage

Storage description:

Plankton, (Tunna larvae, genetics) samples are storage at the Spanish Institute of Fisheries Oceanography, Oceanographic Center of Baleares.

Álvarez-Berastegui,D., et al., 2023. Informe de campaña del programa de monitorización de los estadíos tempranos de túnidos y escenario hidrográfico en el Mar Balear. (TUNIBAL,2023). Internal report https://doi.org/10.20350/digitalCSIC/16263

Sample analysis:

TUNIBAL sampling methodology:

D. Alvarez-Berastegui, M.P. Tugores, A.P. Torres, I. Alvarez, A. Casaucao, P. Reglero, S. Saber, Assessing the adequacy of survey strategies in the Balearic sea (Western Mediterranean) for monitoring abundances of the albacore tuna (Thunnus alalunga) during early life stages, ICCAT SCRS/2024/070, Collect. Vol. Sci. Pap. ICCAT,81(3),SCRS/2024/070:1-10(2024), https://www.iccat.int/Documents/CVSP/CV081_2024/n_3/CV08103070.pdf

Álvarez-Berastegui, D., Pérez Torres, A., Martín-Quetglas, M., Balbín, R., Santiago, R., & Reglero, P. (2023). Informe de Campaña del programa de monitorización de los estadíos tempranos de túnidos y escenario hidrográfico en el Mar Balear (TUNIBAL,2023). CSIC - Instituto Español de Oceanografía (IEO). Retrieved from https://doi.org/10.20350/digitalCSIC/16263

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Data processing

Evaluation of data accuracy (bias and precision):

Y. See documents above

Editing and imputation methods:

Y. See documents above

Quality document associated to a dataset:

Y. See documents above

Validation of the final dataset:

Quality control for hydrographical data described in Aparicio-Gonzalez et al. 2015. IBAMAR database: four decades of sampling on the Western Mediterranean Sea. Data Science Journal, volume13,

Quality control in the laboratory for sample analyses including revision by experts of taxonomical determination.

Quality control using a specific library in R for preliminary analyses of maximum, minimum and distributions of all the different variables that are part of the abundance indices.

Quality control is also published in the documents presented in ICCAT.

RELATED TO TABLE 2.4 AND TEXT BOX 2.4 (RECREATIONAL FISHERIES DATA COLLECTION

SAMPLING SCHEME IDENTIFIER: ESP-AZTI_ONSITESURVEYSRECREATIONAL.

MS : ESP
Region: North-East Atlantic
Sampling scheme identifier: ESP-AZTI_OnSiteSurveysRecreational
Sampling scheme type: recreational onsite surveys
Observation type: SciObsOnShore
Time period of validity: from January 2025 until December 2027
Short description (max 100 words): A routinary on-site sampling design has been established in early 2024, based on results the Marine Recreational Fisheries test study carried out in 2022- 2023. Sampling scheme aiming at collecting catch and effort data from marine recreational fisheries (MRF) in the Basque Country (BC), using onsite methods (surveys). Information is taken for all targeted species, including those for which reporting is mandatory, such as seabass (*Dicentrarchus labrax*) and tunids (e.g., northern albacore). Cod, pollack and elasmobranchs are not target species for this fishery in the BC.
Description of the population
Population targeted: The population targeted are fishers fishing Basque Country (BC) waters. This includes fishing from the coast (i.e., shore fishing), from a boat (i.e., boat fishing) and spearfishing. **Population sampled:** The population sampled is the adult population practicing MRF in harbors of the BC. This is considered as representative of the whole recreational fishing population in the BC **Stratification:** Geographical stratification: the onsite sampling was carried out along the Basque coast, with special focus on harbors and nearby areas. Sampling regions are illustrated in Figure 1 of the Sampling Procedure document, accessible through the link: https://www.azti.es/en/servicios/fisheries-sampling-programme/
Sampling design and protocols
Sampling design description: Sampling Frame: List of port*day PSU: port*day SSU: individual fishers or recreational fishing boats. Selection method: simple random sampling without replacement Contact method: face-to-face interviews. Survey method: on-site questionnaires and quantification of fishing activity (number of fishers and boats) More details about the sampling design can be found in AZTI's website https://www.azti.es/en/servicios/fisheries-sampling-programme/ **Is the sampling design compliant with the 4S principle?:** It has been designed to comply with the 4S principle as much as possible **Regional coordination:** Protocols have not been developed regionally, but recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Link to sampling design documentation:

More details about the sampling design can be found in the LAKET sampling procedure document https://www.azti.es/en/servicios/fisheries-sampling-programme/

Compliance with international recommendations:

Y. Recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Link to sampling protocol documentation:

More details about the recreational sampling protocol can be found in the following link https://www.azti.es/en/servicios/fisheries-sampling-programme/

Compliance with international recommendations:

Y. Recommendations coming from regional Expert Groups (ICES WGRFS) have been followed

Sampling implementation

Recording of refusal rate:

Y Refusals are recorded to get refusal rates from the recreational fishing community.

Monitoring of sampling progress within the sampling year:

The on-site questionnaires have been developed using the KOBO toolbox through the website of the sampling program, so that such formularies can be fulfilled by samplers. Data are stored (and downloaded) in Excel files. The monitoring of sampling progress is performed regularly during the year with R software.

Data capture

Means of data capture:
Face to face questionnaire. An example of the questionnaire can be found in the recreational sampling documentation (https://www.azti.es/en/servicios/fisheries-sampling-programme/)

Data capture documentation:
The data capture is documented in the LAKET protocol https://www.azti.es/en/servicios/fisheries-sampling-programme/

Quality checks documentation:

Collected data are checked for quality. Expert judgement is applied to correct impossible values (errors in the answers). Outliers are identified.

Data storage

National database:

We are in the process of developing a Marine Recreational Fisheries Data Base. But at this stage it is still difficult to set a deadline for it to be ready. At the moment, all data are being stored in Excel files.

International database:

The data can be used to answer ICES general data call with the estimates of recreational catches calculated for the Basque Country.

Quality checks and data validation documentation:

NA

Sample storage

Storage description:

NA

Sample analysis:

NA

Data processing

Collected data are processed to calculate catches made by recreational fishers in the Basque Countr. In the estimation process, R package Rsurveys is used. In addition, data obtained in the on-site sampling is combined with the results of the off-site survey carried out in the NWP 2022-2023.

Evaluation of data accuracy (bias and precision):

Collected data are checked for quality. Expert judgement is applied to correct impossible values (errors in the answers). Outliers are identified.

Editing and imputation methods:

NA

Quality document associated to a dataset:

NA

Validation of the final dataset:

NA

SAMPLING SCHEME IDENTIFIER: ESP_SGP_SELFONSHORE_RECREATIONAL (OFF SITE SURVEYS).

MS : ESP

Region : North-East Atlantic and Mediterranean Sea

Sampling scheme identifier : ESP_SGP_ SelfOnShore_recreational (off site surveys)

Sampling scheme type: recreational (off site surveys)

Observation type: SelfOnShore

Time period of validity : from January 2022 until December 2027

Short description (max 100 words):

According to RD 347/2011, all recreational fishermen must report their catches to the General Secretariat of Fishery (Ministry of Agriculture, Fisheries and Food), in number and weight of the distinct protection species listed in Annex I: highly migratory ICCAT species. This declaration must be made monthly, even if no catch was made. The sampling scheme is census.

Cod, pollack and some elasmobranchs (see Table 2.4) are not target species for the recreational fishery. Other elasmobranchs fishery is banned according to RD 347/2011.

In the Basque Country, a sampling scheme for all species, including seabass, is carried out by AZTI (ESP-AZTI_OnSiteSurveysRecreational).

Description of the population

Population targeted:

License system: All recreational fishermen who have a specific license to fish for the distinct protection species listed in Annex I. This license is issued by the General Secretariat of Fishery. Without this license, recreational fishery for the species listed in Annex I is banned

The distinct protection species listed in Annex I are:

- *Thunnus thynnus*
- *Thunnus alalunga*
- *Thunnus obesus*
- *Makaira spp*
- *Tetrapturus spp*
- *Istiophorus albicans*

Population sampled:

As the sampling is based in census (license system), the population sampled is the same as the population targeted, so there is no need to estimate the population of recreational fishers.

Stratification:

NA.

Sampling design and protocols

Sampling design description:

NA.

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

NA.

Regional coordination:

NA.

Link to sampling design documentation:

NA.

Compliance with international recommendations:

NA.

Link to sampling protocol documentation:

NA.

Sampling implementation

Recording of refusal rate:

NA.

Monitoring of sampling progress within the sampling year:

NA.

Data capture

Means of data capture:

Catch declaration: the recreational fishermen holding of the specific license shall complete a catch and release declaration (Annex IV, RD 347/2011: https://www.boe.es/buscar/doc.php?id=BOE-A-2011-6099) and send it to the General Secretariat of Fishery within the first five days of each month, even when no catches have been taken.

Data capture documentation:

NA.

Quality checks documentation:

With the data of bluefin tuna the pre-notifications are cross-checked with the catch declarations. For the rest of the species, the checking is a verification of the number of specimens vs. weight.

Data storage

National database:

These data are integrated in SIPE (1), the Spanish fishing information database, which is where all the data on both professional and recreational fishing can be found.

(1) SIPE: Sistema de Información Pesquero Español

International database:

NA.

Quality checks and data validation documentation:

NA.

Sample storage

NA.

Data processing

Evaluation of data accuracy (bias and precision):

NA.

Editing and imputation methods:

NA.

Quality document associated to a dataset:

NA.

Validation of the final dataset:

NA.

RELATED TO TABLE 2.3 AND TEXT BOX 2.3 (DIADROMOUS DATA COLLECTION

SAMPLING SCHEME IDENTIFIER: ANG_ANDA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS :ESP

Region : North-East Atlantic and Mediterranean and Black Sea

Sampling scheme identifier : ANG_Anda_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific**)**

Observation type: SciObs water body

Time period of validity : 2022 2025-2027

Short description (max 100 words):

Sampling plan for the evolution of eel stocks in Andalucia.

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_ES_Anda

Stratification: The population sampled is the portion of adult eels (yellow and silver) that begin their migration in rivers downstream to the sea. Upstream reaches of dams are excluded from the sampling, as it is practically impossible for the eels living there to reach lower levels. The rivers to be sampled were chosen from among those with European eel populations. As the Autonomous Community of Andalusia is divided into three Eel Management Units: Atlantic, Guadalquivir and Mediterranean; a representative number of rivers have been taken in each of the Management Units. On the other hand, the number of sampling stations per river is determined by the length of the river, with more sampling stations in longer rivers.

The primary unit is the sampling point, of which there are 40 in total, distributed as follows by province:

- Sevilla. Guadiamar River (3 stations) and Guadaira River (5 stations). Corresponding to the Guadalquivir Eel Management Unit.

- Cádiz. Guadalete River (6 stations) and Barbate River (8 stations), belonging to the Atlantic Eel Management Unit; and Palmones River (5 stations) and Guadarranque River (3 stations), belonging to the Mediterranean Eel Management Unit.

- Málaga. River Guadalhorce (4 stations), belonging to the Mediterranean Eel Management Unit.

Sampling design and protocols

Sampling design description:

Forty stations have been designated in the three Management Units: 8 in the Guadalquivir UGA, 12 in the Mediterranean UGA and 14 in the Atlantic UGA. Each station will be sampled once a year, preferably in winter and avoiding full moon days.

At each station 20 pots will be installed (10 per bank alternating eel and shrimp traps), with an approximate separation of 20 metres (so each station must have at least a length of 400m) and will be fixed with corrugated steel bars fixed to the bed. Their exact location will be recorded by GPS when the satellite error is less than 6 metres. The pots shall be installed in the direction of the end point (downstream). Three-kill eel pots and two-kill shrimp pots shall be used, according to the attached graph showing dimensions and design:

Catches shall be collected 48 hours after installation and the pots shall be lifted in the same order of setting (from start to end point). The eels caught shall be placed in a suitable container on the shore where they shall be weighed, measured and the various distinguishing parameters to determine the degree of maturity (eye diameter, presence of lateral line and fin colouring) shall be recorded. The eels shall be returned to the water as close as possible to the stretch where they were caught.

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

Regional coordination: No.

Compliance with international recommendations: It is not known whether it is in line with international recommendations. The methodology used is described below.

