

**MINISTRY OF AGRICULTURE,
FORESTRY AND FISHERIES**



**INSTITUTE OF OCEANOGRAPHY
AND FISHERIES**

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

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

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

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

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

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

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

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

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

2026-2027

Version 4

Zagreb, Croatia - 05 November 2025

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SECTION 1: GENERAL INFORMATION

Data collection framework at national level

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

This document contains the updated Work Plan (WP) for Republic of Croatia's data collection in the fisheries and aquaculture sectors for the years 2025-2027 in accordance with the provisions of the Common Fisheries Policy of the European Union, with consideration for applied thresholds. The WP integrates planned activities based on the requirements set by Regulation (EU) 2017/1004 (recast Data Collection Framework, DCF) and the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors from 2022 (EUMAP) established by Commission Delegated Decision (EU) 2021/1167 of 16 July 2021 and Commission Implementing Decision (EU) 2021/1168 of 16 July 2021.

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Role: technical/scientific coordinator for the biological component of the WP in 2025-2027.
For each specific component implemented by IOF sub-coordinators are appointed.

National data collection website
https://podaci.ribarstvo.hr/

Designated authorities at national level
Data collection in fisheries and aquaculture sectors in the Republic of Croatia and is conducted by two designated institutions in accordance with the Croatian Marine Fisheries Act (OG 62/17, 130/17, 14/19, 30/23 and 14/24): Ministry of Agriculture, Forestry and Fisheries (Directorate of Fisheries) and the Institute of Oceanography and Fisheries.

1) Ministry of Agriculture, Forestry and Fisheries - Directorate of Fisheries (MAFF-DoF):
Adress: Ulica grada Vukovara 78, 10000 Zagreb, Republic of Croatia
Tel.: +(385) 1 6443 185
E-mail: uprava.ribarstva@mps.hr
Web page: https://ribarstvo.mps.hr/
Responsibilities related to DCF:
- Coordination at national level and data submission.
- Implementation of the following sections of the WP:
  - Section 1b. Other data collection activities
  - Section 3. Fishing Activity Data
  - Section 5. Economic and social data in fisheries

- Section 6. Economic and social data in aquaculture
- Section 7. Economic and social data in fish processing

2) Institute of Oceanography and Fisheries (IOF):
Adress: Šetalište I. Meštrovića 63, 21000 Split, Republic of Croatia
Tel.: +(385) 2 14 08 000
E-mail: office@izor.hr
Web page: www.izor.hr
Implementation of the following sections of the WP:

- Section 1a: Test studies (SPAMon)
- Section 1b: Other data collection activities
- Section 2: Biological Data
- Section 4: Impact of fisheries on marine biological resources.

Participatory institutions
Some of the planned activities are assigned to other scientific bodies based on conducted tenders. Complete list of participating institutes will be provided in following revisions of the WP, after procurement procedures have been completed for the period 2025-2027.
Following scientific bodies have been awarded to carry out fishery independent data collection for European eel in inland waters (Section 2.3) in the period 2023-2026:

- OIKON d.o.o. – Institut za primijenjenu ekologiju (OIKON)
  Adress: Trg Senjskih uskoka 1-2, 10020, Zagreb, Republic of Croatia
  Tel.: +(385) 1 5507 100
  E-mail: oikon@oikon.hr
  Web page: www.oikon.hr

- University of Dubrovnik (UNIDU)
  Adress: Branitelja Dubrovnika 41, 20000 Dubrovnik, Republic of Croatia
  Tel.: +(385) 20 445 700
  E-mail: unidu@unidu.hr
  Web page: www.unidu.hr

Contribution of activities to the objectives of the Marine Action Plan
As outlined in each of the WP's chapters, Croatia is working to enhance scientific monitoring, research, and knowledge base in support of the EU Action Plan: Protecting and restoring marine ecosystems for sustainable and resilient fisheries (Marine Action Plan). National coordination shall be established between relevant scientific bodies and fisheries and environmental authorities, including NGOs when necessary, in order to share pertinent data and information at the national level and to convey activities and outcomes.

Participation of Croatia in Regional Coordination Groups (RCGs)
Croatia is a member of the following regional coordination groups:
- RCG Med&BS - Regional Coordination Group for the Mediterranean and Black Sea
- RCG LP - Regional Coordination Group on Large Pelagics and
- RCG ECON - Regional Coordination Group for Economic Issues.

In addition, Croatia participates in the Intersessional subgroup on Diadromous Species, and other ISSGs when relevant. Information on planned regional and international coordination related with data collection is provided in Table 1.2.

Regional Work Plans
This document is in line with the Regional Work Plans of the RCGs Med&BS, LP and ECON for the period 2025-2027 published on the EC website: https://dcf.ec.europa.eu/wps-and-ars/work-plans_en

Summary of amendments for the 2026-2027 period

- Amendments reflect updated EU/RFMO requirements and methodological improvements from the PETS BYC 2022-2024 study. PETS monitoring was revised to a risk-based design with enhanced coverage for high-risk gear–species–zone combinations. A new subsection describes the national bycatch database and the IOF estimation methodology (modified GFCM–FAO 2019 with stratified estimation by Croatian fishing zones).
- ICCAT monitoring was refined by increasing the share of on-board observer sampling while maintaining the required minimum observer coverage through the combined use of SciObsAtSea and SciObsOnShore. Complementary questionnaires conducted by scientific observers were introduced, bringing total coverage for LHP and LLD métiers to over 20%. For GFCM métiers, SciObsAtSea coverage was increased and EMAtSea activities expanded (including the addition of LLS_DEF and increased effort for OTB_DEF), while questionnaire-based data collection conducted by scientific observers was introduced for selected métiers to improve representativeness and strengthen PETS-relevant monitoring.
- The duration of the national test study on social indicators in fisheries was amended to 2026–2027 to allow adequate preparation and ensure effective implementation, with activities aligned to RCG ECON methodological developments.
- National specifics were updated to reflect Croatia's contribution to the RCG Secretariat funding for 2026, in accordance with the 2025 Decision of National Correspondents establishing the collective MS cost-sharing mechanism for secretarial tasks not covered by SECWEB 2.0.
- The section on recreational fisheries was updated to reflect Croatia's non-participation in the GFCM Research Programme, with national data collection ensured through the annual recall survey and the gradual scientific introduction of mobile applications.
- The SSCF-IMPACT study was removed as completed; Activities related to bluefin tuna farming (PRUT) and CKMR-BFT were removed following the repeal of ICCAT/EU obligations for farm sampling.
- Fishery-independent monitoring of European eel in Prokljan Lake was expanded by adding longlines.
- Transversal data updates reflect the national statistical release calendar.
- Annexes were updated with methodology for eel longlines and revised links to documentation in other sections.

Text Box 1a: Test studies description

Region: Mediterranean and Black Sea

Test study: Monitoring spawning intensity of European pilchard and European anchovy in the Eastern Adriatic (SPAMon)

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

Name of the national test study: Monitoring spawning intensity of European pilchard and European anchovy in the Eastern Adriatic (SPAMon)

1. Aim of the test study

Small pelagic fishery (predominantly European pilchard(=sardine) and European anchovy) is the backbone of Croatian marine commercial fisheries, accounting for up to 94,5% of total landings volume (2015-2018). Apart from their obvious economic importance, their ecological significance is also high, considering that small pelagic fish represent an essential link between lower and higher trophic levels in the marine ecosystem. Previous research defined spatial and temporal spawning period of sardine and anchovy for the eastern side of the Adriatic Sea, namely, the area of Kvarner and Kvarnerić, offshore of Dugi Otok and the area of the central Dalmatian islands were identified as potential spawning grounds. The spawning period for sardine was determined to last up to six months (peak period from December to January), whereas the spawning period for anchovy was determined to last from April until September (peak in the warmest period). Monitoring of the early developmental stages would certainly contribute to the improvement of existing management and conservation measures of both species and the marine environment, as well as the undoubted need to focus on the concept of sustainable fisheries development.

The aim of the SPAMon test study is to investigate the spawning intensity of two commercially significant

small pelagic species in Croatian marine commercial fisheries for the purpose of improving the current management measures related to the spatio-temporal distribution of small pelagic fish. This study fully fits into the latest trends in fisheries biology, namely the ecosystem approach in fisheries (EAF), and in the future could contribute to a better stock assessment of target fish stocks. The results of this study would serve as an upgrade of the base for defining the Third qualitative descriptor for determining good environmental status under the MSFD - Marine Strategy Framework Directive (Population of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock).

2. Duration of the test study: 2025-2027

3. Methodology and expected outcomes of the test study
At the annual level, 60 ichthyoplankton samples of early developmental stages of sardine will be collected during the colder part of the year, and 60 ichthyoplankton samples of early developmental stages of anchovy during warmer period of the year, amounting to 360 ichthyoplankton samples in total for both species for the entire three-year period of the study. Sampling will take place in the areas previously identified as potential sardine and anchovy spawning and nursery areas. Ichthyoplankton samples will be collected with a standard plankton net WP2 (mesh opening 0,255 m^2; mesh size 0,200 mm). In addition, basic environmental parameters (salinity and temperature) will be recorded using a probe. For the purposes of sampling in the winter period a commercial fishery vessel will be rented, whereas during the warmer period of the year sampling is going to be incorporated in the one of the ongoing scientific studies at sea (MEDIAS, MEDITS) depending on the period. The collected ichthyoplankton will be analysed under the magnifying glass Zeiss DiscoverV12, whereby the early developmental stages (eggs and larvae) will be separated based on the morphology and available identification keys. Likewise, the density of individual developmental stages per station will be defined based on the representation. Collected data will be statistically analysed and correlated both with each other and with previously collected scientific data.

Test study: Study on social indicators in fisheries

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

Name of the national test study: Study on social indicators in fisheries

1. Aim of the test study
Based on Conceptual note of the RCG ECON ISSG on Social indicators (September 2024), the study aims to explore the available data sources needed to assess the key social issues in the fishing fleet, aquaculture, and fish processing industry and to collect the missing qualitative and quantitative data related to the following topics:
- Social and financial status
- Working conditions
- Assessment of management measures
- Generational status.

The collected data and analysis will provide comprehensive insight in the social structure, trends, and potential impacts of management measures and further, provide recommendations and guidelines for future social data collection.

2. Duration of the test study: 2026-2027

3. Methodology and expected outcomes of the test study
The study will be for three years and organized in two phases. In the first phase, all available administrative data sources will be analysed to test the availability of data for the above-mentioned topics and some of the related indicators, identified as “forthcoming” by STECF EWG 24-05 and discussed during the ISSG Meeting: Exploring options for data collection for new social variables. The second phase will include fieldwork for the collection of quantitative and qualitative data from the stakeholders.
The study will be performed in collaboration of the MAFF-DoF and competent science institution, after conducting public tender.
Data collection for the implementation of this test study will be conducted in the following manner:
1. Analysis of all available administration data sources for the assessment of the priority social indicators. Detection of the data not available from the public sources and registers and developing the protocol.
2. Field survey – protocol with stakeholders in the fishing fleet, aquaculture and fish processing industry.

Protocol will be structured to collect quantitative and qualitative data. In this way, the data necessary for a detailed analysis of the social structure, trends and potential impacts of management measures will be collected and a proposal for future data collection will be provided.

Text Box 1b: Other data collection activities

Region: Mediterranean and Black Sea
Activity: RCGs Secretariat

General comment: Describe either activities that are funded by the DCF without a direct link to the EU MAP specific requirements or WP template tables, like marine knowledge, or activities funded by other financial instruments and/or programmes that relate to EU MAP requirements, like actions under the marine action plan. You can also include one-off specific studies for a particular end-user need that will not enter the regular data collection.