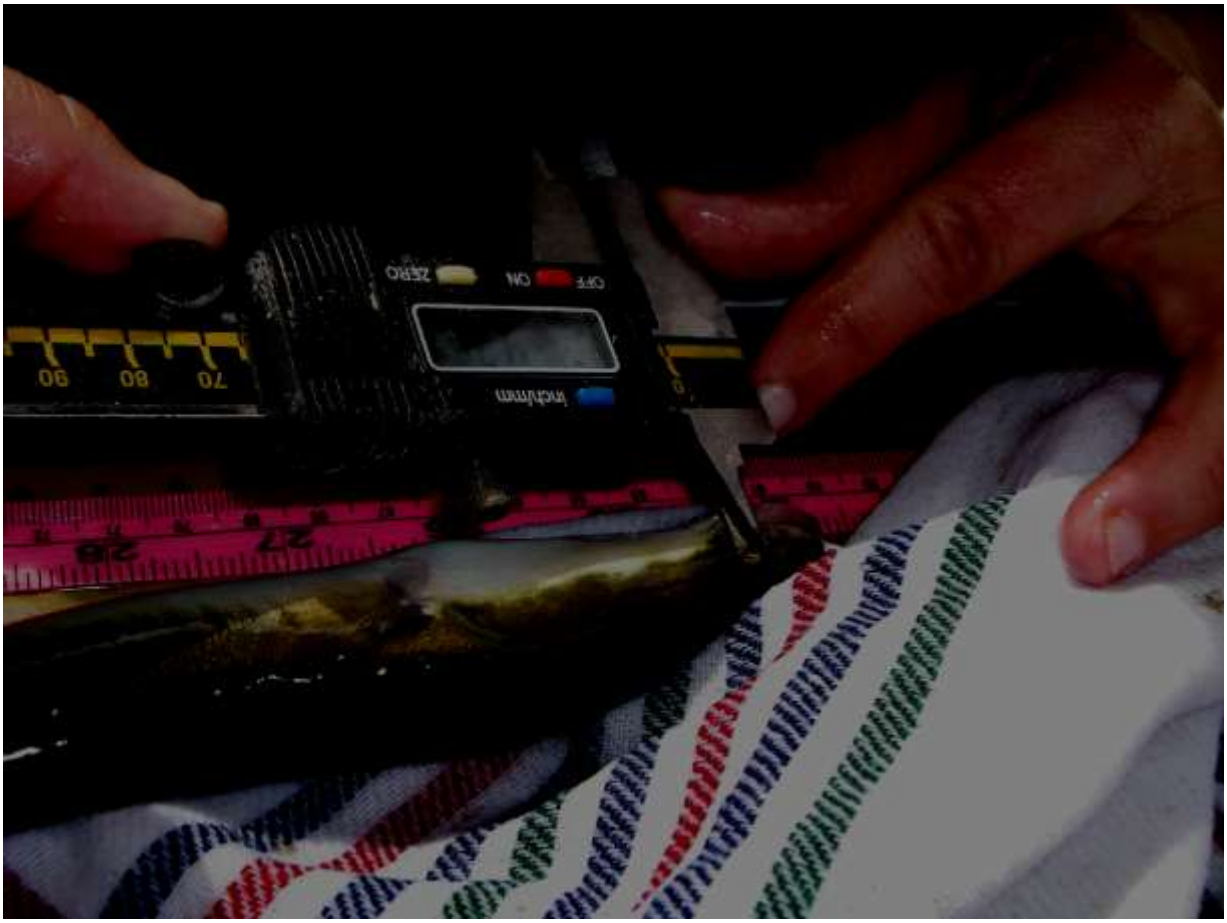
Sampling implementation

Recording of refusal rate: N

Monitoring of sampling progress within the sampling year: The sampling stations are always the same. The scientific advice of the Eel Management Plan provided 47 sampling stations at the beginning of the study, from which the 13 least viable for sampling had to be discarded, leaving 40 census stations, which are sampled annually.

Data capture

Means of data capture: Catching methods are eel pots and shrimp traps. In addition, digital calipers for measuring eye diameter and fin length, scales and measuring trays or tape measures are used.





Data capture documentation: Yes

Quality checks documentation: N. It is not known when the documentation will be available.

Data storage

National database: NA

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): N. The evaluation of these data is pending. The date of delivery is unknown.

Editing and imputation methods: N. The date of delivery of the data evaluation is not known..

Quality document associated to a dataset: Is there a publication digital object identifier (DOI) created? Is there a document summarising the estimation process followed? N

Validation of the final dataset: The validation of the data would be carried out by the staff of the Consejería de Agricultura,Ganadería, Pesca y Desarrollo Sostenible (Regional Ministry of Agriculture, Livestock, Fisheries and Sustainable Development).

SAMPLING SCHEME IDENTIFIER: ANG_ASTU_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Astu_SciObs water body_Diadromous (commercial**)**

Sampling scheme type: Diadromous (commercial)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

Total recruit estimated from daily catches report of commercial fisheries

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_Astu

Stratification:

Glass eel catches from Nalon Management Plan are reported by Cudillero and San Juan de la Arena fishermen´s guilds. Catches from Tinamayor management plan are reported by Bustio fishermen´s guild. Catches from East Management Plan are reported by Ribadesella and Llanes fishermen´s guild. Catches from West and Central Area are reported directly from fishermen to the Regional Administration or through their fishing guilds

Sampling design and protocols

Sampling design description:

Professional glass eel fishery is allowed during 30 days maximum per fishing season which can be divided into several periods. Currently there are 4 periods, one by month from November to February.

Three Management Plans and two areas are established in the Asturian shore:

-Nalon management plan: glass eel fishery is allowed only at Nalon estuary and San Pedro de la Ribera and Quebrantos beaches, done by 36 licenses from boat and 48 on foot.

-Tinamayor management plan: glass eel fishery is allowed only at Deva estuary and Cabra river, done by 20 fishermen on foot.

- East Management Plan: glass eel fishery allowed from Libardón river until Purón river, with 46 licenses on foot.

- West Area: from Eo estuary until Esqueiro river. 12 licenses on foot.

- Central Area: from Esqueiro river until Libardón river, excepting Nalon MP area.17 licenses on foot.

Total catches per night and fisherman are reported.

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

Regional coordination: Regional coordination.

Link to sampling design documentation: NA

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: **NA**

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: By means of dedicated software

Data capture documentation: NA

Quality checks documentation: NA
Data storage
National database: Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión territorial, Principado de Asturias. **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No sample storage
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: NA **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_ASTU_SCIOBS WATER BODY_DIADROMOUS (MARKET)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Astu_SciObs water body_Diadromous (market)

Sampling scheme type: Diadromous (market)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

50 glass eels are collected from Ribadesella fishermen´s guild (Sella river basin) and 50 from San Juan de la Arena fishermen´s guild (Nalon river basin), once a month, during the glass eel fishing period (from November to February). Total: 400 glass eels.

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_ES_Astu

.**Stratification**:

Glass eel collected at the two major fishermen´s guilds for glass eel marketing in the Principality of Asturias Samples from two fishermens´s guilds, belonging to Nalon and Sella basins.

Sampling design and protocols

Sampling design description:

Samples of 50 individuals are collected from the two main fishermen´s guilds in each fishing period. Currently there are 4 fishing periods, one per month from November to February. The total number of fishing days allowed are 30. The samples are preserved alive until the analysis at the laboratory. Each glass eel are measured and weighed and the pigmentation phase is noted.

After measuring, the individuals are released into the river.

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

Regional coordination: Regional coordination

Link to sampling design documentation: N

Compliance with international recommendations: N

Link to sampling protocol documentation: N

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed.

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

National database: Centro de Experimentación Pesquera, Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión Territorial del Principado de Asturias

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): N **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_ASTU_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Astu_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

Electrofishing is carried out in 8 river basins. Each yellow/silver eel captured by electrofishing is measured and weighed. Pectoral fin length and vertical and horizontal eye diameters are also measured for eels longer than 30 cm in order to determine silvering and sex by Durif.

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled:

Eel from EMU_ES_Astu

Stratification:

Yellow and silver eels captured by electrofishing in 30 locations belonging to 8 river basins in EMU_ES_Astu

Sampling design and protocols

Sampling design description:

30 sampling stations located in 8 river basins. Electrofishing is carried out once a year, from September the 8th from October the 12th, by Zippin method, with three passes without replacement, following UNE-EN-14011:2003.

Every eel is measured and weighed. In case of eels longer than 30 cm, data of pectoral fin length and vertical and horizontal diameters are also taken, following the SUDOANG protocol https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

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

Regional coordination: Regional coordination

Link to sampling design documentation:

https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma/?c=N0029997

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Compliance with international recommendations: 'Y'

Link to sampling protocol documentation:

https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma/?c=N0029997

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year:

Sampling allocations are adjusted if needed under CEP and University of Oviedo criteria. In 2019, a sampling station was replaced for a new one placed in a wider part of the river (another category) following the SUDOANG protocol.

Data capture

Means of data capture:

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Data capture documentation:

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Quality checks documentation: 'Y'

Data storage

National database: Centro de Experimentación Pesquera, Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión Territorial del Principado de Asturias. In addition, the SUDOANG project has compiled various eel information from electroishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation:

https://sudoang.eu/wp-content/uploads/2019/03/EN-EEL_SAMPLING_PROTOCOLS_SUDOANG.pdf

Sample storage

Otholits from eels collected during 2019 and 2020 electrofishings are preserved dry in Eppendorfs at the laboratory of the Centro de Experimentación Pesquera (CEP), Dirección General de Pesca Marítima, Consejería de Medio Rural y Cohesión Territorial, Principality of Asturias.

Sample analysis: Protocol https://sudoang.eu/es/grupos-de-trabajo/

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/es/visuang/

Editing and imputation methods: https://sudoang.eu/es/visuang/

Quality document associated to a dataset: https://sudoang.eu/es/visuang/

Validation of the final dataset: https://sudoang.eu/es/visuang/

SAMPLING SCHEME IDENTIFIER: ANG_ BASQ_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_ Basq_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_ES_Basq

Stratification: recruits, standing stock and silver eel from Oria River

Sampling design and protocols

Sampling design description:

1)The abundance of recruits will be estimated by:

a.Monthly samplings of the glass eel entrance in the estuary using sieve trawling during the maximum recruitment period (October- Frebuary). ¡

b.Using the glass eel fishery catch and effort data compiled.

c.Sampling daily the eel entrance in a fish trap located in the tidal limit of the Oria River during the migration period (May-October)

2)The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys in 25 sampling points.

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

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

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

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

- Electroishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Recruitment and estimated escapement data can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

- Data generated in the Oria, can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No samples storage

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

Quality document associated to a dataset: No

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_CANT_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: ANG_Cant_SciObs water body_Diadromous (commercial)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words)

Glass eel catches

Description of the population

Population targeted: Anguilla anguilla

Population sampled: Anguilla Anguilla from EMU_ES_Cant

Stratification: All the rivers from EMU_ES_Cant where Glass Eel fishery happens

Sampling design and protocols

Sampling design description:

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

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

Regional coordination: Regional coordination

Link to sampling design documentation: NA

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: NA

Data capture documentation: NA

Quality checks documentation: NA

Data storage

National database: NA

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No samples storage

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: MA

Quality document associated to a dataset: No

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_CANT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Cant_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words)

Yellow and silver eel electrofishing surveys

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla anguilla* from EMU_ES_Cant

Stratification: Agüera River basin, Asón river basin, Miera River basin, Pas river basin, Saja-Besaya river basin, Nansa river Basin, Cantabrian Deva river basin, West Coastal basin and East Coastal basin .

Sampling design and protocols

Sampling design description:

The abundance of the standing stock (yellow eel); will be determined by electrofishing surveys in 114 125 sampling points with Carle & Strub 1978.

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

Regional coordination: Regional coordination

Link to sampling design documentation: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2023- Ecohydros – Gobierno de Cantabria" (internal report). Not available online

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2023- Ecohydros – Gobierno de Cantabria" (internal report). Not available online

Data capture documentation: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2023- Ecohydros – Gobierno de Cantabria" (internal report). Not available online

Quality checks documentation: "Seguimiento de las poblaciones de peces continentales de Cantabria- Años 2010-2023- Ecohydros – Gobierno de Cantabria" (internal report). Not available online

Data storage

National database:

- Electrofishing data from EMU_CANt have been compiled in thef the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

International database: NA

Quality checks and data validation documentation: NA

Sample storage

No samples storaged
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** MA **Quality document associated to a dataset**: No **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_CANT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC-SUDOANG)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : ANG_Cant_SciObs water body_Diadromous (scientific-SUDOANG)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2025-2027
Short description (max 100 words) Glass eel recruitment surveys
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: *Anguilla anguilla* from EMU_ES_Cant **Stratification**: Nansa river Basin, Cantabrian Deva river basin,
Sampling design and protocols
Sampling design description: Protocol to estimate glass eel recruitment. SUDOANG in 4 sampling points. Monthly sampling (November to March) **Is the sampling design compliant with the 4S principle?**: Y **Regional coordination**: Regional coordination **Link to sampling design documentation**: "Estudio para la adaptación metodológica del seguimiento de la angula (anguilla anguilla) en Cantabria, basado en métodos independientes de pesquerías seguimiento de la angula en Cantabria. temporada 2023 – 2024" –– Gobierno de Cantabria -(internal report). Not available online **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: https://sudoang.eu/wp-content/uploads/2019/03/ES-PROTOCOLOS_MUESTREO_ANGUILLA_SUDOANG.pdf
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: Sampling allocations are fixed
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Archivos de la Dirección General de Pesca y Alimentación**.** Gobierno de Cantabria **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
No samples storaged
Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: MA

Quality document associated to a dataset: No

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_ CAT_ SCIOBS WATER BODY_ DIADROMOUS (COMMERCIAL) GE_RWL

MS : ESP

Region : Mediterranean and Black Sea

Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (commercial)_GE_RWL

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* Glass eel from EMU_ES_Cata

Stratification: All the rivers in EMU_Cata with Glass eel fishery

Sampling design and protocols

Sampling design description:

Girona: commercial fishery of glass eel is only allowed in 4 rivers done by 12 fishermen associated to 3 different fisherman guilds. Commercial fisheries currently are allowed for a maximum period of 4 months and 20 days distributed along the authorized period according to regulations in force. Glass eel fisheries take place only at night in a limit of sampling points (sampling point=trap) per river. Catches are conducted by means of a modified fyke net placed in the shoreline, near the river mouth. Total catches per night and fisherman are reported. No fisheries on yellow and silver eel are authorized on the area.

Ebro: commercial fishery of glass eel is allowed in almost 118 sampling points along the river, lagoons and canals managed by 5 different fisherman guilds. Commercial fisheries are allowed for a maximum of 4 months and 20 days distributed along the authorized according to regulations in force only at night and a limit of sampling points (sampling point=trap). Catches are conducted by means of a modified fyke net called "bussó" placed in the shoreline, near the river mouth, lagoon or canal. Total catches per night and fisherman are reported.

For length and weight measures glass eels are obtained from four sampling points in the Ebro. Sampling three times from October to December by professional fishermen. For each sampling point, 50 individuals are preserved alive and transported to the lab to measure total length (±1mm) the following day. After measuring, the individuals are released into the river. Following SUDOANG protocol.

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

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed
Data capture
Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Data capture documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality checks documentation**: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip
Data storage
National database: Direcció General de Pesca. Generalitat de Catalunya **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Editing and imputation methods:** https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality document associated to a dataset**: No **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_ CAT_ SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)_GE_RWL

MS : ESP

Region : Mediterranean and Black Sea

Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (scientific)_GE_RWL

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2025

Short description (max 100 words):

Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: Glass eel

Stratification: Te River

Sampling design and protocols

Sampling design description:

One sampling point at the river mouth. Sampling monthly from October to March. Total: 6 sampling episodes. For each episode, 50 individuals are preserved alive and transported to the lab to measure total length and weight (±0.01g) the following day. After measuring, the individuals are released into the river.

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

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling allocations are fixed

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

National database: NA

The SUDOANG project has compiled various Glass eel . recruitment data generated in the Ter, can be downloaded in www.sudoang.eu

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No samples storage

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

Quality document associated to a dataset: No

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_ CAT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)_S_EWL

MS : ESP

Region : Mediterranean and Black Sea

Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (scientific)_S_EWL

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2025

Short description (max 100 words):

Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: Silver eel

Stratification: Ter River (pilot river basin for eel monitoring)

Sampling design and protocols

Sampling design description: 17 sampling points along the river and main tributaries. European eel sampled by means of electrofishing (two passes). Fish estimated using Seber method for two passes (removal methods) and referred to fish density. Sampling campaign conducted in September-October. Following SUDOANG protocols https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Silvering stage determined by Durif et al (2003, 2005).

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

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Once per year

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

National database: Direcció General de Pesca. Generalitat de Catalunya and University of Girona.

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

- Electroishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Data generated in the Ter silvering stage samplings, can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/)

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

No samples storage

Data processing

Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

Quality document associated to a dataset: No

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_ CAT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)_Y_SWL

MS : ESP

Region : Mediterranean and Black Sea

Sampling scheme identifier : ANG_Cat_SciObs water body_Diadromous (scientific)_Y_SWL

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2025

Short description (max 100 words):

Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: Yellow eel

Stratification: Ter River (pilot river basin for eel monitoring)

Sampling design and protocols

Sampling design description: 17 sampling points along the river and main tributaries. European eel sampled by means of electrofishing (two passes). Fish estimated using Seber method for two passes (removal methods) and referred to fish density. Sampling campaign conducted in September-October. Following SUDOANG protocols https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

All the eels are measured.

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

Regional coordination: Regional coordination

Link to sampling design documentation: Standardised methods for data collection of SUDOANG project are applied https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Compliance with international recommendations: Y

Link to sampling protocol documentation: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Once per year

Data capture

Means of data capture: https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip

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

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

Data storage

National database: Direcció General de Pesca. Generalitat de Catalunya and University of Girona.

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

- Electrofishing data from the SUDOANG project are hosted at https://bit.ly/3iIgtrT.

- Data generated in the Ter, can be downloaded from the interactive tool VISUANg (https://sudoang.eu/en/visuang/) **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: NA
Sample storage
No samples storage
Data processing
Evaluation of data accuracy (bias and precision): https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Editing and imputation methods:** https://sudoang.eu/wp-content/uploads/2019/02/Protocols-for-recruitment-silvering-and-otolith-preparation.zip **Quality document associated to a dataset**: No **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_GALI_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: ANG_Gali_SciObs water body_Diadromous (commercial)

Sampling scheme type: Diadromous (commercial)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

The catches are established using auctions data from the different fishermen guilds, which are assigned to a determined river basin.

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: Catches from EMU_ES_Gali

Stratification: Catches from EMU_ES_Gali

Sampling design and protocols

Sampling design description:

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

The catches are established using auctions data from the different fishermen guilds, which are assigned to a determined river basin. In the Galician fishermen guilds, yellow and silver eel catches are not split up. The estuaries are considered basins themselves because of their size, and are managed as basin units. In this way, the estuaries listed below contain catches data from the following fishermen guilds:

- Arousa Estuary: Cambados, Carril, and Rianxo fishermen guilds.

- Eo River: Asturians fishermen guilds.

- Ferrol Estuary: Barallobre, and Ferrol fishermen guilds.

- Pontevendra Estuary: Pontevedra fishermen guilds.

- Vigo Estuary: Arcade and Redondela fishermen guilds.

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

Regional coordination: No

Link to sampling design documentation: NA

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture
Means of data capture: The catches are established using auctions data from the different fishermen guilds, which are assigned to a determined river basin. **Data capture documentation**: Auctions **Quality checks documentation**: NA
Data storage
National database: NA **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_GALI_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : ANG_Gali_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: Self water body

Time period of validity : 2022-2027

Short description (max 100 words):

Electrofishing surveys for the estimation on:

- the standing stock of yellow eel
- the related silver eel escapement

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: EMU_ES_Gali for eel (*Anguilla anguilla*),

Stratification: Samples are stratified by river in order to obtain a weighted average

Sampling design and protocols

Sampling design description: Conventional catch-depletion removal methods are used, usually applying Carle-Strub or Seber-LeCren estimators or CPUE formulae in the case of a unique pass. Sampling design intends to cover the whole accessible area, in a kind of systematic sampling.

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

Regional coordination: No

Link to sampling design documentation: (Hervella & Caballero, 1999). Inventariación piscícola de los ríos gallegos. 126 pp. ISBN-13: 978-84-453-2458-5, ISBN: 84-453-2458-6

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Field forms

Data capture documentation: Original field forms are digitized and stored as pdf., and data are written and stored in a database application which is capable to analyze data and derive estimations.

Quality checks documentation: NA

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: N

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_MURC_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : EMU_ES_Murc

Sampling scheme identifier : ANG_Murc_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

Sampling aimed at capturing glass eels at one of the points of entry from the Mediterranean Sea to the coastal lake of the Mar Menor

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla anguilla* from Es_Murc

Stratification: Glass eels that enter the Mar Menor come from the Mediterranean Sea

Sampling design and protocols

Sampling design description:

The abundance of recruits (glass eel) will be determined by sampling with specific trap gear. The sampling point has been selected based on experience from previous campaigns. The traps are set once a month, for a series of hours on new moon nights

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

Regional coordination: The design and sampling protocols were developed as part of a regional agreement

Link to sampling design documentation:

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year:

Data capture

Means of data capture: Specific traps for catching glass eels

Data capture documentation: Excel file

Quality checks documentation: NA

Data storage

National database: NA

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: NA

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_MURC_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL)

MS : ESP
Region : EMU_ES_Murc
Sampling scheme identifier : ANG_Murc_SciObsOnShore_Diadromous (commercial)
Sampling scheme type: Diadromous (commercial)
Observation type: SciObsOnShore
Time period of validity : 2022-2027
Short description (max 100 words): Scientists will carry out at least 3 controls on the commercial fisheries of yellow eel and silver eel from the hypersaline lagoon of the Mar Menor.
Description of the population
Population targeted: *Anguilla anguilla* **Population sampled**: Silver and yellow eels from Mar Menor lagoon **Stratification**: 50 individuals from each class (silver and yellow eels) will be processed
Sampling design and protocols
Sampling design description: During the eel fishing season in the Mar Menor, at least 3 controls will be carried out in which the weight, length and age will be determined. The controls will be carried out in the Lo Pagan Fish Market, where all the commercialization of the eel of the Mar Menor is carried out. 50 individuals from each class will be processed. Weight, length and age will be measured (yellow or silver) **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: The design and sampling protocols were developed as part of a regional agreement **Link to sampling design documentation**: NA **Compliance with international recommendations**: NA **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**:
Data capture
Means of data capture: NA **Data capture documentation**: Excel file **Quality checks documentation**: NA
Data storage
National database: NA **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA

Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: NA **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: ANG_MURC_SELFATSHORE_DIADROMOUS (COMMERCIAL)

MS : ESP

Region : EMU_ES_Murc

Sampling scheme identifier : ANG_Murc_SelfAtShore_Diadromous (commercial)

Sampling scheme type: Diadromous (commercial)

Observation type: SelfAtShore

Time period of validity : 2022-2027

Short description (max 100 words):

Yellow and silver eel catches in the Mar Menor lagoon

Description of the population

Population targeted: *Anguilla Anguilla*

Population sampled: *Anguilla Anguilla* from Mar Menor lagoon

Stratification: All catches of Silver and yellow eels from Mar Menor lagoon

Sampling design and protocols

Sampling design description: Specific monitoring of the fishery for this species consisting in for every lot of eel sold, the fisherman must fill in a document supervised by the Fishermen's Association which reflects the following data: boat, date, kg catch, type of eel (yellow or silver), gear (paranza or longline) and catch area.

This documentation is sent to the Fisheries and Aquaculture Service for processing and supervision.

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

Regional coordination: The design and sampling protocols were developed as part of a regional agreement

Link to sampling design documentation: NA

Compliance with international recommendations: NA

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year:

Data capture

Means of data capture: NA

Data capture documentation: Excel file

Quality checks documentation: NA

Data storage

National database: NA

International database: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx)

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: NA

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: ANG_NAVA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: Nava_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

sampling scheme aiming at characterizing the eel population in the Bidasoa River catchment (standing stock of yellow eels and the silver eel escapement), by collecting length and numbers of yellow eels and length, weight, sex ratio and numbers of silver eels.

Description of the population

Population targeted: The scheme covers the Bidasoa River and main tributaries and is carried out yearly in October by electrofishing 11 sites. Only yellow and silver eels are targeted.

Population sampled: Yellow and silver eels in freshwater habitats are targeted.