Name of the regional activity: RCGs Secretariat

RWP Med&BS 2025-2027; RWP LP 2025-2027; RWP ECON 2025-2027

1. Aim of the data collection activity
To support Croatia's participation in the Regional Coordination Groups under the EU Fisheries Data Collection Framework (RCG ECON, RCG LP, and RCG MED&BS) as well as pan-regional coordination activities, including the co-funding of the RCGs Secretariat in line with the 2025 Decision of the National Correspondents on the funding model for 2026. The activity ensures Croatia's contribution to the jointly agreed cost-sharing mechanism for the RCG Secretariat, established to provide continuous, cross-regional secretarial support following SECWEB and SECWEB 2.0, and required to be referenced in all relevant National and Regional Work Plans. It enables coordinated regional work under Articles 9.1 and 9.2 of Regulation (EU) 2017/1004 and supports the implementation of tasks that cannot be executed without Member State co-funding, given the termination of SECWEB 2.0 in 2026.

2. Duration of the data collection activity: 2026-2027

3. Methodology and expected outcomes of the data collection activity
The activities covered under secretarial activities include, at a minimum:

- A full-time dedicated Secretariat support service for the RCGs enables a consistent approach to administering RCG activities, facilitates communication, and enhancing the intersessional work, supporting also the work of sub-groups.
- A dynamic and permanently updated website will be kept available, including as features:
    - Integration – allowing seamless synchronisation 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.
- The Visual identity for the RCGs is further strengthened and consolidated. The visibility and understanding of the work by the RCGs are enhanced for the relevant stakeholder groups.
- A regularly updated Stakeholders' database improves communication between the RCGs' experts and the stakeholders' community.
- Internal communication protocols and help-desk in place makes it easier for any newcomer to efficiently join, adopt responsibilities, and contribute to the RCGs objectives and work commitments.
- The public description of the secretariat functions, operational working protocols, and commitments will build trust and enhance the transparency and accountability of the whole network.

National specifics
Croatia's contribution to the RCGs Secretariat in 2026 is determined in line with the 2025 Decision of the National Correspondents on the collective funding of secretarial activities not covered by SECWEB 2.0. The contribution is calculated according to the agreed distribution key, based on each Member State's EMFAF budget for 2021-2027 and membership in the relevant RCGs (RCG ECON, RCG LP and RCG MED&BS). The decision represents a pan-regional agreement by all participating Member States to ensure uninterrupted

secretarial support for the RCGs in 2026 and must be referenced in all relevant National and Regional Work Plans. Funding arrangements for the period beyond 2026 will be subject to further agreement at EU level.

Activity: Regional Coordination taking place in ISSGs and pan regional cooperation between RCGs

General comment: Describe either activities that are funded by the DCF without a direct link to the EU MAP specific requirements or WP template tables, like marine knowledge, or activities funded by other financial instruments and/or programmes that relate to EU MAP requirements, like actions under the marine action plan. You can also include one-off specific studies for a particular end-user need that will not enter the regular data collection.

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

RWP Med&BS 2025-2027; RWP LP 2025-2027; RWP ECON 2025-2027.

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, RCG LP and RCG ECON.

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.

The ISSGs may change over the years as task are completed and new needs are coming up.

A non-exhaustive list of the RCG Med&BS ISSG is presented below:

- 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.

The intersessional work for social and economic data collection will be decided during the RCG ECON TM and may include (among others) novel approach to the segmentation of fishing fleets, Quality Assurance Framework, social variables, aquaculture issues.

National specifics
Croatia fully supports regionally coordinated activities, to the extent of availability of relevant experts, and not withstanding national obligations.

Activity: Med&BS Regional data base (RDBFIS)

General comment: Describe either activities that are funded by the DCF without a direct link to the EU MAP specific requirements or WP template tables, like marine knowledge, or activities funded by other financial instruments and/or programmes that relate to EU MAP requirements, like actions under the marine action plan. You can also include one-off specific studies for a particular end-user need that will not enter the

regular data collection.

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

RWP Med&BS 2025-2027

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 the Med&BS EU Member States:
- 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 etc).

National specifics
Croatia fully supports the establishment of the RDBFIS, in case this activity will optimize data-submission to main end-users in the future.

Activity: Regional data base development for large pelagics data

General comment: Describe either activities that are funded by the DCF without a direct link to the EU MAP specific requirements or WP template tables, like marine knowledge, or activities funded by other financial instruments and/or programmes that relate to EU MAP requirements, like actions under the marine action plan. You can also include one-off specific studies for a particular end-user need that will not enter the regular data collection.

Name of the regional activity: Regional data base development for large pelagics data

RWP LP 2025-2027

1. Aim of the activities
To contribute to the development and operation of the future Regional Database for Large Pelagics (LP) data.

2. Duration of the activity: 2025–2027

3. Methodology and expected outcomes of the activity
The development of a Regional Database (RDB) is a crucial tool in achieving the goals of regional coordination. Regarding the case of LP among there is a division in preference of the RCG associated countries between two ongoing development systems: the Regional Database & Estimation System (RDBES) and the Med&BS RDBFIS (regional database for the Mediterranean and Black Seas). These country preferences are directly influenced by their specificities in terms of needs and participation to other RCG and/or RFMOs. To progress on this topic, an ISSG dedicate to the development of the future RDB for Large Pelagics was launched in 2022. So far, no consensus has been reached, except for the desire expressed by all MS to avoid creating a new system and focus all effort in joining an existing one. Future discussions and associated actions will shape the future of this topic for LP and will determine the implications among RCG ISSGs.

National specifics
Croatia fully supports development of a regional database for large pelagic species. Considering the need to

streamline reporting and the need to optimize data-submission to main end-users in the future, national preference is to incorporate this activity with the development of RDB FIS.

SECTION 2: BIOLOGICAL DATA

Text Box 2.3: Diadromous species data collection in freshwater

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

Method selected for collecting data

Fishery independent on-site sampling of biological variables will be carried out in defined areas of river basins, which also include transitional waters, as specified in Table 2.3.

Scientific monitoring program for the collection of biological data for European eel in freshwater started in 2023. Annual monitoring is carried out in the Adriatic Sea Basin (including rivers Mirna, Raša, Zrmanja, Krka, Cetina, and Neretva). Additionally, Prokljan Lake was added to the list of sampling localities (Table 2.3). Individual biological data (length, weight, sex ratio and age) is collected according to different life stages (glass, yellow and silver eel). Starting from 2026 it is envisioned to reduce the frequency of sampling and increase the number of sampling locations. Sampling frequency is going to be reduced from four times per year (i.e. seasonally) to two times per year (April/May and September/October). On the other hand, number of sampling locations are going to be increased, from two locations per river/water body to four sampling (Rivers Mirna, Raša, Krka and Cetina) and five sampling (River Zrmanja) locations, and from three locations on river Neretva to five sampling locations. Sampling on Prokljan Lake is going to be conducted on four locations. On-site sampling for biological data on each location in freshwater is planned to be carried by electrofishing, while in transitional habitats (e.g. Prokljan Lake) fyke nets, and longlines form 2026 are going to be applied. Additionally, visual census may be used as a complementary sampling method to electrofishing, fyke nets and longlines in freshwater and in transitional parts of rivers/water bodies (depending on the waterbody).

OIKON and UNIDU are carrying out scientific monitoring in freshvater in the period 06/2023-06/2026 according to public tender conducted in 2023 (62/2022/VV). Public tender is planned for the continuation of scientific monitoring in freshwater and transitional waters for the period 7/2026-12/2027.

Fishery dependent on-site sampling of biological variables specified in Tables 2.2 and 2.5 will be carried out by IOFs scientific observers in the Neretva River Delta for FYC_CAT metiere specified in Table 2.5. Namely, according to Marine Fisheries Act, River Neretva Delta is considered a marine fishing area in Croatia, and managed as such. Eel fishery (commercial and recreational) within the freshwater bodies of the Adriatic Sea Basin is prohibited. Therefore, fishery dependent monitoring is not conducted as specified in Table 2.3.

Contribution of activities to the objectives of the Marine Action Plan

In addition to the management measures that have already been implemented to prohibit any exploitation of European eels in Croatia, the long-term scientific monitoring of European eels, which was developed within WP 2022-2024 and WP 2025-2027, intends to meet data needs. The collection of biological data will give an overall biological and ecological status of European eel in freshwater (and transitional/brackish waters) of Croatia, and therefore enable potential future management measures with the aim of recovery and restoration of population of European eel applied according to the Eel Management Plan in line with the Eel Regulation (Council Regulation (EC) No 1100/2007).

Text Box 2.4: Recreational Fisheries

Region: Mediterranean and Black Sea

General comment: This text box fulfils Article 5(2)(a), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.2 of the EU MAP Delegated Decision annex. Use this text box to give an overview of the methodology used to collect data on marine and freshwater recreational catches. For freshwater diadromous species, use Table and Text Box 2.3.

RWP Med&BS 2025-2027

National specifics

Minimum requirements of RWP Med&BS 2025-2027:
1. Estimating the population of recreational fishers by segment and sub-region:

HR: Not applicable for Croatia. In Croatia, both recreational and sports fisheries are recognized and regulated through Marine Fishery Act and "Ordinance on sport and recreational fishing at sea". Recreational and sports fishing activities are allowed only with the possession of license. The Ordinance on sport and recreational fishing at sea prescribes type and quantity of fishing gear and equipment which fisherman is allowed to use, the type of license required for sport or recreational fishing at sea and the license for bottom longline fishing. Pursuant to the Ordinance, the licenses for sport and recreational fishing are issued by the MAFF-DoF and licensed distributors for a specified purpose and period. A database of licenses issued for recreational and sport fishery is established and maintained by MAFF-DoF. Therefore, since the population of recreational fisherman is determined on a yearly basis based on the licencing system, Croatia is not conducting an off-site telephone survey.

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 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.

HR: The multispecies approach has been applied in Croatia and therefore the species are not listed in advance in Table 2.4. The data is collected for target species in recreational fisheries, so as for protected or sensitive bycatch species. Data collection on the incidental catch of vulnerable species will be conducted both in HRV RECFISH and BFT BGF surveys. Complete list of species may be provided in AR after data collection has been implemented.

As a minimum, Croatia will collect data on European eel and elasmobranchs, as well as species identified by GFCM and RCG Med&BS as priority species for the Mediterranean – Adriatic Sea.

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/fisherman), 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.

HR:
Description of data collection activities in 2026-2027:
1) RECFISH recall survey: annual recall survey carried out by IOF in 2026-2027 for reference years 2025 and 2026, used to estimate catch by species and fishing modality.
2) Mobile applications (mRECFISH and mTunaRec): gradually introduced tools used to verify data reported by fishers and to estimate basic biological parameters (length, weight). The implementation of mRECFISH is phased and depends on necessary adjustments of the national legal framework to align with the requirements of the EU Control Regulation.
3) On site sampling by scientific observers of biological variables during BFT BGF REC competitions.

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 to collect data on marine and freshwater recreational catches. For freshwater diadromous species, use Table and Text Box 2.3.

National strategy

Three institutions are designated at national level for data collection on recreational fisheries within the DCF.

Their roles are following:

- **MAFF-DoF:** national coordination, mobile applications, central database, legal framework
- **IOF:** scientific recall survey
- **Croatian Federation of sports fishing on sea (CSSFA):** organization and data collection during local, regional and national sports fishing competitions, maintenance of sports fishing database (angling, underwater and BGF competitions).

Starting from 2022, a systematic monitoring of recreational and sports fisheries in Croatia has commenced, with the gradual introduction of new elements including electronic system of data collection in the following years.
In the reference period 2025-2027 an introduction of the mobile application mRECFISH is planned, which implies the amendment of the national legal framework. New amendments will include gradually introducing an obligation of daily reporting of retained and released catch by species in recreational and sport fisheries for all licence holders (2026-2027).