Stratification: Eels below 30cm are considered "colonising yellow eels" and are only measured. The length/weight relationship for these small eels was established years ago and the formula $y = 2E\text{-}07x^{3,3471}$ ($R^2 = 0,9822$; n=2237) is used to estimate the biomass.

Eels of 30cm or bigger are considered potentially migrant and therefore the biometric parameters to determine the silvering stage (as defined by Durif et al. 2003; 2005) are measured for each individual (length, weight, horizontal and vertical eye diameter and pelvic fin length).

Sampling design and protocols

Sampling design description: The catchment is sampled in 11 sites: 6 sites in the main Bidasoa River and 5 in the most important tributaries (Zia, Onin, Tximista, Latsa and Ezkurra streams). The entire potential distribution of eels in the catchment is covered.

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

Regional coordination: The sampling design and protocols were developed as part of the Eel Management Plan in Navarra, that was included in the Eel Management Plan in Spain.

Link to sampling design documentation: There is no link to a webpage where the documentation can be found. After some preliminary samplings carried out between 2009 and 2011, an internal document was developed in 2012 describing the sampling design and monitoring protocol: Elso J., Álvarez J. y Leunda P.M. (2012) Memoria Anguila 2011: situación de la especie y protocolo de seguimiento. Informe técnico elaborado por G.A.N.A.S.A. para el Gobierno de Navarra. This protocol is reviewed every year and the latest versión is: Elso J. (2024) Protocolo para la toma de datos de anguila. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found. An internal document was developed in 2013 describing the sampling protocol and is still in force: Elso J., Álvarez J. y Leunda P.M. (2013) Protocolo de muestreos de anguila en la cuenca del Bidasoa. Informe técnico elaborado por G.A.N.A.S.A. para el Gobierno de Navarra.

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture: The localities are sampled by electric fishing, applying the method of successive catches without return, carrying out as many passes as necessary to obtain reliable results. In the stations of the main river, a wet surface of not less than 500 m^2 is sampled, delimiting an area of 50x10 meters with stakes in those stations

of the main river of greater width. In tributaries, 100 linear meters are sampled. The total area sampled is measured and the effective fishing time is taken to determine the effort made. All the catches of each fishing are kept separate for the subsequent taking of biometric data. These are taken as follows:

- Total length: with a fish measuring board, in millimeters, accuracy of ± 1 mm
- Weight: with a scale, in grams, accurate to ± 1 g
- Ocular diameter: with a digital caliper, in millimeters, precision of ± 0.01 mm. The diameter is measured on both the vertical and horizontal axes.
- Pectoral fin length: with a digital caliper, in millimeters, accurate to ± 0.01 mm. The maximum length of the fin is measured, from insertion to limit

Data capture documentation: There is no link to a webpage where the documentation can be found. An internal document was developed in 2013 describing the protocol for biometric data collection and it is reviewed every year. The last review is: Elso J. (2024) Protocolo para la toma de datos de anguila. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Ichthyological Registry of Navarra.

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage

No samples are stored or analysed.

Data processing

Evaluation of data accuracy (bias and precision): 'N'

Editing and imputation methods: 'N'

Quality document associated to a dataset: 'N'

Validation of the final dataset: 'N'

SAMPLING SCHEME IDENTIFIER: ANG_VALE_SCIOBS WATER BODY_DIADROMOUS (COMMERCIAL)

MS : ESP

Region : Mediterranean and Black Sea

Sampling scheme identifier : ANG_Vale_SciObs water body_Diadromous (commercial)

Sampling scheme type: Diadromous (commercial)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

Catches sampling (GE, Y and S) in EMU_Vale

Description of the population

Population targeted: *Anguilla anguilla*

Population sampled: *Anguilla Anguilla* from EMU_Vale

Stratification: All the eel cathes (GE, Y and S) in EMU_Vale

Sampling design and protocols

Sampling design description:

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

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

- Valencia: There are 4 fishing associations: In the Albufera, -which is a 2100 ha costal lagoon between Turia and Júcar Rivers-, El Palmar, Silla, Catarroja associations exercise their rights to exploit the yellow and silver eel. Eel fishery in the Albufera has its own regulation and two types of fishing are considered: the fixed place fishing (named "redolins") and the traveling fishing. The fishermen community of El Palmar is the fishing organization with the major tradition and number of members, and the only one that is allowed to fish in fixed places in the lagoon. On the other hand, Molinell association operates in the Molinell river, which constitutes the channel that connects Pego-Oliva marsh (an agrarian landscape with a traditional economic activity) with the sea. They also use fixed places for eel fishery.
- Alicante: In this province, professional fishery occurs in 15 fishing preserves located between the El Hondo wetlands (Elche) and the salt flats of Santa Pola. In the fishing preserve of Alicante, a maximum number of fishing rigs (named "mornells") is allowed.

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

Regarding length and weight measurements, glass eels and eels are selected at random from:

1) The deliveries made by the glass eel fishermen to the administration, at the Tuéjar fish farm. Data on weight and length of 150 glass eels shall be taken from the deliveries (a part of the catch) made by all professional glass eel fishermen to the administration.

2) Thee catches of the day (or of several days if there were not enough in a single day), at the Palmar fish market. Data on the weight and length of 100 eels will be taken from a sample of the catches made by the professional fishermen of Palmar in the Albufera of Valencia.

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

Regional coordination: NA

Link to sampling design documentation: NA

Compliance with international recommendations: N. **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: NA **Data capture documentation**: NA **Quality checks documentation**: NA
Data storage:
National database: ***NA*** **International database**: The data collected within the National Plan are requested through a data calll by ICES and are hosted in the ICES eel database. In addition, data are published in the annual Spanish Country Report ICES/EIFAC/GFCM WGEEL (https://www.ices.dk/community/groups/Pages/WGEEL.aspx) **Quality checks and data validation documentation**: the ices eel working group (WGEEL) reviews the information before incorporating it into its database.
Sample storage: NA
Data processing
Evaluation of data accuracy (bias and precision): N **Editing and imputation methods: N.** **Quality document associated to a dataset**: **N.** **Validation of the final dataset**: **N.**

SAMPLING SCHEME IDENTIFIER: SEATROUT_NAVA_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: Seatrout_ Nava_SciObs water body_Diadromous (recreational)

Sampling scheme type: Diadromous (recreational)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

sampling scheme aiming at gathering information about the sea trout that are caught by anglers during the angling season, by collecting numbers and biometric data (length, weight, sex and age). Each time an angler catches a sea trout, must call the rangers who collect the data. Please, be aware that this sampling scheme is subject to angling authorization. Since angling was banned in the years 2023 and 2024, no data from this source were gathered.

Description of the population

Population targeted: The scheme covers all sea trout caught in the Bidasoa River between the sea and the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea), the only river stretch where sea trout angling is authorized.

Population sampled: Spring migrating sea trout in their freshwater stage are targeted.

Stratification: Males and females are distinguished (based on morphologic characters) and age (based on scale reading). Angling is only authorized between 1st of May and 31st of July.

Sampling design and protocols

Sampling design description: All sea trout captured during the angling season. Individual biometric data are taken.

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

Regional coordination: The sampling design and protocols were developed in the 90's and have been reviewed periodically.

Link to sampling design documentation: There is no link to a webpage where the documentation can be found.

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found.

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture: When an angler catches a sea trout, must call the rangers who verify that the fish has been legally caught. If so, a legal certificate allowing the animal to be transported is issued. The ranger then collects the following data:

- Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm
- Weight: with a scale, in grams, accurate to ± 50 g
- Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination

Data capture documentation: There is no link to a webpage where the documentation can be found.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Ichthyological Registry of Navarra.

International database: 'NA'

Quality checks and data validation documentation: 'N'
Sample storage
Scales are read for age determination (river and sea age) and stored in GAN-NIK.
Data processing
Evaluation of data accuracy (bias and precision): 'N' **Editing and imputation methods:** 'N' **Quality document associated to a dataset**: 'N' **Validation of the final dataset**: 'N'

SAMPLING SCHEME IDENTIFIER: SEATROUT_NAVA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: Seatrout_ Nava_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

sampling scheme aiming at characterizing the sea trout population migrating upstream in the Bidasoa River, by collecting numbers and biometric data (length, weight, sex and age)

Description of the population

Population targeted: The scheme covers all sea trout that migrate upstream the Bidasoa River through the Migratory Fish Control Station (located upstream of the angling area, in Bera, 17.5Km upstream of the sea).

Population sampled: Migrating Sea Trout in their freshwater stage are targeted.

Stratification: Males and females are distinguished (based on morphologic characters) and age (based on scale reading)

Sampling design and protocols

Sampling design description: All sea trout reaching the Migratory Fish Control Station are captured in a fish trap and individual biometric data are taken, before they are released upstream of the fish trap.

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

Regional coordination: The sampling design and protocols were developed in the 90's and have been reviewed periodically.

Link to sampling design documentation: There is no link to a webpage where the documentation can be found.

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found.

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture: All sea trout reaching the Migratory Fish Control Station are captured in a fish trap, counted and individual biometric data are taken, before they are released upstream of the fish trap. After anesthetizing the fish, biometric data are taken as follows:

- Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm
- Weight: with a scale, in grams, accurate to ± 50 g
- Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination

Data capture documentation: There is no link to a webpage where the documentation can be found.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Ichthyological Registry of Navarra.

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage
Scales are read for age determination (river and sea age) and stored in GAN-NIK.
Data processing
Evaluation of data accuracy (bias and precision): 'N' **Editing and imputation methods:** 'N' **Quality document associated to a dataset**: 'N' **Validation of the final dataset**: 'N'

SAMPLING SCHEME IDENTIFIER: SEATROUT_GALI_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : Seatrout_Gali_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

Counting of upstream migrants in a fish trap.

Description of the population

Population targeted: Salmo trutta

Population sampled: Sea trout run in rivers Landro, Ulla and Lérez. Smolt run in river Ulla

Stratification: The fraction of individuals that cross the obstruction through the fish trap. Samples are stratified for each river individually.

Sampling design and protocols

Sampling design description:

1) An index of abundance will be derived from density in the lowest reach of rivers, obtained from electrofishing surveys

2) An index of abundance of adults will be estimated from recreational catch and fish trap

3) Biometry of adults will be derived from recreational catch and fish trap samples.

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

Regional coordination: No

Link to sampling design documentation: NA

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Field forms

Data capture documentation: Original field forms are digitized and stored as pdf., and data are written and stored in a database.

Quality checks documentation: NA

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: SALMON_ASTU_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Astu_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of Asturias
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Asturias **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling. 1) The abundance of parr will be derived from electrofishing surveys in autum 2) Abundance of adults will be estimated from recreational catch and salmons passing in the fish trap traps (sampled every 1-2 days.) 3) Abundance of adults will be estimated from an annual underwater Visual Census: once a year 2 divers enter each river and make an assesment of the population. 4) Biometry of adults will be derived from recreational catch and fish trap samples. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Data is reported to the ministry **International database**: Data is reported to NASCO and ICES if required **Quality checks and data validation documentation**: NA
Sample storage

NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: SALMON_BASQ_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : Salmon_Basq_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2022-2027

Short description (max 100 words):

Salmon sampling int the rivers of the Basque Country with current salmon presence

Description of the population

Population targeted: Salmo salar

Population sampled: the main rivers available for the species in the Basque Country

Stratification: Samples are stratified by river in order to obtain a weighted average.

Sampling design and protocols

Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling.

1) The abundance of parr will be derived from electrofishing surveys between March and Mau. Conventional catch-depletion removal methods are used, usually applying Carle-Strub or Seber-LeCren estimators or CPUE formulae in the case of a unique pass.

2) Abundance of adults will be estimated from salmons passing in the fish trap between March and Decemeber

3) Biometry will be derived from electrofishing and fish trap samples.

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

Regional coordination: No

Link to sampling design documentation: NA

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Field stadia

Data capture documentation: Original field stadia are digitized and stored as Excel

Quality checks documentation: NA

Data storage

National database: NA

International database: Data is reported ICES if required

Quality checks and data validation documentation: NA

Sample storage

NA

Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: SALMON_CANT_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Cant_SciObs water body_Diadromous (recreational)
Sampling scheme type: Diadromous (recreational)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of Cantabria
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Cantabria **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: the catches are reported by the fishermen are weighed and measured **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Archivos de la Dirección General de Montes y Biodiversidad **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: SALMON_CANT_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Cant_SciObs water body_Diadromous (scientific)
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity : 2022-2027
Short description (max 100 words): Salmon sampling int the rivers of Cantabria
Description of the population
Population targeted: Salmo salar **Population sampled**: the main rivers available for the species in Cantabria **Stratification**: Samples are stratified by river in order to obtain a weighted average.
Sampling design and protocols
Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling. 1) The abundance of parr will be derived from electrofishing surveys in August_september 2) Abundance of adults will be estimated from recreational catch and salmons passing in the fish trap traps (sampled every 1-2 days.) 4) Biometry of adults will be derived from recreational catch **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field stadia **Data capture documentation**: Original field stadia are digitized and stored as Excel **Quality checks documentation**: NA
Data storage
National database: Archivos de la Dirección General de Montes y Biodiversidad **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing

Evaluation of data accuracy (bias and precision): NA

Editing and imputation methods: NA

Quality document associated to a dataset: N

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: SALMON_GALI_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL)

MS : ESP
Region : North-East Atlantic
Sampling scheme identifier : Salmon_Gali_SciObs water body_Diadromous (recreational)
Sampling scheme type: Diadromous (recreational)
Observation type: Self water body
Time period of validity : 2022-2027
Short description (max 100 words): Compilation of biometric data of the recreational catch of atlantic salmón (declaration of catches is mandatory in Galicia)
Description of the population
Population targeted: Galicia for atlantic salmon (Salmo salar) in the main rivers were recreational fishing is allowed: Eo, Masma, Mandeo, Ulla and Miño. **Population sampled**: Adult fish legally caught. **Stratification**: Samples are stratified as each river has his own and separate population.
Sampling design and protocols
Sampling design description: Every salmon is measured andweighted. **Is the sampling design compliant with the 4S principle?**: NA **Regional coordination**: No **Link to sampling design documentation**: NA **Compliance with international recommendations**: Y **Link to sampling protocol documentation**: NA
Sampling implementation
Recording of refusal rate: NA. **Monitoring of sampling progress within the sampling year**: NA
Data capture
Means of data capture: Field forms **Data capture documentation**: Original field forms are digitized and stored as pdf., and data are written and stored in a database. **Quality checks documentation**: NA
Data storage
National database: NA **International database**: NA **Quality checks and data validation documentation**: NA
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA

Quality document associated to a dataset: N

Validation of the final dataset: NA

SAMPLING SCHEME IDENTIFIER: SALMON_GALI_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier : Salmon_Gali_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: Self water body

Time period of validity : 2022-2027

Short description (max 100 words):

Salmon sampling int the rivers of Galicia

Description of the population

Population targeted: Salmo salar

Population sampled: the main rivers available for the species in Galicia Eo, Masma, Ouro, Landro, Mera, Xubia, Mandeo, Anllóns, Ulla, Lérez, Miño (tributaries)

Stratification: Samples are stratified by river in order to obtain a weighted average.

Sampling design and protocols

Sampling design description: Sampling design intends to cover the whole accessible area, in a kind of systematic sampling.

1) The abundance of parr will be derived from electrofishing surveys. Conventional catch-depletion removal methods are used, usually applying Carle-Strub or Seber-LeCren estimators or CPUE formulae in the case of a unique pass.

2) The abundance of smolts will be derived from numbers in the fish trap.

3) Abundance of adults will be estimated from recreational catch and salmons passing in the fish trap

4) Biometry of adults will be derived from recreational catch and fish trap samples.

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

Regional coordination: No

Link to sampling design documentation: (Hervella & Caballero, 1999). Inventariación piscícola de los ríos gallegos. 126 pp. ISBN-13: 978-84-453-2458-5, ISBN: 84-453-2458-6

Compliance with international recommendations: Y

Link to sampling protocol documentation: NA

Sampling implementation

Recording of refusal rate: NA.

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Field forms

Data capture documentation: Original field forms are digitized and stored as pdf., and data are written and stored in a database application which is capable to analyze data and derive estimations.

Quality checks documentation: NA

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: NA

Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): NA **Editing and imputation methods:** NA **Quality document associated to a dataset**: N **Validation of the final dataset**: NA

SAMPLING SCHEME IDENTIFIER: SALMON_NAVA_SCIOBS WATER BODY_DIADROMOUS (RECREATIONAL)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: Salmon_Nava_SciObs water body_Diadromous (recreational)

Sampling scheme type: Diadromous (recreational)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

sampling scheme aiming at gathering information about the adult salmon that are caught by anglers during the angling season, by collecting numbers and biometric data (length, weight, sex, origin, sanitary status and age). Each time an angler catches a salmon, must call the rangers who collect the data. Please, be aware that this sampling scheme is subject to angling authorization. Since angling was banned in the years 2023 and 2024, no data from this source were gathered.

Description of the population

Population targeted: The scheme covers all adult salmon caught in the Bidasoa River between the sea and the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea), the only river stretch where salmon angling is authorized.

Population sampled: Spring migrating adult Salmon in their freshwater stage are targeted.

Stratification: Males and females are distinguished (based on genetic analysis), origin (wild or hatchery) and 1SW and MSW (based on scale reading). Angling is only authorized between 1st of May and 31st of July.

Sampling design and protocols

Sampling design description: All salmon captured during the angling season. Individual biometric data are taken.

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

Regional coordination: The sampling design and protocols were developed in the 90's and have been reviewed periodically. Now they are included in the Salmon Management Plan in Navarra and in the NASCO Implementation Plan.

Link to sampling design documentation:

https://nasco.int/wp-content/uploads/2022/01/CNL2170_Implementation-Plan_EU-SpainNavarra.pdf

https://www.navarra.es/documents/48192/7222658/Memoria_Salmon_2022.pdf/5bbf5b0f-993e-fbbc-89f9-c654cde50ea0?t=1707987154440

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found. An internal document is developed every year describing the sampling protocol. The last one is: Elso J., (2024) Protocolo de toma de datos y muestras de salmón durante la temporada de pesca. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture: When an angler catches a salmon, must call the rangers who verify that the salmon has been legally caught. If so, a legal certificate allowing the animal to be transported is issued. The ranger then collects the following data:

- Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm
- Weight: with a scale, in grams, accurate to ± 50 g

- Maximum height: with a fish measuring board, in millimeters, accuracy of ± 1 mm
- Upper maxilla length: with a caliper, in millimeters, precision of ± 1 mm.
- Tissue sample: small cut from the fin (preferably from the adipose fin), preserved in a numbered Eppendorf tube with 96% alcohol. This sample is used for sex determination.
- Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination
- Sanitary status: a visual review of the health status (parasites, wounds, etc.) and the determination of the RVS (Red Vent Syndrome) is carried out
- Fish origin: it is verified if the adipose fin has been cut (fish farm origin) or not (wild origin). In case it is a fish farm salmon, the presence of a CWT (Coded Wire Tag) in the salmon head must be verified (with a CWT hand held detector). If a CWT is detected, the angler has to allow the ranger to cut the head of the salmon, so the CWT can be recovered.

Data capture documentation: There is no link to a webpage where the documentation can be found. An internal document is developed every year describing the sampling protocol. The last one is: Elso J., (2024) Protocolo de toma de datos y muestras de salmón durante la temporada de pesca. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Salmon Database of Navarra and the Ichthyological Registry of Navarra. A report is published with all the sampling results on a yearly basis.

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage

Tissue samples are analysed for sex determination and stored in the University of Vigo.

Scales are read for age determination (river and sea age) and stored in GAN-NIK.

Results of both analysis are included in the annual report.

Data processing

Evaluation of data accuracy (bias and precision): 'N'

Editing and imputation methods: 'N'

Quality document associated to a dataset: 'N'

Validation of the final dataset: 'N'

SAMPLING SCHEME IDENTIFIER: SALMON_NAVA_SCIOBS WATER BODY_DIADROMOUS (SCIENTIFIC)

MS : ESP

Region : North-East Atlantic

Sampling scheme identifier: Salmon_Nava_SciObs water body_Diadromous (scientific)

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity : 2025-2027

Short description (max 100 words):

sampling scheme aiming at characterizing the juvenile and migrating adult salmon population in the Bidasoa River catchment, by collecting length and numbers of salmon parr (0+) and numbers and biometric data (length, weight, sex, origin, sanitary status and age) of the returning adults..

Description of the population

Population targeted:

Parr The scheme covers the Bidasoa River and main tributaries and is carried out yearly in September by electrofishing 31 sites. Only salmon parr are targeted. Most of them are 0+, but a few 1+ are also found.

Adult The scheme covers all adult salmon caught migrating upstream in the Bidasoa River through the Migratory Fish Control Station (located in Bera, 17.5Km upstream of the sea), the only river stretches where salmon angling is authorized.

Population sampled: Salmon parr and migrating adult Salmon in their freshwater stage are targeted.

) are targeted.

Stratification:

Parr: parr below 130mm in the main river and 110mm in tributaries are considered 0+. Parr longer that those measures are considered 1+. Hatchery origin fish are distinguished from those of wild origin as the former have the adipose fin clipped.

Adult: Males and females are distinguished (based on genetic analysis) and 1SW and MSW (based on scale reading). Origin of fish (wild or hatchery) is also noted.

Angling is only authorized between 1st of May and 31st of July.

Sampling design and protocols

Sampling design description:

Parr**:** The catchment is sampled in 31 sites: 16 sites in the main Bidasoa River and 15 in the most important tributaries. The entire potential distribution of salmon in the catchment is covered.

Adult: All salmon captured during the angling season. Individual biometric data are taken

Adult: All salmon reaching the Migratory Fish Control Station are captured in a fish trap and individual biometric data are taken, before they are released upstream of the fish trap.

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

Regional coordination: The sampling design and protocols were developed in the 90's and have been reviewed periodically. Now they are included in the Salmon Management Plan in Navarra and in the NASCO Implementation Plan.

Link to sampling design documentation:

https://nasco.int/wp-content/uploads/2022/01/CNL2170_Implementation-Plan_EU-SpainNavarra.pdf

https://www.navarra.es/documents/48192/7222658/Memoria_Salmon_2022.pdf/5bbf5b0f-993e-fbbc-89f9-c654cde50ea0?t=1707987154440

Compliance with international recommendations: 'Y'.

Link to sampling protocol documentation: There is no link to a webpage where the documentation can be found. An internal document is developed every year describing the sampling protocol. The last one is: Elso J., (2024) Protocolo para la toma de datos y muestras de salmón en la Estación de Seguimiento de Peces Migradores de Bera/Lesaka. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra

Sampling implementation

Recording of refusal rate: 'NA'

Monitoring of sampling progress within the sampling year: No sampling allocations are adjusted

Data capture

Means of data capture:

Parr: The localities are sampled by electric fishing, applying the method of successive catches without return, carrying out as many passes as necessary to obtain reliable results. In eight of the sampling sites of the main channel, semi-quantitative samplings (5 'of effective fishing) are carried out to calculate the abundance index and in the other eight and in the two main tributaries (Tximista and Ezkurra) a complete quantitative inventory is also carried out, to estimate population density. Only quantitative inventories are carried out at the other 13 sampling points of the tributaries. In the stations of the main river, a wet surface of not less than 500 m^2 is sampled, delimiting an area of 50x10 meters with stakes in those stations of the main river of greater width. In tributaries, 140 linear meters are sampled. The total area sampled is measured and the fishing time is taken to determine the effort made. All the catches of each fishing are kept separate for the subsequent taking of biometric data. Fork length is measured with a fish measuring board (in millimeters, accuracy of ± 1 mm) for all individuales and it is checked if the adipose fin is cut, to verify the origin of the fish (hatchery or wild)

Adult: All adult salmon migrating upstream of the Bidasoa River reaching the Migratory Fish Control Station are monitored by the rangers of the Government of Navarra. The rangers collect the following data of each individual:

Fork length: with a fish measuring board, in millimeters, accuracy of ± 5 mm

- Weight: with a scale, in grams, accurate to ± 50 g
- Maximum height: with a fish measuring board, in millimeters, accuracy of ± 1 mm
- Upper maxilla length: with a caliper, in millimeters, precision of ± 1 mm.
- Tissue sample: small cut from the fin (preferably from the adipose fin), preserved in a numbered Eppendorf tube with 96% alcohol. This sample is used for sex determination.
- Scale sample: 6–8 scales taken with forceps from the left flank, between the dorsal fin and the lateral line, and stored in a numbered envelope. Used for their age determination
- Sanitary status: a visual review of the health status (parasites, wounds, etc.) and the determination of the RVS (Red Vent Syndrome) is carried out
- Fish origin: it is verified if the adipose fin has been cut (fish farm origin) or not (wild origin). In case it is a fish farm salmon, the presence of a CWT (Coded Wire Tag) in the salmon head must be verified (with a CWT hand held detector). If a CWT is detected, the angler has to allow the ranger to cut the head of the salmon, so the CWT can be recovered.