RECFISH recall survey: An annual recall survey, carried out by IOF, will use the MAFF-DoF licence database as the sampling frame for the random selection of recreational and sport fishers. Each year, the survey is conducted for the previous reference year (e.g. in 2026 and 2027 for reference year 2025 and 2026, respectively) and is used to estimate catch by species and fishing modality, as well as to cross-check data collected by MAFF-DoF through other reporting channels. Sample size needed to provide accurate representation of the population of recreational and sports fishers is determined according to the GFCM Handbook. A minimum of 500 sampling units (fishers) will be sampled in the survey on a yearly basis. Non-respondents may be identified by cross-checking licences and catch records. Possibility of stratification of sampling will be considered according to fishing zone utilization provided beforehand by each licensed fisherman through the licensing system. Collected data will be stored in the database curated by MAFF-DOF. Additionally, data collected by CSSFA during sport competitions will be included in central MAFF-DoF database and analysed.
Also, systematic monitoring of catches in sport fishery is already established within the DCF for big game fishing competitions of large pelagic fish in relation to ICCAT species (see below) which is jointly conducted by the MAFF-DoF, IOF and CSSFA.

On site sampling at sport big game fishing competitions of large pelagic fish (BFT BGF REC)
As this fishery catches highly migratory ICCAT species with allocated TAC for sport fishery (BFT) it will be recorded by IOF scientific observers on shore by sampling every BGF competition held during the year. All the landed LP fish during the competitions will be sampled for biological data and variables. Around 10 BGF competitions are held annually, it is planned to sample every catch during each BGF competition (including around 25 fishing days in total monitored by scientific observers).

Data collection on incidental catch of protected species
For protected species (marine mammals, marine birds, marine turtles and protected elasmobranchs, as well as European eel) information on the incidental catch is collected in all sampling activities (RECFISH survey and mobile apps including m-Ribič (mobile app for inland sports fishing)).
As regards to European eel, according to Article 4(4) Council Regulation (EU) 2024/259 (relating to marine fisheries) as well as Paragraphs 9 and 44 of Recommendation GFCM/46/2023/16 on a long-term management plan for European eel in the Mediterranean Sea, repealing Recommendations GFCM/45/2022/1 and GFCM/42/2018/1 (relating to all habitats including freshwater) recreational fishing of all stages of European eel life cycle (glass, yellow, silver) is prohibited. In addition, incidental cactches and biological parameters, if possible, are recorded by scientific observers during on-site sampling of bluefin tuna big game fishing competitions (BFT BGF REC).

Participation in regional projects
Croatia does not participate in the GFCM Research Programme on Recreational Fisheries in the Mediterranean and the Black Sea, as this programme overlaps with national activities implemented under EU legislation (Data Collection Framework – DCF, and the Control Regulation).
However, it is planned that Croatia will continue developing its national framework for the collection and assessment of recreational fisheries data under the DCF. The results of these national activities are regularly

presented to the GFCM Subregional Committee for the Adriatic Sea (SRC-AS), ensuring alignment and coordination with GFCM processes.

More information is provided in Table 2.4.

Text Box 2.5: Sampling plan description for biological data

Region: Mediterranean and Black Sea

Sampling scheme name: Commercial fishing trip

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

Sampling scheme name (or identifier): Commercial fishing trip

RWP Med&BS 2025-2027

The regional coordination of sampling plan for biological data is under development in the RCG Med&BS ISSG on sampling optimization. The work relates to developing regional sampling plans.

The following roadmap was agreed at the ISSG and RCG level:

- Identification of new scenarios, based on feedback during the next RCG.
- New RCG data call on sampling costs, biological detailed data, landing data; a template for sampling costs was distributed. The ISSG experts started to collect the data.
- Biological data revision, including identification of reference person for each case study.
- Run sampling optimization tools on revised biological data, including new scenarios.
- Transferring new results to ISSG RWP for revision and discussion.

Agreement and commitment: Based on the activities performed under Task 2.1 of the STREAMLINE regional grant, the RCG Med&BS agreed to use the sampling optimization strategy R routines (developed by STREAM and refined by STREAMLINE) to feed the RWP Med&BS 2025-2027, including SSFs.

National specifics

All Croatian sampling schemes under GFCM have been evaluated and confirmed.

Sampling scheme name: Commercial fishing trip / RFMO: GFCM

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

Sampling scheme name (or identifier): Commercial fishing trip / RFMO: GFCM

National sampling schemes from region Med&BS (GFCM)

Additional information on sampling schemes

Sampling strategy for each metier is designed partly as concurrency-at-sea (sampling directly on board by observers and scientists) and concurrency-at-landing site (sampling directly on landing site, at market etc.), taking also into account the Croatian fishing zones and their specificities. The target population for the reference year will be the number of fishing trips (fishing days) by metier of the previous years. The frame population is a subsample of the target population: it will be a selection of fishing trips, mainly on spatial (Croatian fishing zones and subzones) and time stratification basis (monthly, quarterly or annually) with measurements of the composition of the catch to detect seasonal differences in the demographic structure and composition of the landings for different metiers. Sampling scheme identifier is scientific observer on shore or scientific observer at sea. Fishing area under jurisdiction of the Republic of Croatia is divided into several fishing zones. Each zone has its own specific oceanographic and geomorphological characteristics and environmental conditions differ from one zone to another. Selected species for monitoring are not equally distributed across the Adriatic Sea due to its biological and ecological characteristics. For some species there is strong variation in distribution between seasons due to migrations patterns, recruitment, spawning etc. Sampling scheme is designed to cover quarterly all fishing zones in Croatia in order to achieve representative length frequency distribution and to cover different life stages as well. Croatian fishing vessels operate

exclusively in the Northern Adriatic Sea (GSA 17).
In comparison to monitoring conducted in previous years, the sampling scheme for 2025-2027 was adjusted to increase the number of PSUs for sampling by scientific observers for those metiers which have a higher risk of incidental catch of vulnerable species.
Croatia incorporated the improvements, in line with sampling optimization carried out under STREAMLINE regional grant, into the sampling plan for 2025-2027 to improve the sampling design.

In the **WP 2026-2027 amendment**, the sampling plan has been refined to ensure adequate and representative coverage of fishing effort across all ICCAT and GFCM métiers, with particular emphasis on those identified as high-risk for PETS interactions. The updated plan ensures that the minimum recommended coverage levels are met or exceeded: 5/10/20/100% for ICCAT métiers depending on gear type and vessel size (ICCAT Recs. 16-14, 22-08, 22-12) and at least 0,5% and where possible higher 2-7% for GFCM métiers (FAO Handbook 2019).

- For ICCAT métiers, Croatia achieves the required coverage through a combined approach in which SciObsAtSea and SciObsOnShore jointly ensure the minimum 5% observer coverage for vessels <15 m LoA (most Croatian LHP/LLD vessels), while métiers involving vessels ≥15 m LoA reach 10% observer coverage. When complementary alternative methods (e.g. structured questionnaires collected by scientific observers) are included, total monitoring coverage exceeds 20%, ensuring enhanced representativeness and robustness of PETS-relevant data. Purse seiners (PS_LPF_BFT) remain under 100% observer coverage through the ICCAT ROP and the national observer programme.
- For GFCM métiers, overall monitoring coverage exceeds 2% for most gears, while for set nets (GNS/GTR/GTN) the coverage exceeds the required 0,5%, despite the exceptionally high fishing effort expressed in fishing days. Namely, passive gears accumulate effort in terms of days rather than trips, therefore coverage expressed as a percentage of fishing days appears lower; however, when expressed in terms of fishing trips, the relevant metric for assessing the likelihood of PETS presence in the catch, the effective coverage of passive gears is substantially higher. This distinction is essential in the context of PETS monitoring, as fishing trips provide the correct basis for evaluating interaction rates and ensuring robust estimation of incidental catches.

Overall, the revised sampling design ensures full compliance with ICCAT and GFCM standards, while providing improved spatial and temporal representativeness for high-risk gear–species–area combinations relevant to PETS monitoring. Sampling will be implemented through a combination of scientific observers, self-sampling, and the pilot use of cameras and questionnaires, all carried out under the supervision and implementation of scientific observers.

Opportunistic sampling for selected species (Table 2.2) will be conducted by IOF scientific observers on-board fishing vessels across all sampling frames listed in Table 2.5.

Additional description of sampling frames

Purse seines: PS metiers

The most important fleet segment in terms of share in landing weight was the purse seine segment (PS, 90% of total landings weight) with less than 3% of total number of active vessels. This segment includes vessels which remain active the entire year and fishing activity represents the main activity. Several different PS metiers were identified in Croatia based on gear characteristics and target species assemblages.

- **PS_SPF** (purse seine net "srdelara") is the dominant purse seiner operating in Croatia. The main target species of metier are sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*), this gear is managed under GFCM MAP. Sampling for purse seine for small pelagic fish species is planned to be conducted in 6 most important fishing zones (considering volume of landings) and in each 9 months (three month in year are with fishing ban for this fishing gear) that fishing is taking place as well as additional three times during year in the months that most of the fishing is in that fishing zone (72 on board), and twice in quarter in each of four marine districts on landing place (32 samplings).

  A total of 170 questionnaires will be conducted annually by scientific observers for purse seiners targeting small pelagic fish (PS_SPF) to adequately monitor this high-risk métier, not for bycatch, but for interactions, primarily depredation, as identified in the PETS BYC 2022-2024 study.
- **PS_LPF** (purse seine net "palamidara") targets the LPF *Sarda sarda* and other large pelagic fish species (*Auxis rochei, Euthynnus alletteratus, Seriola dumerili*). This fishery is carried out in inner seas and territorial waters mostly on a seasonal basis. Sampling is planned to be twice in the quarter in the landing place (in total 9 samplings).

Bottom otter trawls: OTB_DEF

The primary target species of this metier are red mullet (*Mullus barbatus*), hake (*Merluccius merluccius*), musky octopus (*Eledone moschata*), Norway lobster (*Nephrops norvegicus*) and deep-water rose shrimp (*Parapenaeus longirostris*). Species composition varies depending on the fishing zone. In fishing zone A, octopus and other cephalopods as well as sole (*Solea solea*) and red mullet are particularly important. In fishing zone C and D which can be considered to be an outer zone, further offshore, hake and Norway lobster dominate the catches to a larger extent. Catches in inner seas (zones E and G) are dominated by hake, red mullet and octopus, but in the northern area (zone E) Norway lobster is also important while in the southern area (zone G) other species are caught such as anglerfish, rays and sparids. The fishing zone beyond the territorial waters (zones H, I, J, K) are characterised by low fishing activity and catches due to fleet limitations (i.e. small vessels and limited engine power). This gear is managed under GFCM MAP for the Adriatic Sea.

Sampling by individual fishing zones is planned for the demersal trawl metier; in total 6 zones per year will be covered 72 times on-board and 72 times at landing places.

Within the PETS monitoring programme, activities for this métier are being strengthened and expanded from 2026 to improve data quality, spatial representativeness, and monitoring coverage. Two complementary approaches will be applied:

1. **Pilot REM activity (combination of EMAtSea + SelfAtSea):** Experimental self-sampling using cameras installed on a limited number of bottom trawlers (OTB_DEF). The system is operated by fishers to record fishing operations, and the collected video footage is regularly analysed by IOF observers to support the national assessment of PETS bycatch. The REM activity aims to improve the efficiency, coverage and consistency of monitoring across fishing zones and to further strengthen the methodological framework for integrating electronic monitoring into routine data collection. A total of 100 camera-monitored fishing trips are planned annually.
2. **Questionnaire-based sampling (SciObsOnShore):** Scientific observers will conduct 360 questionnaires per year with fishers operating bottom trawlers to collect complementary data on interactions with PET species during fishing activities.

Close cooperation with the Fisheries Inspection and the Coast Guard has been established to enable efficient coverage of offshore and remote fishing zones, particularly those identified as high-risk areas for incidental catches of vulnerable species based on the PETS BYC 2022-2024 study. These activities will strengthen the integration of traditional and innovative monitoring methods, ensuring a more representative and risk-based PETS data collection framework.

Dredges: DRB_MOL

In beam trawl fisheries (dredge "rampon") the main target assemblages are bivalves, mostly two species: the Mediterranean scallop *Pecten jacobaeus* and European flat oyster *Ostrea edulis*. However, three other commercially important species, the common sole *Solea solea*, European common cuttlefish *Sepia officinalis* and musky octopus *Eledone moschata* are frequently present in the beam trawl as by-catch. Sampling is planned for the dredges metier in total 6 times on-board and 6 times at landing places per year.

Sampling of demersal trawl and dredges will be conducted seasonally to achieve optimum quarterly distribution of data.

30 questionnaires will be conducted annually by scientific observers for boat dredges (DRB_MOL) to complement PETS bycatch monitoring and provide additional information on interactions in high-risk areas.

Fixed nets: GNS/GTR/GTN metiers

The largest number of vessels in the main commercial fleet were active in fixed nets fishery. Several different metiers were identified in Croatia based on gear characteristics and target species assemblages. Gillnets for demersal species is a grouping of various traditional gillnets used in small-scale fisheries. The most important are called "prostica", "psara" and "polandara" which are similar but of different mesh sizes. Overall, catches are dominated by hake (*Merluccius merluccius*), demersal elasmobranchs, sparids and pelagic species like *Scomber* sp. and *Euthynnus alletteratus* among others. Species composition varies depending on the net type. Trammel nets for demersal species is a grouping of three main traditional trammel net types used in small-scale fisheries. The type called "listarica" is used predominantly in the Istria area to catch common sole (*Solea solea*). The trammel nets called "poponica" are used in inner seas to catch various species including cephalopods, red scorpion fish, various demersal elasmobranchs and sparids. The combined trammel net and gillnet "sipara" mainly targets the common cuttlefish (*Sepia officinalis*).

- **Trammel nets: GTR_DEF**
  Trammel nets will be sampled a total of 30 times on-board and 30 times at landing places per year. Two national gears will be included in the sampling: listarica and poponica. GTR_DEF "listarica" will be sampled throughout the year; 12 times on-board and 12 times at landing places. GTR_DEF "poponica" will be sampled seasonally, during the period when the gear is permitted, with 14 on-board and 18 landing

samples planned. In addition, four extra on-board sampling trips will be carried out in high-risk fishing zones, and 150 questionnaires will be conducted by scientific observers to complement PETS bycatch monitoring.

- **Combined trammel net and gillnets: GTN_DEF**
  Combined trammel net and gillnets "sipara" will be sampled depending on the season when the gear is allowed to be used. Sampling will be carried out 6 times on board and 8 times at landing places. 22 questionnaires conducted by scientific observers for set gillnets (GTN_DEF) to complement monitoring of PET species interactions.
- **Set gillnets: GNS_DEF**
  Set gillnets will be sampled a total of 30 times on-board and 44 times at landing places per year. Three national gears will be included in the sampling: polandara, prostica, and psara. GNS_DEF "polandara" will be sampled throughout the year: 4 times on-board and 8 times at landing places. GNS_DEF "prostica" will be sampled throughout the year: 10 times on-board and 16 times at landing places. GNS_DEF "psara" will be sampled throughout the year: 14 times on-board and 20 times at landing places. In addition, two extra on-board sampling trips will be carried out in high-risk fishing zones, and 300 questionnaires will be conducted by scientific observers to complement PETS bycatch monitoring and strengthen spatial and seasonal coverage for high-risk areas.

Set longlines: LLS_DEF

This métier consists mostly of small-scale fishing vessels operating both in inner and open coastal waters. The main target assemblages are demersal species such as *Merluccius merluccius*, *Trigla lucerna*, and demersal elasmobranchs. In addition, optional sampling of vessels targeting *Anguilla anguilla* in Prokljan Lake will be attempted, depending on the cooperation and activity of commercial fishers.

Set longlines will be sampled throughout the year: 22 times at landing places and 4 times on-board.

A pilot REM activity (combination of EMAtSea + SelfAtSea) will start in 2026, involving experimental self-sampling with cameras installed on a limited number of set longliners (LLS_DEF). In the initial phase, 10 fishing trips will be monitored, and the recorded video footage will be analysed by IOF observers to assess feasibility, data quality, and the potential integration of REM into the national PETS monitoring framework.

Additionally, 140 questionnaires will be conducted annually by scientific observers for set longliners (LLS_DEF) in GSA 17, starting in 2026, to complement at-sea observations and provide supplementary data on interactions with PET species.

Both additional methods, the pilot REM and questionnaire-based surveys, will be primarily focused on open coastal areas and high-risk zones, as identified in the PETS BYC 2022-2024 study, to enhance spatial representativeness and improve the accuracy of national bycatch assessments.

Pots for crustaceans: FPO_CRU

This metier consists mostly of small-scale fishery vessels that usually operate in inner sea and coastal areas. The main target assemblages are crustaceans. Pots for crustaceans will be sampled bimonthly 14 times at landing places targeting catches of *Nephrops norvegicus* (6 samplings), and *Homarus gammarus* and *Palinurus elephas* (8 samplings).

<u>Population out of sampling frame</u>

Sampling frames (metiers) presented above were selected according to metier ranking procedure performed for the reference period (2021-2023) prior to submitting the WP 2025-2027. Cumulatively they represent more than 90% of landing, value, effort and discard or were selected due to other reasons (i.e. gears included in national fishing gear management plans).

SB_SV metiers: Seine nets (migavica, girarica, šabakun) are excluded from the sampling plan as these nets are no longer in use since November 2023.

Other PS metiers: Several purse seine metiers were selected for sampling in previous period based on the national management plans such as the purse seine net "igličara" with the main target species *Belone belone*, PS "oližnica" that targets *Atherina* spp., PS "ciplara" that targets the Mugilidae species and PS "lokardara" whose main target species is *Scomber colias*. However, none of the mentioned gears will be sampled in the period 2025-2027, due to very low activity in previous years leading to difficulties in sampling and/or due to buy-off of gears conducted in 2024. In case it will be needed for the evaluation of effects of national management plan, these gears will be sampled at a later stage in the framework of other national projects.

In addition, following metiers have not been selected by ranking procedure (out of frame) and will not be sampled: FYK_DEF, LHP-LHM_CEP, LHP-LHM_FIF and MISC. For these metiers there is currently no specific management need related to fishing gear or target species.

Sampling scheme name: Biological parameters specific / RFMO: GFCM

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

Sampling scheme name (or identifier): Biological parameters specific / RFMO: GFCM

National sampling schemes from region Med&BS (GFCM)

Additional information on sampling schemes

Fyke nets for eel: FYK_CAT

This metier consists mostly of small-scale fishery vessels that usually operate in inner sea and coastal areas. The main target assemblage is demersal species, mostly European eel (*Anguilla anguilla*).

Field sampling of European eel (*Anguilla anguilla*) for biological variables according to Table 2.5 and Table 2.3 will be carried out in coastal areas through direct sampling of the fishermen's catches at the location of fishing by IOF scientific observers. This species is caught predominately by fyke nets which are used by a low number of licensed fishermen. Majority of landings of this species are reported for the area of Neretva River delta where targeted sampling will be carried out. The yearly reported landings are relatively low (approx. 500 kilos) of which the majority (>90%) is caught by fyke nets. Sampling will be carried out 4 times in the season when the use of this gear is allowed (autumn and winter). In each of the planned sampling trips, as many catches as possible will be sampled. Biological data will be obtained on landing place (length, weight) while a subsample will be obtained for laboratory analysis where age and sex of the specimens will be determined. Contacts of licensed fishermen will be provided by MAFF-DoF, while the sampling will be carried out by IOF in the area of Neretva River delta. During sampling, data on the characteristics of the fishing gear will be collected (number, technical characteristics), as well as data on fishing effort (catch per unit effort) and the information on the qualitative and quantitative composition of catches (target species, by-catch and discard). Data on length frequencies and biological data (length, individual weight, sex, maturity and age over otolith) will be collected for standing stock – yellow eel and emigrating silver eel.

Additional description on sampling frames

Opportunistic sampling for eel (Table 2.2) will be conducted by IOF scientific observers on-board fishing vessels across all sampling frames listed in Table 2.5.

Contribution of activities to the objectives of the Marine Action Plan

Fishery dependent scientific monitoring carried out in the Neretva River Delta will complement fishery independent scientific monitoring for European eel described in Section 2.3.

Sampling scheme name: Commercial fishing trip / RFMO: ICCAT

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

Sampling scheme name (or identifier): Commercial fishing trip / RFMO: ICCAT

National sampling schemes from region Med&BS (ICCAT)

Additional information on sampling schemes

Commercial fisheries included here catch highly migratory ICCAT species and are sampled for Bluefin tuna *Thunnus thynnus* (BFT) and swordfish *Xiphias gladius* (SWO). Based on the type of gear and the targeted species sampling is separated in three metiers:

PS_LPF_BFT (purse seine net "tunolovka")**:** Large purse seiners targeting BFT using individual quotas. The fishing season is restricted from 26th of May until 1st of July. This BFT fishery is based on farming activities which means that BFT is not landed but transferred live into cages. Metier shall be covered by all relevant monitoring and data collection activities. Purse seine for BFT is covered 100% by both national and regional ICCAT observers (ROP) where they collect and sample any eventual mortality which is later handed to IOF scientific observers for further laboratory preparation and storage of the collected data. Due to the dynamic of the BFT fishing season which lasts around 45 days where the fishing ships stay on the open sea for long

periods and the timing of the catch is uncertain, the main role of the scientific observer is to collect the mortality samples when possible (mainly spines), along with biological data from other observers and further prepare it for laboratory processing. For this reason, lower number of boarding samplings is expected to be sufficient to perform these tasks. Sampling of mortalities is conditional depending on availability of PS vessels in GSA 17 during BFT fishing season and possibilities to deploy scientific and national ICCAT observers. Information on bycatch and PETS for national purposes is collected from ROP and national ICCAT observer reports.

LLD_LPF_SWO: This metier includes commercial catch of SWO by drifting longlines. Sampling programme will target individual quota of vessels under 15m LoA authorized for this activity during their fishing season that lasts from 10th of April until the end of the year or until the designated quota has been fulfilled.

A total of 90 questionnaires will be conducted annually by scientific observers to complement PETS bycatch monitoring, with special focus on interactions with sea turtles, in line with ICCAT Recommendations 16-14 and 22-12.

LHP_LPF_BFT-SWO: Sampling programme will encompass commercial catch that is part of the TAC used by a number of authorized vessels under 15m LoA that catch BFT mainly by hand and pole lines during their fishing season that lasts from 15th of February to the end of the year or until they fulfil their individually allowed quota.

A total of 100 questionnaires will be carried out annually by scientific observers to support PETS monitoring for this small-scale hand and pole line fishery targeting BFT and SWO.

Additional description on sampling frames

LLD_LPF_SWO, LHP_LPF_BFT-SWO: Change compared to previous period is in the determination of metier. In the previous period hand lines and pole lines as well as long lines were integrated into the same metier based on the targeted species they catch. Since authorized fishing vessels are under 15m LoA they have and use licenses for both fishing gears (drifting longline and hand and pole line) and the catch quantity may greatly differ when looking at a vessel/gear based on their current fishing gear preference. Therefore, sampling was previously based on targeted species. This included incorporating drifting longlines and hand and pole lines in the same metier, one that targets Bluefin tuna and second metier that targets swordfish.
For 2025-2027, metiers were again divided by fishing gears, to enable more precise planning and sampling by fishing gear, and hence estimation of incidental catch of vulnerable species according to ICCAT.