Data capture documentation: There is no link to a webpage where the documentation can be found. Internal documents were developed in 2013 describing the protocols for electrofishing and biometric data collection in the Migratory Fish Control Station and they are reviewed every year. The last review are: Elso J. (2024) Protocolo para la toma de datos de juveniles de salmón. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra and Elso J. (2024) Protocolo para la toma de datos y muestras de salmón en la Estación dre Seguimiento de Peces Migradores de Bera/Lesaka. Informe técnico elaborado por GAN-NIK para el Gobierno de Navarra.

Quality checks documentation: 'N'

Data storage

National database: All data gathered are stored in the Ichthyological Registry of Navarra. A report is published with all the sampling results on a yearly basis.

International database: 'NA'

Quality checks and data validation documentation: 'N'

Sample storage

Parr: No samples are stored or analysed. Adult: Tissue samples are analysed for sex determination and stored in the University of Vigo. Scales are read for age determination (river and sea age) and stored in GAN-NIK. Results of both analysis are included in the annual report.
Data processing
Evaluation of data accuracy (bias and precision): 'N' **Editing and imputation methods:** 'N' **Quality document associated to a dataset**: 'N' **Validation of the final dataset**: 'N'

ANNEX 1.2 - QUALITY REPORT FOR SOCIOECONOMIC DATA SAMPLING SCHEME

The quality report fulfils Article 6 (3) (d) of the Regulation (EU) 2017/1004. This document is intended to specify data to be collected under chapter II, points 3, 5, 6, and 7 of the Delegated Decision annex: Socioeconomic data on fisheries, aquaculture and any complementary data collection of fishing activity and fish processing.

Use this document to describe quality aspects of the data collection process (design, sampling implementation, data capture, data storage and data processing etc.). The annex should be filled for each sampling scheme. Where applicable, use the handbook on sampling design (Deliverable 2.1 from MARE/2016/22 SECFISH study), available on the DCF website.

Provide information under each point in all sections.

Please indicate sampling scheme identifier (e.g combination of 'sector' and 'sampling scheme' or 'variables' from the annex table). Each identifier is unique and can be used only once; records with identical scheme identifiers are overwritten in the platform. Do not add any tables others than from the template.

Create a first survey specification record as a reference to the regional WP, add 'RWP ECON' in the 'sector name' field and leave the other fields empty.

REGIONAL WORK PLAN ECON

Survey specifications
Sector name(s): RWP ECON
Sampling scheme:
Variables:
Supra region(s):
Survey planning
Survey design and strategy
Estimation design
Error checks
Data storage and documentation

Revision
Confidentiality

SAMPLING SCHEME IDENTIFIER: FISHERIES. PROBABILITY SAMPLE SURVEY

Survey specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Fisheries
Sampling scheme: Probability sample survey
Variables: All variables in tables 7 and 9 less Value of physical capital and Consumption of fixed capital (Inactives)
Supra region(s): All Supra regions
Survey planning
The statistical unit or observation unit is each of the vessels included in the CFP (Operative Fishing Fleet Census, in Spanish), which can perform marine fishing, classified in group 03.11 of the National Activities Classification (CNAE-2009). **The reporting unit** is the vessel's owner. **The sampling unit** is each CFP vessel with activity during the referred year. **The analysis unit**, or economic activity unit is the vessel, therefore, it coincides with the observation unit.
Survey design and strategy

Data sources:

Stratified random sampling. The main variable of this survey is the economic profitability of the ship, and the auxiliary variable to be used to stratify is the GT, a variable of which the population distribution is known.

Stratification: Survey population was divided into strata, according to the auxiliary variable GT, with the aim of obtaining groups on vessels as homogeneous as possible within stratum GT and with the greatest possible heterogeneity among the different strata, in relation to the profitability of the vessels.

Strata were defined according to statistic, biological (similarity in the fishing grounds' characteristics), and technical (type of fishing methods utilised and vessel length).

In addition to the above-mentioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Strata cannot contain less than 10 elements: strata not meeting this condition are grouped with others.

Sample sizes

Sample size: with optimum allocation. Total sample size is determined aiming to estimate the median GT of the population with an expected error of 5%, that is, a 95% level of confidence.

Sample selection: In the population database, vessel data will appear together with the vessel's owner data. By selecting the statistical units, reporting units of the survey are perfectly demarcated.

The various ships in the population are grouped according to the stratum to which they belong, and in each of these groups, membership or not of each of the vessels to the stratum will be randomly allocated. The result is a set of random and mutually independent subsamples.

The size of each of these subsamples will be previously determined by the (previously set) expected error level.

Estimation design

Calculation method for population estimate.

Method to calculate the population estimate from the sample.

The population under study has been divided into strata, for the purposes of sample design, based on the auxiliary variable GT, with the aim of achieving groups of vessels with a GT that is as homogeneous within the stratum and with the greatest possible heterogeneity. between the different strata, in relation to the economic profitability of the vessels. All this so that the representativeness of the vessels, within each stratum, is as high as possible. In this way, when applying the corresponding sample design, samples will be obtained that will have the least possible number of units to be sampled.

Sample size.

- Total sample size with optimal allocation.

The total sample size to estimate the mean GT of the population with an expected error of 5% to 95% confidence level, has been calculated assuming that an optimal allocation is going to be made and that a normal population is considered.

The formula used to calculate the sample size n is the following:

$$n = \frac{\left(\sum_{h=1}^{h=L} N_h S_h\right)^2}{\frac{N^2 e^2 \overline{X}^2}{z^2} + \sum_{h=1}^{h=L} N_h S_h^2} \qquad (1)$$

Where: h is the number of strata ranging from 1 to L (maximum number of strata), Nh the size of stratum h, N the size of the population, Sh the standard deviation of stratum h, the mean GT of the population, and the error of the estimate and z the standardized variable for the chosen confidence level.

- Assignment of the sample by strata.

The allocation of the sample to each of the strata is calculated by applying a double allocation or distribution of the sample (allocation of commitment), considering the estimators of the totals of the variable Tonnage (GT) and the proportionality of vessels within each stratum .
The commitment of the sample to the strata is carried out using the following formulas:

Optimal Attachment

$$nOP_h = n \frac{N_h S_h}{\sum_{h=1}^{h=L} N_h S_h} \quad (2)$$

Being: n, h, Nh and Sh the same statistics as in (1).

Proportional allocation

$$nP_h = n \frac{N_h}{\sum_{h=1}^{h=L} N_h} \quad (3)$$

Being: n, h and Nh the same statistics as in (1).

The Compromise Allocation between minimum (optimal) and proportional variance will be weighted ¾, ¼ for each of the allocations.

$$n_h = nOP_h * 3/4 + nP_h * 1/4 \quad (4)$$

Sample selection

- Determination of the reporting units.

The reporting unit can articulate around the ship, but doing so would mean losing the necessary information in those in which a shipowner has more than one ship, since it can report on all the ships it controls, without additional effort.

For these reasons, it is proposed to adopt the shipowner as the reporting unit, who will be questioned about all the vessels it manages, although it must be taken into account that these vessels may not belong to the sample and will therefore not be taken into account in the elevations. .

In the population database the data of the vessels will appear together with the data of the owners thereof. When selecting the statistical units, the reporting units of the survey are perfectly delimited.

- General description of the sample selection procedure.

As the ship is the sampling unit, it is necessary that the selection of any unit within the sample is random within the stratum to which it belongs.

The different vessels in the population will be grouped according to the stratum to which they belong, and in each of these groups the membership or not of each of the vessels in the stratum sample will be randomly drawn. The result is a set of random and independent subsamples.

The size of each of the aforementioned subsamples will be previously determined by the level of error that is set.

Estimators

The population estimators of the total of the main variable and the rest of the variables of interest will be estimated. The variables of interest will be estimated using stratified sampling procedures.

From the data contained in the questionnaire, the variables whose population values are of interest will be constructed.

The relevant formulas for stratified random sampling are:

- Estimation of population mean : $\hat{\bar{X}}_S$

$$\hat{\bar{X}}_S = \sum_{h=1}^{h=L} W_h \bar{x}_h \qquad (3)$$

Where: $\bar{X}_h$ the mean of the variable observed in stratum h and $W_h = N_h / N$ the weight of stratum h.

- Estimated variance of the population mean $V(\hat{\bar{X}}_S)$:

$$V\left(\hat{\bar{X}}_S\right) = \sum_{h=1}^{h=L} W_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \qquad (4)$$

Where: Nh is the population size of the stratum, nh the size of the sample in stratum h.

- Estimate of the total population, $\hat{X}_S$:

$$\hat{X}_S = \sum_{h=1}^{L} N_h \bar{x}_h \qquad (5)$$

Where: Nh is the population size of the stratum and $\bar{X}_h$ the mean of the variable observed in each stratum.

- Estimated variance of the total population, $V(\hat{X}_S)$:

$$V(\hat{X}_S) = \sum_{h=1}^{h=L} N_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \qquad (6)$$

All parameters match those described in expression (4).

Calculation method for derived data:

The different economic variables requested from the informant are considered of two types; mandatory response and non-mandatory response. Those with a mandatory response are compulsorily collected, and those with a non-mandatory response can have a value or be zero in case there is no value. Therefore, no values are imputed.

Nonresponse handling.

Treatment of total lack of response and treatment of stratum change.

The lack of response, generated by some heads of the sampling units, will imply an increase in the level of error. A different case is the location of the units that have been decommissioned or are no longer in operation, these cases will imply a variation in the framework of the initial population.

Total lack of response and treatment of stratum change will be treated as follows:

The basic estimator (unbiased estimator of expansion in stratified sampling)

$$\hat{X} = \sum_h \frac{N_h}{n_h} \sum_i x_i$$

being:

Nh: Total number of units in the directory in stratum h

nh: Number of units selected for the sample in stratum h

Xi: Value of the observed variable X in unit i of stratum h

It is corrected from the corrections made in the elevation factor due to the various types of incidents that arise during field work: total non-response, change of stratum, etc.

Thus, the final elevation factor will be:

If there is no change in stratum: $\frac{N_h}{n_h}$

If there is a change of stratum: $\frac{\hat{N}_h^*}{n_h^*}$

being:

n_h^* : Number of units of the effective sample that has not changed stratum

$\hat{N}_h^*$: Number of units in the directory in stratum h obtained by deflating as a function of losses and changes in stratum

$$\hat{N}_h^* = N_h \left(1 - \frac{b_h}{n_h}\right) - \sum_{h \neq k} \frac{N_h}{n_h} n_h^k$$

b_h : Number of units that are low in the sample (sample incidence of frame correction)

n_h^k : Number of units selected in stratum h and that really belong to stratum k

Final expression of the estimator:

$$\hat{X} = \sum_h \left\{ \sum_{i=1}^{n_h^*} \frac{\hat{N}_h^*}{n_h^*} x_i + \sum_{k \neq h} \frac{N_k}{n_k} \sum_{i=1}^{n_k^h} x_i \right\}$$

The first addend represents the contribution of the units that have not changed stratum.

The second addend represents the contribution of the units selected in stratum k and that really belong to h.

Treatment of incidents

In the event that an incident occurs once the questionnaires have been collected, they will be treated as follows.

First, the different situations are defined:

E : RESPONDENTS, sample units located and surveyed, are considered Surveyable.

B : LOW, units which are on leave during the reference year and it is not expected that they will be active again, therefore they will be considered Non-surveyable.

I : INACTIVE, those units that have not had activity during the study period are considered, but it is known that in future periods they will be able to do so. They are considered to be surveyable with incidents.

N : NEGATIVE, those sample units that have not wanted to answer the survey or that after several attempts to carry out the survey have been unsuccessful. They are considered to be surveyable with incidents.

IL : ILOCALIZABLE, sample units that could not be surveyed because they were not located. They will be considered Surveyable with incidents.

AS : ABSENT, sample units that are absent in all data collections. They will be considered pollstable with incidents.

F : DECEASED, those sample units located but deceased. They are considered not surveyable.

J : RETIRED, retired sample units, will be considered not surveyable.