ICCAT métiers – updated coverage explanation

For ICCAT métiers, coverage requirements are achieved through a combined sampling approach tailored to each métier:

- LHP_LPF_BFT-SWO and LLD_LPF_SWO: Most Croatian vessels in these métiers are <15 m LoA; therefore, the required minimum 5% observer coverage is ensured through the combined application of SciObsAtSea and SciObsOnShore. When complementary alternative methods (structured questionnaires completed by scientific observers) are included, the total monitoring coverage exceeds 20%, providing improved representativeness for PETS-relevant data.
- LLD ≥15 m LoA (where applicable): These vessels achieve 10% observer coverage in accordance with ICCAT Recommendations 16-14, 22-08 and 22-12.
- Purse seiners (PS_LPF_BFT): This métier maintains 100% observer coverage, ensured through the ICCAT Regional Observer Programme (ROP) and the national observer programme.

This approach ensures full compliance with ICCAT minimum standards while strengthening data quality and coverage relevant to PETS interactions.

Population out of sampling frame

There are no metiers out of sampling frame. All metiers relevant to ICCAT are included in the sampling scheme.

Text Box 2.6: Research surveys at sea

Region: Mediterranean and Black Sea

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 annex. It is intended to specify which research surveys at sea, as set out in Table 2 of the EU MAP Implementing Decision annex will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU MAP Implementing Decision annex or whether it is an additional survey.

Research survey: International bottom trawl survey in the Mediterranean (MEDITS)

RWP Med&BS 2025-2027

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 (MEDITSHandbook.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).

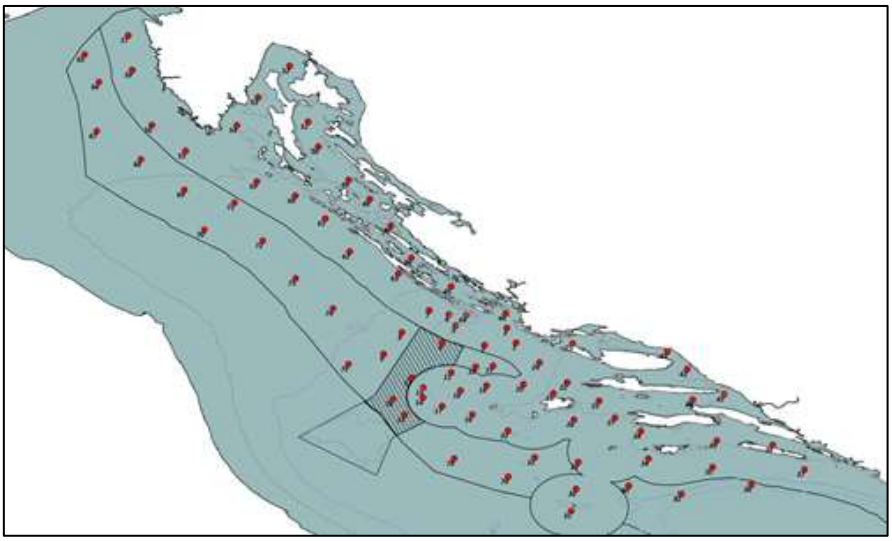


Figure 1. Map of sampling positions during the MEDITS survey in GSA 17 (Eastern side).

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).

National specifics

Croatia is participating in MEDITS Surveys by conducting a bottom trawl survey in the eastern part of GSA17 area (Adriatic Sea), covering an area of 55.000 km2 in the period from May-July.
Survey is conducted by IOFs research/survey vessel BIOS DVA:

Research survey: Beam Trawl Survey (SOLEMON)

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 annex. It is intended to specify which research surveys at sea, as set out in Table 2 of the EU MAP Implementing Decision annex will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU MAP Implementing Decision annex or whether it is an additional survey.

Research survey: Beam Trawl Survey (SOLEMON)

RWP Med&BS 2025-2027

1. Objectives of the survey

Common sole, *Solea solea*, is an important resource in the GFCM area. About 22% of the GFCM landings of common sole come from the Adriatic Sea. In GSA 17, common sole is targeted by "rapido" trawl and set nets, that amount to an annual value of landings of around 40 million Euros.
The main survey objectives are:
a) Assessing abundance and distribution in GSA17 of sole and other important demersal resources by surveys with "rapido" gears suitable to seize flatfish and other benthic animals.
b) Pursuing the studies on the ecosystem impact of the "rapido" trawl fishery.
c) Finally, survey data will also contribute to the setting of the GES and targets for the Adriatic Sea in the framework of an ecosystem approach. Thus, matching to the requirement of the implementation of the MFSD (DIRECTIVE 2008/56/EC).

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 should cover sole presence within the GSA 17 that, according to the genetic information pertains as a single stock. All this holds also for benthic fish and shellfish of commercial interest, including rays and other elasmobranchs, since EU greatly focuses on such vulnerable resources. Survey should be carried out based on the protocol used since 2005 (SoleMon, 2019; Survey – Handbook Version 2019) and utilising the same gear. The gear is a modified beam trawl named as "rapido" trawl and should be appositely planned to fish on different types of bottom. The research vessel should utilize two gears simultaneously in each haul.

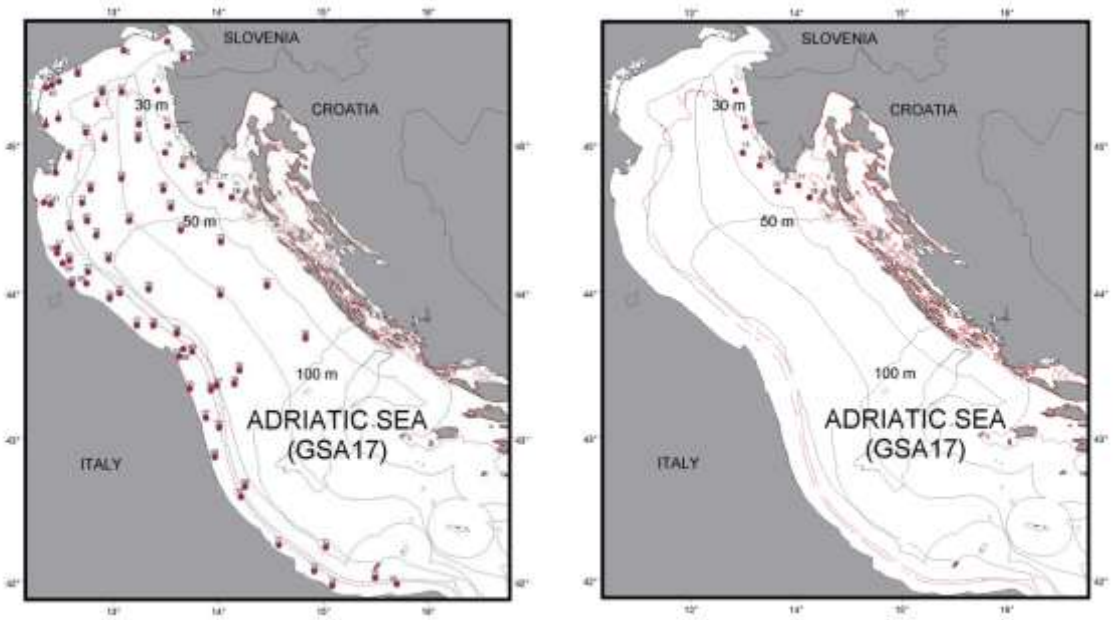


Figure 2. (left) Map of SOLEMON hauls in the Adriatic, GSA 17. Borders between MS are indicative and

without prejudice to territorial boundaries.

Figure 3. (right) Croatian hauls in the Adriatic Sea, GSA 17.

3. For internationally coordinated surveys, describe the participating Member States/vessels.
Data will be shared in WGs, both at EU and Mediterranean level, and with all Adriatic member States through common database AtrIS. Targets number of hauls, by area and participating countries, are reported in the Solemon Handbook (SoleMon, 2019).

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Cooperation and coordination of activities with Italy and Slovenia is established.

National specifics
Croatia is participating in Solemon in the eastern part of GSA17 area (Adriatic Sea) in the period from October-December.

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 annex. It is intended to specify which research surveys at sea, as set out in Table 2 of the EU MAP Implementing Decision annex will be carried out. Member States shall specify whether the research survey is included in Table 2 of the EU MAP Implementing Decision annex or whether it is an additional survey.

Research survey: Pan-Mediterranean Acoustic Survey (MEDIAS)

RWP Med&BS 2025-2027

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. 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 official time period for GSA 17 is June-July involving Croatia, Italy and Slovenia.
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). 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.

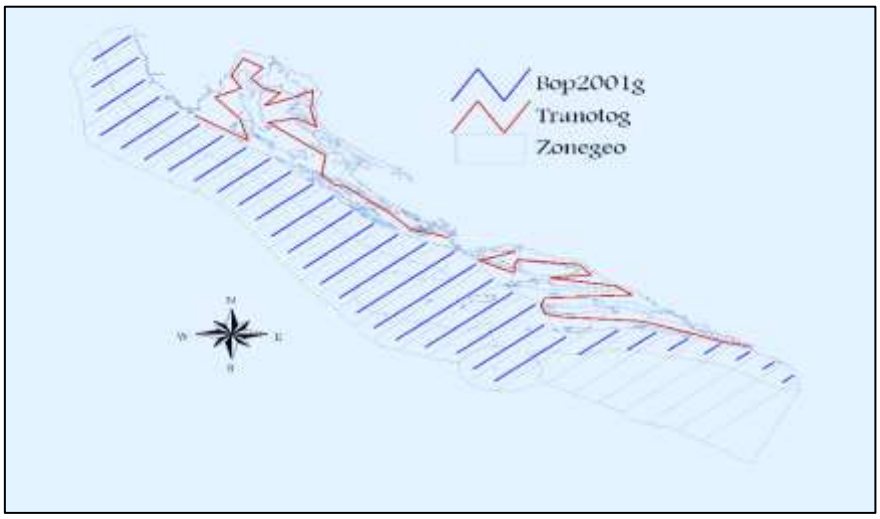


Figure 4. Map of acoustic survey in eastern part of GSA 17 during MEDIAS-DCF survey. Blue transects in the open sea and red transects in inner sea.

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, Greece, Malta) 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).

National specifics
Croatia is participating in MEDIAS in the eastern part of GSA17 area (Adriatic Sea) in the period from June-July. Compared to previous period, Croatia changed planned period for MEDIAS in WP 2025-2027 (from August-October to June-July), following the agreement in the RCG Med&BS TM in 2024. Notwithstanding the long time series of MEDIAS in Croatia, the basis for this amendment is mainly the need to perform harmonization of acoustic survey in GSA 17 as identified by the GFCM and SC MEDIAS. Important first step in the harmonization is aligning the survey periods for relevant MS. The survey period June-July is in line with the survey periods for other MS performing the survey in GSA 17 – Italy and Slovenia. Additional reason for performing MEDIAS earlier is in biology of the species which in Adriatic Sea will be better covered (spawning of anchovy and recruitment of sardine) with survey in early summer period.

Survey is conducted by IOFs research/survey vessel BIOS DVA:

Important note: Considering that MEDITS and MEDIAS surveys are planned to be conducted by the same research vessel BIOS DVA, IOF has agreed to conduct the MEDIAS survey as soon as feasible and without endangering the MEDITS survey, which is typically conducted between June 15 and July of each year.