IN : DISABLED, are the sample units that during the period under study have been unable to carry out their activity. Each particular case will be studied to determine whether in successive periods the sample unit will be able to carry out the activity or will have to be terminated. In the first case, they will be considered Surveyable with incidents.

In the case of the sample units considered Not to be surveyed, the reason for not having their information for the design of future surveys will be noted and they will affect the survey frame by reducing it by the corresponding percentage.

It will be necessary to document each of the situations described above with confirmation from the interviewer.

The theoretical design of the sampling work is developed in the published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx

Error checks

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All questionnaires are checked and their information is recorded. This is done visually by comparing the physical questionnaire with the electronic one.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded for that ship.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

Described in published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-

maritima/default.aspx

Data storage and documentation

Data storage:

INFORMATION STORAGE METHOD

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to be able to identify the holders.

Documentation:

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/pesca-maritima/encuesta-economica-pesca-maritima/default.aspx

Revision

The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection.

The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU

Confidentiality

Are procedures for confidential data handling in place and documented?

No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data

Are protocols to enforce confidentiality between DCF partners in place and documented?

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In accordance with confidentiality legislation, data will not be published or shared if they identify the owner of the same.

SAMPLING SCHEME IDENTIFIER: FISHERIES. CENSUS

Survey specifications

Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex.

Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.

Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.

Sector name(s): Fisheries

Sampling scheme: Census

Variables: Value of physical capital and Consumption of fixed capital (Inactives)

Supra region(s): All Supra regions

Survey planning

The statistical unit or observation unit is each of the vessels included in the CFP (Operative Fishing Fleet Census, in Spanish), which can perform marine fishing, classified in group 03.11 of the National Activities Classification (CNAE-2009).

The reporting unit is the vessel's owner.

The sampling unit is each CFP vessel.

The analysis unit, or economic activity unit is the vessel, therefore, it coincides with the observation unit.

Survey design and strategy

Data sources

The data source are data collection questionnaires and estimates obtained through the PIM method.

Sample sizes:

The sample sizes for these variables are all active and inactive vessels from the Operational Fleet Census.

Survey methods:

The information is collected through questionnaires carried out in person and by telephone.

Additional information used in the survey strategy:

To obtain the information necessary for the estimation of the variables through the PIM method, the annual information is collected in the questionnaires of the economic survey and through consultations on the Operational Fleet Census, and they are stored in historical databases that are used to obtain data on the age of the vessels, GT, prices per unit of capacity ...

Stratification: Strata were defined according to statistic, biological (similarity in the fishing grounds' characteristics), and technical (type of fishing methods utilised and vessel length).

In addition to the above-mentioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Strata cannot contain less than 10 elements: strata not meeting this condition are grouped with others.

Estimation design

Calculation method for population estimate
The population estimate is calculated as the sum of the values obtained by stratum of the PIM method

Error checks

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All questionnaires are checked and their information is recorded. This is done visually by comparing the physical questionnaire with the electronic one.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded for that ship.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

Data storage and documentation

Data storage:

INFORMATION STORAGE METHOD

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to be able to identify the holders.

Revision

The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection.

The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU

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SAMPLING SCHEME IDENTIFIER: AQUACULTURE. PROBABILITY SAMPLE SURVEY

Survey specifications

Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex.

Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.

Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.

Sector name(s): Aquaculture

Sampling scheme: Probability sample survey

Variables: All variables in tables 10

Variables with C-Census Data Collection scheme and the following comment in WP comment: "*Planned sample rate for PSS cannot be changed as this rate is derived from a formula. Any change would imply that some of the variables have to be modified. To adapt these registers to comments from EWG 22-18, PPS has been changed into C, but we would like to highlight that PSS scenarios with Planned sample rate (%) of 100% may occur.*" in Table are sampled by Probability sample survey sampling scheme. As it is stated in "WP comments", PPS has been changed to C, because Planned sample rate for PSS cannot be changed.

Supra region(s):

Survey planning

The statistical unit or observation unit is each of the establishments authorised to perform aquaculture activities, as described in group 03.2 of CNAE-2009.

The reporting unit is the person who, owning the company to which the establishment belongs, or having the power and ability to respond, can be asked the questions contained in the corresponding questionnaire, related to the observation unit.

Sample units are the establishments performing aquaculture activities which in the reference year were authorised to do so.

The analysis unit, or economic activity unit is the establishment. It is the part of the company which undertakes its activity in a given geographical situation. Hence, in most cases it coincides with the observation unit.

When a company of the same owner and the same main activity has several establishments of aquaculture and data collected in the questionnaire are not disaggregated by each of the establishment, an proportional estimation of the corresponding fraction

for each establishment is made.

Survey design and strategy

Data sources:

The methodology used for data collection is mixed. One part of the population is surveyed exhaustively (with a census) and the other part is surveyed with stratified random sampling.

Stratified random sampling. The main variable of this survey is the result before taxes. However, the main variable will be determined at the end of the survey. This is why, in order to determine the simple size, it is necessary to have an auxiliary variable that is both previously known and correlated to the main variable. The effectively used capacity of the establishment will be the auxiliary variable, referred to as the size of the existing facilities in the establishment used to accommodate the species during the different phases or processes of aquaculture, which are effectively being used to this end.

Within stratified random sampling or Probability sample survey there are strata that are exhaustively collected due to the fact that being the small populations and the high variabilities or the interest for the important study, so the planned sample rates will be 100%

The population to be sampled has been divided into strata, aiming to obtain groups of establishments with characteristics as homogeneous as possible within the stratum and with the greatest possible heterogeneity among the different strata.

Another criterion when defining the strata has been to obtain a number of them which can be handled, ensuring that each either includes a significant number of establishments or it represents a given species or zone.

In addition to the 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 thoroughly or by sampling according to the following criteria:

-Strata including less than 20 establishments for each main species cultivated: exhaustive survey.

-Strata including 20 or more establishments and homogeneous characteristics: sampled and then extrapolated to obtain data for the population.

In this second group we must consider that sample size is calculated according to the auxiliary variable, the capacity effectively used by the establishment, and that, when variability within the stratum is high, it may be the case that sample size is the same as the population size for a particular stratum.

Sample sizes:

Sample size: with optimum allocation. Total sample size is determined aiming to estimate the economics results of the population with an expected error of 5%, that is, a 95% level of confidence.

Sample selection: In the population database, data from the aquaculture establishments will appear together with the corresponding owner data, for both the exhaustive survey and sampling. By selecting the statistical units, reporting units of the survey are perfectly demarcated.

In the exhaustive survey, each statistical unit will represent one unit in the population as a whole.

In sampling, the units will represent the corresponding population. Therefore, it will be necessary to select sampling units randomly.

For sampling, the population of different groups will be grouped according to the stratum to which they belong, and in each of these groups sampling will be made randomly obtaining as many random and mutually independent subsamples as there are strata.

The size of each of these subsamples will be previously determined by the (previously set) expected error level.

Estimation design

Calculation method for population estimate:

Type of sampling. Stratification.

The strata have been investigated on a census or sample basis, according to the following criteria:

- Those strata that due to their low number of establishments (less than 20), for each main cultivated species, all establishments of the stratum are investigated (exhaustive investigation).

- Those strata that have a high number of establishments, 20 or more, and, usually, homogeneous characteristics, are investigated by sampling the establishments of the stratum, with their subsequent elevation to obtain results from the population.

In this second group, it must be considered that the sample size is calculated using the auxiliary variable, used capacity of the establishment and that, when its variability within the stratum is high, it may be the case that the sample size is equal to the population size, in that stratum.

Sample size.

- Total sample size with optimal allocation

The total size of the sample to estimate the Economic Result of the population with an expected error of 5% to 95% confidence level, has been calculated assuming that an optimal allocation will be made.

The formula used to calculate the sample size n is the following:

$$n = \frac{\left(\sum_{h=1}^{h=L} N_h S_h\right)^2}{\frac{N^2 e^2 \overline{X}^2}{z^2} + \sum_{h=1}^{h=L} N_h S_h^2} \quad (1)$$

Where: h is the number of strata ranging from 1 to L (maximum number of strata), Nh the size of stratum h, N the size of the population, Sh the standard deviation of stratum h, mean capacity of the population, and the error of the estimate and z the standardized variable for the chosen confidence level.

- Assignment of the sample by strata

The optimal allocation of the sample to the strata is carried out using the following formula:

$$n = \frac{N_h S_h}{\sum_{h=1}^{h=L} N_h S_h} \quad (2)$$

Being: n, h, Nh and Sh the same statistics as in (1)

Sample selection

- Determination of the reporting units

An informant unit is considered to be that natural person, who, being the owner of the company to which the establishment belongs, or having the power and capacity to respond, can be asked the questions collected in the corresponding questionnaires, in relation to the observation unit. Therefore, the reporting unit is related to the statistical unit of the survey, aquaculture establishment.

In the population database, the data of the aquaculture establishments will appear together with the data of the owners of the companies of these establishments, both for exhaustive research and sampling.

For these reasons, when selecting the statistical units, the reporting units of the survey are perfectly delimited.

- General description of the sample selection procedure

The data collection of this survey is carried out in two ways, one exhaustive and the other by stratified random sampling.

In the exhaustive collection part, each statistical unit will represent one unit in the total population.

The units of the sample collection part will represent their corresponding population, for this it will be necessary that the selection

of the sample units is made randomly.

For sampling, the population of the different groups will be grouped by strata and the necessary sample will be drawn randomly from them, obtaining as many independent subsamples as strata.

The size of each subsample is predetermined by the level of error that is set.

Estimators

For the part of the study in which the collection is to be carried out exhaustively, there is an imputation method for cases of non-response to mandatory questions within partially answered questionnaires. For these questionnaires, after trying to collect them by all possible means, revisiting the holders, telephone contact, etc., the unanswered units will be analyzed and if any common characteristic is found with the units that do have a response, then the value will be imputed taking this into account. If no common characteristic is found, the missing data will be imputed with the mean value of that question for the units of the same stratum.

The relevant formulas for estimating the population results corresponding to stratified random sampling are:

• Estimation of the population mean,: $\hat{\bar{X}}_S$

$$\hat{\bar{X}}_S = \sum_{h=1}^{h=L} W_h \bar{x}_h \quad (3)$$

Where: $\bar{X}_h$ the mean of the variable observed in stratum h and $W_h = N_h / N$ the weight of stratum h.

• Estimated variance of the population mean, $V(\hat{\bar{X}}_S)$

$$V\left(\hat{\bar{X}}_S\right) = \sum_{h=1}^{h=L} W_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \quad (4)$$

Where: Nh is the population size of the stratum, nh the size of the sample in stratum h.

Estimation of the total population,: $\hat{X}_S$

$$\hat{X}_S = \sum_{h=1}^{L} N_h \bar{x}_h \quad (5)$$

Where: Nh is the population size of the stratum and $\bar{X}_h$ the mean of the variable observed in each stratum.

• Estimated variance of the total population,: $V(\hat{X}_S)$

$$V(\hat{X}_S) = \sum_{h=1}^{h=L} N_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h} \quad (6)$$

All parameters match those described in expression (4).

Calculation method for derived data:

The different economic variables requested from the informant are considered of two types; mandatory response and non-mandatory response. Those with a mandatory response are compulsorily collected, and those with a non-mandatory response can have a value or be zero in case there is no value. Therefore, no values are imputed.

Nonresponse handling:

Treatment of total lack of response and treatment of stratum change

The lack of response, generated by some heads of the sampling units, will imply an increase in the level of error. A different case is the location of the units that have been decommissioned or are no longer in operation, these cases will imply a variation in the framework of the initial population.

Total lack of response and treatment of stratum change will be treated as follows:

The basic estimator (unbiased estimator of expansion in stratified sampling)

$$\hat{X} = \sum_h \frac{N_h}{n_h} \sum_i x_i$$

being:

Nh: Total number of units in the directory in stratum h

nh: Number of units selected for the sample in stratum h

Xi: Value of the observed variable X in unit i of stratum h

It is corrected from the corrections made in the elevation factor due to the various types of incidents that arise during field work: total non-response, change of stratum, etc.

Thus, the final elevation factor will be:

If there is no change in stratum: $\frac{N_h}{n_h}$

If there is a change of stratum: $\frac{\hat{N}_h^*}{n_h^*}$

being:

n_h^*: Number of units of the effective sample that has not changed stratum

$\hat{N}_h^*$: Number of units in the directory in stratum h obtained by deflating as a function of losses and changes in stratum

$$\hat{N}_h^* = N_h \left(1 - \frac{b_h}{n_h}\right) - \sum_{h \neq k} \frac{N_h}{n_h} n_h^k$$

: Number of units that are low in the sample

b_h (sample incidence of frame correction)

n_h^k : Number of units selected in stratum h and that really belong to stratum k

Final expression of the estimator:

$$\hat{X} = \sum_h \left\{ \sum_{i=1}^{n_h^*} \frac{\hat{N}_h^*}{n_h^*} x_i + \sum_{k \neq h} \frac{N_k}{n_k} \sum_{i=1}^{n_k^h} x_i \right\}$$

The first addend represents the contribution of the units that have not changed stratum.

The second addend represents the contribution of the units selected in stratum k and that really belong to h.

The theoretical design of the sampling work is developed in the published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/encuesta-economica-acuicultura/default.aspx

Error checks

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All questionnaires are checked and their information is recorded. This is done visually by comparing the physical questionnaire with the electronic one.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

A control of non-sampling errors is carried out throughout the statistical process.

The survey framework is formed from the Directory of Aquaculture Establishments. This directory is made up of all the establishments authorized to carry out aquaculture activities. The directory is updated annually by the Survey of Aquaculture Establishments, either by means of the records that authorize the activity, or by the fieldwork of said survey itself. The population object of study in the Economic Survey of Aquaculture is obtained from the analysis of said framework and is made up of the set of farms with cultivation that, in the reference period, had authorization to develop aquaculture activity.

The interviewers go out into the field with a copy of the questionnaires and their corresponding roadmaps. The roadmaps are a fundamental instrument to keep track of the situation of the surveys and the possible incidents produced. By completing them, the validity of the study framework is checked and the number of questionnaires collected is validated.

The data collection, at the beginning, is used to analyze the possible errors in the completion of questionnaires and to correct them in the successive field trips of the interviewers.

The lack of response, generated by some managers of establishments considered as sample data, implies an increase in the level of error. A different case is the location of establishments that have been canceled or are no longer in operation; These cases imply a change in their situation within the initial population and a change, therefore, in the elevation coefficient.

Total non-response and treatment of stratum change are addressed by estimating stratum values.

The data collected is purified by correcting possible inconsistencies in them. Once they are received and after they have been recorded, it is again observed if there are possible deviations of values at a global level and any inconsistencies are corrected.

Described in published methodology

https://www.mapa.gob.es/es/estadistica/temas/estadisticas-pesqueras/acuicultura/encuesta-economica-acuicultura/default.aspx

Data storage and documentation

Data storage:

INFORMATION STORAGE METHOD

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The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

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Documentation:

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The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU

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SAMPLING SCHEME IDENTIFIER: AQUACULTURE. CENSUS

Survey specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Aquaculture
Sampling scheme: Census
Variables: All variables in tables 9 (Social data) Variables with C-Census Data Collection scheme and the following comment in WP comment: "*Planned sample rate for PSS cannot be changed as this rate is derived from a formula. Any change would imply that some of the variables have to be modified. To adapt these registers to comments from EWG 22-18, PPS has been changed into C, but we would like to highlight that PSS scenarios with Planned sample rate (%) of 100% may occur.*" in Table are sampled by Probability sample survey sampling scheme. As it is stated in "WP comments", PPS has been changed to C, because Planned sample rate for PSS cannot be changed.
Supra region(s):
Survey planning
The statistical unit or observation unit is each of the establishments authorised to perform aquaculture activities, as described in group 03.2 of CNAE-2009. **The reporting unit** is the person who, owning the company to which the establishment belongs, or having the power and ability to respond, can be asked the questions contained in the corresponding questionnaire, related to the observation unit. **Sample units** are the establishments performing aquaculture activities which in the reference year were authorised to do so. **The analysis unit**, or economic activity unit is the establishment. It is the part of the company which undertakes its activity in a given geographical situation. Hence, in most cases it coincides with the observation unit. When a company of the same owner and the same main activity has several establishments of aquaculture and data collected in the questionnaire are not disaggregated by each of the establishment, an proportional estimation of the corresponding fraction for each establishment is made.
Survey design and strategy

Data sources:

Data on social and employment variables are collected from the Survey of Aquaculture Establishments carried out by the Ministry of Agriculture.

From this exhaustive survey, all the information necessary to obtain the requested variables is collected.

Sample sizes:

The sample sizes for these variables are all aquaculture establishments with aquaculture activity during the study year.

Survey methods:

The information is collected from the databases provided by the Ministry, selecting the information necessary to obtain the variables of the study.

Additional information used in the survey strategy:

The population to be sampled has been divided into strata, aiming to obtain groups of establishments with characteristics as homogeneous as possible within the stratum and with the greatest possible heterogeneity among the different strata.

Another criterion when defining the strata has been to obtain a number of them which can be handled, ensuring that each either includes a significant number of establishments or it represents a given species or zone.

In addition to the above mentioned criteria, stratification of the population has to meet the levels of disaggregation required by Community rules, resulting from Commission Delegated Decision (EU) 2019/910.

Stratification was made based on the establishments' characteristics: type of aquaculture according to water origin, type of aquaculture facilities (ground, in natural spaces. Horizontal culture, cages), and main species rose.

Each statistical unit will represent one unit in the population as a whole.

Estimation design

Calculation method for population estimate:

The population estimate is calculated as the sum of the values obtained by stratum.

Error checks

VALIDATION METHOD

Three types of validations are carried out:

1. Initial Validation:

All data are checked and their information is recorded.

2. Logical Validation:

It is carried out by the application by carrying out a series of controls with the recorded data, applying controls on the recorded information, checking if the data is recorded as it is mandatory and if it is in accordance with the rest of the information recorded.

Once the data has been analyzed and the errors corrected or the data confirmed with the interviewer and the owner thereof, these data are accepted as correct and the results are calculated.

3. Validation of results:

Once the results are obtained, they are exported to Excel and checks are made of whether the operations to calculate the indicators are well done and whether the results are consistent with those obtained in other years.

Data storage and documentation

Data storage:

INFORMATION STORAGE METHOD

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

The information on the variables collected, as well as the economic indicators produced are stored in databases for each of the vessels selected in the sample.

This information is protected by statistical secrecy so that the data is always used in an aggregate way so as not to

be able to identify the holders.
Revision
The methodology is reviewed annually and modifications are incorporated in order to be applied in the subsequent year's collection. The population is adjusted annually to the stratification defined in the methodology, following the indications of the regulations and decisions of the EU
Confidentiality
Are procedures for confidential data handling in place and documented? No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data Are protocols to enforce confidentiality between DCF partners in place and documented? No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data Are protocols to enforce confidentiality with external users in place and documented? No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data The confidentiality of the information is subject to the Data Protection regulations and the Law of the Public Statistical Function of Spanish legislation. In accordance with confidentiality legislation, data will not be published or shared if they identify the owner of the same.

SAMPLING SCHEME IDENTIFIER: PROCESSING. PROBABILITY SAMPLE SURVEY

Survey specifications

Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex.

Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.

Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.

Sector name(s): Processing

Sampling scheme: Probability sample survey

Variables: Variables defined in the methodology

The following variables are not collected by the main source of the survey

- Subsidies on investments
- Consumption of fixed capital
- Total value of assets
- Financial income
- Financial expenditures
- Gross Investments, net
- Debt

Variables with C-Census Data Collection scheme in Table are sampled by Probability sample survey sampling scheme. As it is stated in "WP comments", PPS has been changed to C, because Planned sample rate for PSS cannot be changed.

Supra region(s):

Survey planning

Units of the survey

The basic survey unit is the industrial company. The company may perform one or more activities in one or more places.

In the scheme of the survey, the company assumes at the same time, the roles of informing unit and observation unit.

However, although the company is the main unit of the survey, given the numerous objectives to be reached with this investigation, there are units that complement the information system, such as the industrial establishment (as observation unit) and the economic activity unit at local level (as analysis unit).

Population scope

The population under sampling is comprised by the companies whose main activity is included in the CNAE-2009 following sections:

- Section B: harvesting industries
- Section C: manufacture industry
- Section D: air conditioning, steam, gas and electric provider
- Section E: water provider, sanitation activities, waste management and decontamination.

Survey design and strategy

Survey methods:

Collecting of information

The collection of information is carried out annually by the "*Collection Units*" of INE, responsible also for answering telephones to clear up doubts of the informers and for recording and filtering questionnaires.

The process of this collection of reference year "t" is carried out from the second trimester of the year "t+1", with an aproximate duration of 4 months.

It will be assumed that the company has been surveyed if its main activity is one of those included in the population scope of the survey; also, if the questionnaire has been obtained duly fullfilled and the data comply with the consistency and completeness as established.

Besides, during the collection of all the information, some incidences may arise that dont allow to obtain the questionnaire: definite closure of the bussines, temporary closure o inactive company, mistakenly included in the survey, not in the scope, duplicated or impossible to locate, negative or not responding.

Models of questionnaires

Four models of questionnaires have been designed with the purpose of adequating the requested information to the specific features of the companies:

- Companies with less than 10 employees.
- Companies between 10-49 employees.
- Companies with 50 or more employees and whose activity is included in sections B and C of CNAE-2009.
- Companies with 50 or more employees and whose activity is included in sections D and E of CNAE-2009.

Sampling and design

Population framework: Companies Central Directory ("*DIRCE*") which contains the information on the companies identification, as well as its main economic activity, location and size.

Type of sampling. Estratification

The population under study has been divided in different strata, according to the following variables:

- Company main activity, at 4 digit level (class), according to CNAE-2009.
- Autonomous region
- Company size interval, depending on the number of employees:
    - Up to 3 employees
    - From 4 to 9
    - From 10 to 19
    - From 20 to 49
    - 50 or more employees
- Characteristics of the subsidiary company (if it is subsidiary of a foreign company or not)

It has been thoroughly investigated those companies with 50 or more employees, as well as all companies included in the "*Foreing subsidiary companies*" record in Spain. Also, all companies that, although with a small size in terms of employees, have an important facturation volume, have been exhaustively surveyed.

The rest of the companies have been sampled. Each stratum, which has been determined by the crossing of the above mentioned variables, has conformed an independent population, in terms of the sampling.

Sample sizes:

Size sampling. Affixation. Within each stratum, it has been calculated the size sample by optimum affixation or Neyman´s affixation, by fixing in advance the relative sampling error for the variable "number of employees", at national level of 1%, and at regional level of 5%.

The size sampling has been increased, if necessary, to a minimum of two companies by stratum. On the other hand, and with the purpose of reaching more precise aggregated results, it has been determined by statistical criteria, within each strata, the outlier companies (in terms of facturation volume and employees) with the objective of including them in the thorough part of the sample.

By size intervals, sampling fraction have been as follows:

Strata by size	Sampling fraction
Up to 3 employees	10%
From 4 to 9 employees	29%
From 10 to 19 employees	42%
From 20 to 49 employees	69%
50 or more	100%
TOTAL	21%

Size selection: by means of the assigning aleatory number, which allows the coordination of the sample with other surveys.

The selection process is independent from one year to another: the probability of a company being selected in year "t" is independent from the fact that this company has been selected the previous year (t-1).

Estimation design

Calculation method for population estimate:

The theoretical design of the sampling work is developed in the published methodology

https://www.ine.es/en/metodologia/t37/metodologia_eee2019_en.pdf

Error checks

Described in published methodology

https://www.ine.es/en/metodologia/t37/metodologia_eee2019_en.pdf

Data storage and documentation

Data storage:

The data is stored in databases and the documentation and publication of results can be seen on the website of the Ministry.

Documentation:

https://www.ine.es/en/metodologia/t37/metodologia_eee2019_en.pdf

Revision

The population is adjusted annually to the stratification defined in the methodology.

Confidentiality

Are procedures for confidential data handling in place and documented?

No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data

Are protocols to enforce confidentiality between DCF partners in place and documented?

No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data

Are protocols to enforce confidentiality with external users in place and documented?

No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data

Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.

No, the Spanish legislation to which the confidentiality of statistical data is subject, Law of the Public Statistical Function, does not allow the handling of confidential data

The confidentiality of the information is subject to Law 12/1989 on the Public Statistical Function establishes that the INE cannot disseminate, nor do available in any way, individual or aggregated data that could lead to identification of data previously unknown to a person or entity.

The INE adopts the logical, physical and administrative measures necessary so that the protection of confidential data is effective, from data collection to publication