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
Data collection on fishing activity variables in Croatia, implemented according to the Control Regulation (Regulation (EU) 2023/2842 amending Control Regulation (EC) 1224/2009) and national regulation prescribed in the Marine Fisheries Act, is of sufficient quality and aggregation level for the intended scientific use according to 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. National rules on data collection are proscribed by the Ordinance on the formats, content and methods of keeping and submitting data on the catch in commercial marine fisheries (OG 114/23). In line with the **Statistical Data Release Calendar on Fisheries and Aquaculture,** official statistics for the previous year are published by the Ministry of Agriculture, Forestry and Fisheries in two stages: **preliminary data by end of June** and **final data by mid-December** of year *N* for year *N-1*. This two-step publication system, introduced following the transfer of statistical responsibilities from the Croatian Bureau of Statistics to the Ministry in 2024, ensures continuous improvement of data quality and transparency. Consequently, the **Republic of Croatia regularly updates transversal data under the DCF** to reflect the latest available official statistics on fishing and aquaculture activities. Complimentary data collection is not foreseen; therefore Table 3.1 is not included in the WP.

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.
According to the Croatian Freshwater Fisheries Act (OG 63/2019) and Ordinance on Commercial Fishing in Freshwater Fisheries (OG 21/2022), commercial fishing in freshwater is carried out only in Rivers Sava and Danube (Black Sea Basin), where European eel is not naturally present. Commercial fishery in River Neretva Delta (Adriatic Sea Basin) is managed according to Marine Fisheries, as this area is considered a marine fishing area, and therefore fishery dependent sampling for biological variables is conducted in accordance with Tables 2.2 and 2.5 (FYK_CAT metier).

Text Box 4.2: Incidental catches of sensitive species

Region: Mediterranean and Black Sea

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.

RWP Med&BS 2025-2027

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/coordinationsmore/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.

National specifics

The amendments to the WP 2025-2027 for the period 2026-2027 are based on the results of the PETS BYC (2022-2024) study. The study's findings have contributed to a better understanding of fishery–PET species interactions in the Adriatic Sea, particularly regarding high-risk fishing gears in specific fishing zones. Based on these new insights, PET species monitoring has been enhanced, including increased coverage for high-risk fishing gears and the introduction of new monitoring tools (e.g. cameras for set longlines). The amendment foresees optimization of sampling design and enhancement of monitoring coverage for high-risk gear–species–area combinations, as identified through national risk assessment. The updated framework integrates complementary observation methods and strengthens interinstitutional coordination, ensuring coherent and representative data collection across all PETS groups and supporting evidence-based management of fisheries–environment interactions.

In the **WP 2026-2027 amendment**, the sampling plan has been refined to ensure adequate and representative coverage of fishing effort across all ICCAT and GFCM métiers, with particular emphasis on those identified as high-risk for PETS interactions. The updated plan ensures that the minimum recommended coverage levels

are met or exceeded: 5/10/20/100% for ICCAT métiers depending on gear type and vessel size (ICCAT Recs. 16-14, 22-08, 22-12) and at least 0,5% and where possible higher 2-7% for GFCM métiers (FAO Handbook 2019).

- For ICCAT métiers, Croatia achieves the required coverage through a combined approach in which SciObsAtSea and SciObsOnShore jointly ensure the minimum 5% observer coverage for vessels <15 m LoA (most Croatian LHP/LLD vessels), while métiers involving vessels ≥15 m LoA reach 10% observer coverage. When complementary alternative methods (e.g. structured questionnaires collected by scientific observers) are included, total monitoring coverage exceeds 20%, ensuring enhanced representativeness and robustness of PETS-relevant data. Purse seiners (PS_LPF_BFT) remain under 100% observer coverage through the ICCAT ROP and the national observer programme.
- For GFCM métiers, overall monitoring coverage exceeds 2% for most gears, while for set nets (GNS/GTR/GTN) the coverage exceeds the required 0,5%, despite the exceptionally high fishing effort expressed in fishing days. Namely, passive gears accumulate effort in terms of days rather than trips, therefore coverage expressed as a percentage of fishing days appears lower; however, when expressed in terms of fishing trips, the relevant metric for assessing the likelihood of PETS presence in the catch, the effective coverage of passive gears is substantially higher. This distinction is essential in the context of PETS monitoring, as fishing trips provide the correct basis for evaluating interaction rates and ensuring robust estimation of incidental catches.

Overall, the revised sampling design ensures full compliance with ICCAT and GFCM standards, while providing improved spatial and temporal representativeness for high-risk gear–species–area combinations relevant to PETS monitoring. Sampling will be implemented through a combination of scientific observers, self-sampling, and the pilot use of cameras and questionnaires, all carried out under the supervision and implementation of scientific observers.

Croatia conducts data collection for the assessment of incidental catches following regional agreement at the level of RCG Med&BS (bottom trawlers, longlines, set nets (gillnets), and other metiers: PS_SPF, PS_LPF_BFT, LLD_LPF, LHP_LPF, OTB, DRB, FPO, GNS/GTR/GTN, LLS) and according to RFMO (GFCM, ICCAT) recommendations.

Following data sources are considered for the purpose of bycatch estimation at national level:

1. **Commercial fishery_Sampling by scientific observers:** IOF scientific observers on board fishing vessels (252 sampling trips per year) and at landing sites (in total 294 sampling trips per year) for all sampled metiers listed in Table 2.5 (including BGF_REC).
   During the scientific monitoring of commercial fishing vessels, scientific observers are trained and GFCM-certified for the identification, handling and recording of sensitive species and discards. Depending on vessel type and sampling conditions, the number of observers on board varies. On larger vessels (e.g. trawlers and purse seiners), sampling is usually carried out by two observers, allowing one to focus on the observation and documentation of PET species and discard processes. On smaller vessels, where space and safety conditions limit the number of personnel, a single observer performs all sampling duties, including the recording of PETS observations and bycatch events. This approach ensures consistent data collection and appropriate species handling across all fleet segments, in line with the methodology applied during the PETS BYC 2022-2024 study.
   From 2026, operational cooperation with the Fisheries Inspection and the Coast Guard has been established to facilitate observer embarkation and transport to commercial fishing vessels at sea. This arrangement enables scientific observers to conduct sampling on vessels operating in offshore and high-risk areas identified through the PETS BYC 2022-2024 study. The cooperation is expected to increase representativeness, improve access to distant fishing grounds, and reduce potential bias in the national bycatch dataset.

2. **Commercial fishery_Questionnaires** collected by IOF scientific observers at landing sites. Fishermen will be asked to make the photos of bycatch so that the determination of vulnerable species can be more precise. It is planned to collect in total 1442 questionnaires. Following number of fishing trips per year will be covered by questionnaires and interviews: for bottom trawls (360 trips), purse seine nets "srdelara" (170 trips), dredge "rampon" (30 trips), set gillnets (300 trips), trammel nets (150 trips), combined gillnets and trammel nets (22 trips), bottom longlines (140 trips) and vessels using hand lines and pole lines and/or drifting longlines with quota for Bluefin tuna and/or swordfish (in total 190 trips). Questionnaires are modified forms according to GFCM FAO 2019 methodology.

3. **Commercial fishery_Self-sampling by fisherman using experimental cameras (pilot REM project):**
   A pilot remote electronic monitoring (REM) activity will be implemented through self-sampling by fishers using experimental cameras installed on a limited number of commercial bottom trawlers and bottom longliners. The aim is to collect video records of fishing operations to monitor incidental catches of vulnerable species, starting from the beginning of the hauling phase until the completion of fishing activities.
   During the pilot phase, camera-based test sampling will be carried out for approximately 100 demersal trawl trips (OTB) and 10 bottom longline trips (LLS) per year.
   The recorded footage is securely stored, downloaded, and analysed monthly by IOF scientific observers, and the resulting data are used in the national assessment of PETS bycatch. This activity strengthens data coverage, operational consistency and analytical capacity, contributing to improved risk-based monitoring and the long-term integration of REM methods into the national PETS monitoring framework.

4. **Fishery independent survey data:** Collecting and analysing data from scientific surveys (MEDITS, MEDIAS, SOLEMON). These data are used primarily to record the presence and distribution of PET species, as well as to identify key areas and periods of occurrence, providing complementary information to fishery-dependent monitoring activities. In particular, MEDITS survey is essential for assessing spatial distribution, population structure and long-term trends of sensitive elasmobranch species in the Adriatic Sea.

5. **Other data sources:** Collecting and analysing data from additional official sources to supplement scientific monitoring data, including the following:
   - MAFF–DoF: logbooks and fishing activity reports,
   - Ministry of Environmental Protection and Green Transition (MEPGT): data from the national alert system on strandings, injuries and mortality of PET species,
   - ICCAT observer reports from regional observers on PS_BFT vessels (ROP) and national observers deployed on BFT towing vessels provided by MAFF–DoF.

   These complementary datasets are used to validate, cross-reference and enhance national PETS monitoring, particularly regarding species distribution, incidental catch events and post-capture outcomes.

6. **Sports BGF competitions:** IOF scientific observers during big game fishing competitions in sports fishery.
   Observers record any incidental catch or interaction with PET species. The collected data are used in the national assessment of marine fisheries bycatch, providing complementary information on interactions occurring within the recreational fishing segment.

7. **Recreational fishery:** Analysis of information collected through the national survey on recreational fishery (RECFISH, Section 2.4).

National bycatch database and estimation methodology

All data collected from the abovementioned sources are compiled in the **national bycatch database** maintained by IOF. The database also enables the extraction of standardised reports for end-users, including the European Commission, GFCM, ICCAT, ICES, and other competent bodies.

Estimation procedures have been developed to provide the relevant fisheries and environmental authorities with national bycatch estimates, following the **modified GFCM–FAO (2019) methodology**, at the level of high-risk fishing gears and species.

The modification reflects the **national stratification of sampling by Croatian fishing zones**, which correspond to the monitoring, management and reporting framework used in the Marine Fisheries Act. Bycatch estimates are first calculated **at the level of each fishing zone**, and then aggregated to the national total. This approach ensures that estimations are more accurate and representative, reflecting both the natural distribution of PET species and the spatial variation in fishing effort across Croatian waters.

The current estimation approach was developed under the PETS BYC 2022-2024 study, in line WP 2022-2024, and represents an integrated national methodology that not only produces bycatch estimates, but also incorporates population abundance data and key habitat areas to assess the risk posed by individual fishing gears, specific species, and geographic zones within Croatian waters.

Participation in regional projects

- Croatia participated in the GFCM regional project "Bycatch – Reduction and Mitigation of the Catch of Elasmobranchs Incidentally Captured by Gillnets and Combined Nets along the Croatian Coast (GSA 17 – Northern Adriatic Sea)". The project, which was completed in mid-2025, aimed to increase sampling

coverage through both landing and onboard observations and to test mitigation measures for elasmobranchs. The results and experience gained are being used to supplement national data collection activities and to further improve bycatch monitoring and mitigation practices within the PETS framework.

- Monitoring activities are conducted within the framework of the Regional Plan of Action on Vulnerable Species (RPOA-VUL) and with the support of the MedSea4Fish programme. In this regard, Croatia will coordinate with the scientific network operating within the Working Group on Vulnerable Species (WGVUL).

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.

National activities

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

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

Yes, in line with results of PETS-BYC study.

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

Demersal trawls, bottom longlines, and fixed nets are considered to be gear with the highest risk for by catch of PETS on the level of GFCM. These gears were included in the Pilot study performed in the previous implementation period.

Drifting longlines that target swordfish and Bluefin tuna have the highest risk of bycatch of PETS species (mostly elasmobranchs and marine birds). Occurrence of bycatch in BFT purse seine operations is mitigated by release of majority of the bycatch PETS species from the net directly to the sea by divers prior to the transfer of caught BFT to towing cages. The remaining recording bycatch is mostly rays. In regard to marine mammals there has been no recorded interaction with gears that target ICCAT highly migratory species.

Following metiers are considered to be “high risk” metiers according to national assessment, based on the results of monitoring in the previous period.

- Metiers managed under GFCM:
  - Bottom otter trawl for demersal species (OTB_DEF)
  - Purse seine net for small pelagic fish (PS_SPF “srdelara”)
  - Dredge (DRB_MOL “rampon”)
  - Set gillnets (GNS_DEF)
  - Trammel nets (GTR_DEF)
  - Bottom longlines (LLS_DEF)
- Metiers managed under ICCAT:
  - Hand lines and pole lines for large pelagic fish (LHP_LPF_BFT-SWO) (vessels <15m LoA)
  - Drifting longlines for large pelagic fish (LLD_LPF_SWO) (vessels <15m LoA)
  - Purse seine net for bluefin tuna (PS_LPF_BFT “tunolovka”).

- What are the methods to calculate the observation effort?

For all high-risk métiers managed under GFCM, Croatia has increased onboard sampling coverage within the scientific monitoring programme and introduced additional sampling methods to achieve the level of fishing effort coverage recommended by the GFCM methodology for data collection (*FAO, 2019. Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries*), which represents the relevant regional standard.

For ICCAT fisheries, all fishing operations of BFT purse seiners are covered by 100% regional observer coverage (ROP), while national ICCAT observers are deployed on BFT towing vessels to record bycatch. For

other gears targeting highly migratory species, including drifting longlines, bycatch is recorded by IOF scientific observers during fishing trips, complemented by questionnaires on the occurrence of PET species bycatch for every sampled landing.

The observation effort for incidental catch is calculated based on the number of sampled fishing trips (both onboard and landing observations) during which scientific observers record PET species bycatch. The calculation also incorporates additional sampling methodologies presented in Table 1, including REM (camera-based self-sampling) and structured questionnaires.

Data collection during 2022-2024 was carried out successfully, achieving coverage significantly higher than initially planned, mainly due to the integration of monthly questionnaires. This approach will continue under the Work Plan 2026-2027, with strengthened cooperation with the Fisheries Inspection and the Coast Guard to improve coverage in offshore and high-risk areas.

The planned minimum sampling coverage for most high-risk métiers exceeds the minimum levels required by RFMOs: 2-7% of fishing effort for most GFCM métiers, 5-10-20% for ICCAT HL/LL métiers (depending on vessel size), and 100% for ICCAT PS métiers, as presented in the table below. The planned sampling design and coverage are technically and financially feasible and fully aligned with GFCM and ICCAT requirements. Based on the procedures and methodological improvements established during 2022-2024 (PETS BYC study), actual coverage is expected to be significantly higher, through the combined use of experimental REM, questionnaires, and enhanced inter-institutional cooperation.

The planned sampling coverage in Table below is calculated using fishing days as the primary effort metric; however, when calculated using the number of fishing trips, the resulting coverage is higher.

Table 1. Planned minimum annual PETS bycatch sampling coverage for "high-risk" fishing gears (WP 2026-2027).

Metier	*Scientific observer at landing sites*	*On-board sampling by scientific observers*	*Questionnaires*	*Fishing trips covered by self-sampling (cameras)*	*ICCAT observers*	Total fishing trips for bycatch estimation	Total planned sampling coverage
OTB_DEF	72	72	360	100	-	604	2,8%
PS_SPF_"SRDELARA"	32	72	170	-	-	274	2,0%
DRB_MOL_"RAMPON"	6	6	30	-	-	42	2,9%
GTR_DEF	30	30	150	-	-	210	0,6%
GNS_DEF	44	30	300	-	-	374	0,5%
LLS_DEF	22	4	140	10	-	176	2,1%
LHP_LPF_BFT-SWO	28	10	100	-	-	138	21,6%
LLD_LPF_SWO	16	16	90	-	-	122	35,9%
PS_LPF_BFT	-	6	-	-	80	80	100,0%

- 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.

For métiers listed in Table 2.5, onboard sampling of bycatch is conducted by scientific observers throughout the entire fishing trip, meaning that the observation effort equals the sampling effort. In addition, questionnaires are used at landing sites to collect complementary information on bycatch. Fishers are asked to provide details on the quantitative and qualitative composition of bycatch, as well as the condition of individuals upon release, and are instructed to photograph bycatch to ensure accurate species identification.

Sampling design and protocols follow the recommendations of the GFCM and ICCAT expert groups and are consistent with their respective bycatch monitoring guidelines and observer programme protocols. Scientific observers are required to record all bycatch events during each trip, ensuring full coverage of the fishing operation.

Methodologies:

- 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: https://www.fao.org/gfcm/publications/series/technical-paper/640/en/
- ICCAT Recommendations relating to observer programmes and duties of observers.
- Recommendation by ICCAT amending the recommendation 22-08 establishing a multi-annual management plan from Bluefin tuna in the Eastern Atlantic and the Mediterranean.
- Recommendation 16-14 by ICCAT to establish minimum standards for fishing vessel scientific observer

programs.

- FAO GFCM resources: https://www.fao.org/gfcm/activities/environment/bycatch/en/

National protocols:

- https://podaci.ribarstvo.hr/publikacije/
- https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

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

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

Yes (same as above).

- 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 applicable.

- 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 scientific observer is indicated to monitor all of the bycatches during the entire fishing trip. During separation of the catches, the observer is primarily instructed to record catches of PETS.

Additional information on sampling schemes

The sampling plan for 2025–2027 has been improved to further increase sampling coverage for high-risk fishing gears, based on the review of data collected under the PETS BYC 2022–2024 study and the recommendations of the STREAMLINE regional project, GFCM, and ICCAT.

The planned number of observations will be achieved through a combination of complementary methods, including onboard observations, questionnaires, logbook data, and self-reporting by fishers, following the approaches and methodologies described in the FAO–GFCM Manual (2019) "Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection", and relevant ICCAT observer protocols.

The list of species has been harmonised at the level of RCG Med&BS and RCG LP, and is based on the FAO–GFCM Manual (2019). In addition, the official list of PET species that Croatian fishers are required to report is available at the following link:

https://podaci.ribarstvo.hr/metodologije-i-protokoli/popisi-morskih-organizama/

The final list of species reported by Croatia will be regularly updated according to the results of ongoing monitoring, and taking into account relevant international conventions and EU legislation considered under the EU MAP, including Commission Delegated Decision (EU) 2021/1167.

Additional description on sampling frames

Not applicable.

Contribution of activities to the objectives of the Marine Action Plan

Scientific base of knowledge in WP 2025-2027 has been strengthened through increased sampling coverage, addition of new sampling methodologies, regional coordination and database development (including regional database RDBFIS). High risk gears have been determined at national level, however, the actions from the WP 2025-2027 will enable the identification of high-risk fisheries that should be sampled at regional level based on the needs of the main end-users. For that purpose, the sampling plan is improved for the following period. This will further enable to determine measures to reduce impact on sensitive species at both national and regional scales.

Text Box 4.3: Fisheries impact on marine habitats

Region: Mediterranean and Black Sea

Study: Stomach sampling and analysis for demersal species

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.

Name of the study: Regional coordination on fish stomach contents collection and analysis in the Med&BS

RWP Med&BS 2025-2027

National specifics

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
European hake
HR: Stomach sampling for European hake, *Merluccius merluccius*, shall be based on the MEDITS survey. However, to cover all the quarters (and a larger size range), as is suggested by the RWP Med&BS, if possible, stomachs will be sampled during 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.

Monkfish and anglerfish
HR: Stomachs of monkfish and anglerfish, *Lophius piscatorius* and *L. budegassa*, will be sampled on optional basis by Croatia, in case opportunity allows during MEDITS survey and, if possible, during biological sampling of commercial fisheries.

4. Application of metagenomic techniques for demersal species
HR: In addition to regionally coordinated activities, a combined morphological and metabarcoding approach is planned for European hake at national level. After the macroscopic dietary analysis, DNA-based dietary analysis will be conducted on experimental basis following the protocol by Šegvić-Bubić and Žuvić (2024) developed for large-pelagic species in the period 2022-2024:

Using the metabarcoding approach, and after bioinformatic analysis of the datasets, a list of prey taxa, along with their biodiversity and relative abundance, will be provided.

More information provided in Table 4.1.

Contribution of activities to the objectives of the Marine Action Plan
The Stomach sampling and analysis of demersal species with application of experimental methods and protocols shall provide new insights on food chain, biodiversity and relative abundance of demersal species. Innovative applied methods are results of successful WP 2022-2024 study (Stomach content analysis of large pelagic species combining morphological and metagenomic approach (METAGENOM)), and shall be further developed in WP 2025-2027.

Study: Stomach content analysis of large pelagic species combining morphological and metagenomic approach (METAGENOM)

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.

Name of the study: Stomach content analysis of large pelagic species combining morphological and metagenomic approach (METAGENOM)

RWP LP 2025-2027
Based on activities planned in WP 2022-2024, IOF was awarded public tender to implement METAGENOM study. According to planned activities, IOF will develop by June 2025 a reliable DNA metabarcoding protocol for the analysis of tuna and swordfish stomach contents aiming to quantify relative diet composition and pray selectivity based on presence-absence inventories, considering ontogenetic preferences of the fish, which may

be made publicly available by the end of 2025. Coordination on this subject should be discussed among RCG LP members in the following period.

1. Aim of the study

Atlantic Bluefin tuna (*Thunnus thynnus*) and swordfish (*Xiphias gladius*) are important targeted species for commercial and recreational fisheries. Impact of fishing activities on these top predators requests the need for a better knowledge of the food webs which these populations are a part of at different stages of their life cycle. Stomach sampling and analysis, as noted in the Chapter 2 of the Annex of EU MAP 2021/1167, provides us with insight in fish diet and feeding habits that form the basis for understanding trophic interactions in aquatic food webs and represent an integration of many important ecological components. To support place-based, integrated ecosystem assessments of marine fisheries, the implementation of trophodynamic measures and models is a growing priority. In large food web models such as Ecopath with Ecosim (EwE), top predators are important to constrain the parameters of other consumers in the ecosystem, and thus it is particularly important to have biomass estimates for the top predators in the ecosystem, but also to capture ontogenetic dietary shifts and/or different exploitation patterns. Nevertheless, studies on the feeding ecology of tuna and swordfish in the eastern Adriatic are scarce, i.e. in an area known as a feeding ground for juvenile fish. The research based exclusively on macroscopic analysis of stomach contents of adult tuna in central Adriatic generally confirms the opportunistic behaviour. However, morphological identification of prey has limitations. It requires special skills and experience and, more importantly, may be limited by the differential digestion of prey, with species composed of soft tissues often being missed. In contrast, DNA metabarcoding allows for a relatively simple and rapid inventory of prey but is more suitable for a qualitative inventory approach as the exact abundance of prey consumed cannot be accurately inferred due to the high PCR bias affecting the number of sequences obtained for each detected target. Therefore, a complementary approach is recommended to meet the research interest. In the present study, two main objectives are pursued: (1) to quantify relative diet composition and (2) pray selectivity based on presence-absence inventories and associated metrics, considering ontogenetic preferences of the fish.

2. Duration of the study: 2025-2027

3. Methodology and expected outcomes of the study

For each sampling year, at least 12 successful stomach content analyses per species, combining morphological and metabarcoding approaches is planned. Fish stomach samples will be collected in the eastern regions of the Adriatic Sea during monitoring of commercial fishing trips (as specified in Table 2.5 for ICCAT). Metadata on each specimen, including year, sex, weight, and length, will be recorded in line with the protocol for sampling of commercial fishery.

Fish and stomach sampling, stomach preservation, and macroscopic and DNA-based dietary analysis following protocol Šegvić-Bubić and Žuvić (2024) will be conducted:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/PROTOCOL-Thunnus-thynnus-and-Xiphias-gladius-stomach-sampling-and-DNA-quality-check.pdf

DNA isolation and amplification of two barcoding gene regions will be performed, followed by Illumina MiSeq sequencing. Bioinformatics analysis of datasets will be conducted allowing further statistical analysis to provide a list of prey taxa, their biodiversity and relative abundance.

More information provided in Table 4.1.

Contribution of activities to the objectives of the Marine Action Plan

See study on Stomach sampling and analysis for demersal species above.

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.

RWP ECON 2025-2027

1. Description of clustering

The Croatian fishing fleet has a range of vessel types using various gears and targeting different species exclusively in FAO area 37.2.1. (Adriatic), in the GFCM-GSA 17 (Northern Adriatic Sea). The fleet consists of 23 (DCF) active main fleet segments, which are divided into 10 small-scale coastal fleet (SSCF) segments (DFN, FPO, HOK, PGP and PMP) and 13 large-scale fleet (LSF) segments (DFNVL1218, DRB, DTS, MGO and PS), and 5 inactive length classes, according to DCF methodology.

Croatia applies a dynamic fleet segmentation and clustering scheme. Fleet segmentation is done at the beginning of each reporting year for the previous (referent) year by statistically analysing fishing activity data obtained from logbooks and fishing reports. Based on capacity data on the population and data on the use of fishing gears retrieved and stored, after data has been validated and verified, a segmentation of the fishing fleet is performed. In some cases, fleet segments are clustered for sampling purposes or reporting purposes for confidentiality reasons. As fleet segmentation depends entirely on the activity of vessels, in cases where clustering is needed, vessel activity is reviewed on a vessel-to-vessel case. In cases where a vessel changes its activity from one year to another inconsistently, it is directly reflected in the clustering. Clustering is performed in cases where a fleet segment has less than 10 vessels and it is necessary to design the sampling plan and to report economic variables. Clustering is done entirely based on similarity to other segments (either clustering by adjacent vessel length category or by assessing fishing activity on a case-by-case basis in terms of landings (value and volume) and/or effort).

Information on clustered fleet segments (based on referent year 2023):

- Vessel using other active gears 6-< 12 m* (41 vessels) is clustered with Vessel using other active gears 12-< 18 m (2 vessels)
- Vessels using active and passive gears 0-< 6 m* (24 vessels) is clustered with Vessels using other Passive gears 0-< 6 m (5 vessels)
- Vessels using active and passive gears 6-< 12 m* (24 vessels) is clustered with Vessels using active and passive gears 12-< 18 m (2 vessels) and Vessels using other Passive gears 6-< 12 m (1 vessel)
- Vessels using hooks 6-< 12 m* (223 vessels) is clustered with Vessels using hooks 6-< 12 m (7 vessels)
- Vessels using Polyvalent “passive” gears only 6-< 12 m* (793 vessels) is clustered with Vessels using Polyvalent “passive” gears only 12-< 18 m (1 vessel).

2. Description of activity indicator

Not applicable.

3. Deviation from the RCG ECON (ex. PGECON) definitions

Not applicable.

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.

RWP ECON 2025-2027

1. Description of the threshold application

According to available Eurostat aquaculture production data, Croatian aquaculture production, with 27,2 thousand tonnes in 2022 represents a share of 2,51% of the total EU-28 production from aquaculture (excluding hatcheries and nurseries), which is an increase of 0,03% compared to 2021.
Croatia is not applying a threshold on data collection. Data collection is planned in the period 2025-2027.

2. Deviation from the RCG ECON (ex. PGECON) definitions

Not applicable.

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.

RWP ECON 2025-2027

1. The Member State should provide justification for complementary data collection for fish processing in addition to Eurostat data.
Data collection is planned to be carried out following the same approach as in previous years. Detailed data on processing industry is needed in Croatia as additional data is required for the calculation of various indices for measures targeting the fishing processing industry which are planned in the framework of Programme for fisheries and aquaculture of the Republic of Croatia for the programming period 2021-2027 according to EMFAF.

2. Deviation from the RCG ECON (ex. PGECON) definitions
Not applicable.

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 2.6 [and Text Box 2.6] (Biological specific data collection)

Sampling scheme identifier: MEDIAS

MS: HRV
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: MEDIAS
Sampling scheme type: Mandatory research survey
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Description of the population
Population targeted: The primary sampling units (PSU) used in MEDIAS sampling scheme is called EDSU (Elementary Distance Sampling Unit) collected along acoustic profiles (transects). The main target species from a survey perspective are anchovy and sardine, and the main survey area covers Croatian territorial waters and EEZ. **Population sampled:** MEDIAS is a multispecies survey targeting anchovy and sardine populations. A part of the target populations (anchovy and sardine) present in the survey area (i.e. eastern part of GSA17) during the survey period will be sampled. A part of the target populations present at that time in other parts of the Adriatic Sea is unreachable for sampling. **Stratification:** The logic taken to stratify the population is based on biological analyses (age, length, sex) and the number of strata generated corresponds to the number of length classes, number of age classes and sex (3 strata: females, males, undetermined).
Sampling design and protocols
Sampling design description: Sampling design is based on 32 acoustic profiles (transects); two of them are located in inner sea (northern and southern part) and adapted to geomorphology of these areas, while 30 parallel acoustic profiles (transects) are located in the open sea, oriented in 43°-223° direction, with 10 NM distance between them. Toward open sea the length of acoustic profiles is determined by Croatian EEZ outer border or by 200 m bathymetry. **Is the sampling design compliant with the 4S principle?:** NA **Regional coordination:** MEDIAS Steering Committee; participating MS: Spain, France, Italy, Slovenia, Croatia, Greece, Malta and Bulgaria **Link to sampling design documentation:** https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/MEDIAS-Handbook-vApril2024.pdf **Design follows international recommendations:** Y **Link to sampling protocol documentation:** https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/MEDIAS-Handbook-vApril2024.pdf **Protocol follows international recommendations:** Y
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year:** Sampling is adjusted to take into account

weather conditions during the survey (if necessary number of days may be increased).
Data capture
Means of data capture: calibrated scientific echosounder SIMRAD EK80, research vessel' navigation equipment (GPS), mid-water trawl, calibrated on-board balances, calibrated CTD probe, ichtiometer, plankton net. **Data capture documentation:** https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/MEDIAS-Handbook-vApril2024.pdf **Quality checks documentation:** N No documentation on the quality checks of data capture exists. All captured data are checked by scientists involved in the survey.
Data storage
National database: IOF database: https://vrtlac.izor.hr/ords/riba/m_tereni_prikaz. **International database:** JRC&GFCM **Quality checks and data validation documentation:** Internal database documentation, access is granted only to project partners (IOF and DoF) with authorized credentials: https://vrtlac.izor.hr/ords/riba/DCF_DOKUMENTACIJA.
Sample storage
Storage description: Acoustic samples together with navigation data are stored as raw data files in electronic form. Age structures (otoliths) are stored as digital images in the IOF permanently, while soft tissue (biological specimens) is temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples is organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored. **Sample analysis:** See descriptions at https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/MEDIAS-Handbook-vApril2024.pdf
Data processing
Evaluation of data accuracy (bias and precision): Y - data are collected using previously calibrated measuring equipment (calibrated echosounder, calibrated CTD probe, calibrated weighing balances). As described in MEDIAS Handbook: https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/MEDIAS-Handbook-vApril2024.pdf **Editing and imputation methods:** N **Quality document associated to a dataset:** Y - calibration report for scientific echosounder before survey (as requested in MEDIAS Handbook). **Validation of the final dataset:** Data validation tool is used: https://www.fisheries-rcg.eu/rcg-medbs/

Sampling scheme identifier: MEDITS

MS: HRV
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: MEDITS
Sampling scheme type: Mandatory research survey
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Description of the population
Population targeted: The MEDITS is a scientific fishery independent bottom trawl survey. The main target species belongs to group G1 of the MEDITS sampling protocol. The main survey area covers the eastern part of GSA17 area (Adriatic Sea), with an area of approximately 55.000 km2.

Population sampled: MEDITS is a multispecies survey targeting the demersal population of fish, cephalopods, crustaceans and other invertebrate species that belong to D, E, V, G, H taxonomic category V, G, H according to MEDITS sampling protocol. A part of the target populations present in the survey area (i.e. eastern part of GSA17) during the survey period will be sampled. A part of the target populations present at that time in other parts of the Adriatic Sea is unreachable for sampling.

Stratification: The logic taken to stratify the population is based on biological analyses (age, length, sex) and the number of strata generated corresponds to the number of length classes, number of age classes and sex (3 strata: females, males, undetermined).

Sampling design and protocols

Sampling design description: 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. The duration of tow in the area shallower than 200 m is 30 min, while in the area deeper than 200 m is 60 min. On board the vessel, the catches are split into the categories and sub-categories as reported in Annex V and XV of the manual. For each species the total weight and number of individuals should be collected, excluding the taxonomic category V, G, H for which only the total weight should be collected. For taxonomic categories D and E the number of individuals is not mandatory. When the catch of a given species or a fraction of a given species (e.g. juveniles) is too abundant to be measured in extenso it is reasonable to take a representative subsample of the catch. This sub-sample should be not less than 100 individuals.

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

Regional coordination: MEDITS Working Group is in charge of survey planning; participating MS: Spain, France, Italy, Slovenia, Croatia, Montenegro, Albania, Greece, Cyprus and Malta.

Link to sampling design documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/Medits_Handbook_2017_version_9.pdf

Design follows international recommendations: Y

Link to sampling protocol documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/Medits_Handbook_2017_version_9.pdf

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling is adjusted to take into account weather conditions during the survey (if necessary, number of days may be increased). MEDITS is a mandatory survey that should be conducted according to the National Work plan that is in line with EU MAP Delegated Decision. National coordination is in charge to follow-up the progress of the survey and to establish the mitigation measures. Bilateral agreement with other MS or institutions could be established to resolve issues.

Data capture

Means of data capture: Bottom trawl net, scales, electronic measuring board, CTD

Data capture documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/Medits_Handbook_2017_version_9.pdf

Quality checks documentation: N
No documentation on the quality checks of data capture exists. All captured data are checked by scientists involved in the survey.

Data storage

National database: TruSt and AtrIS database software
International database: NA

Quality checks and data validation documentation:
https://www.fisheries-rcg.eu/rcg-medbs/
https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf

Sample storage
Storage description: Age structures (otoliths) are stored in the IOF permanently, while soft tissue (biological specimens) is temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples is organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored. **Sample analysis:** See descriptions at https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/Medits_Handbook_2017_version_9.pdf
Data processing
Evaluation of data accuracy (bias and precision): N No documentation on the evaluation of data accuracy exists. It is expected that procedures will be developed at regional level in the framework of the MEDITS working group by the end of implementation period. **Editing and imputation methods:** Y https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf **Quality document associated to a dataset:** N **Validation of the final dataset:** Final datasets undergo multi-level validation, including internal scientific review at national level and external methodological and quality checks through relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS).

Sampling scheme identifier: SOLEMON

MS: HRV
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: SOLEMON
Sampling scheme type: Mandatory research survey
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Description of the population
Population targeted: The SOLEMON is a scientific fishery independent rapido (beam trawl) survey. The main target species is *Solea solea*. The survey area covers the northern part of the Adriatic Sea (GSA17). **Population sampled:** A part of the target populations of *Solea solea* present in the survey area (i.e. northern part of GSA17) during the survey period will be sampled. A part of the target populations present at that time in other parts of the Adriatic Sea is unreachable for sampling. **Stratification:** The logic taken to stratify the population is based on biological analyses (age, length, sex) and the number of strata generated corresponds to the number of length classes, number of age classes and sex (3 strata: females, males, undetermined).
Sampling design and protocols
Sampling design description: SOLEMON is conducted in the autumn- winter period from October to December based on SOLEMON protocol. The survey vessel utilizes two gears simultaneously; taking the characteristics of the gear and the rigging into account the warps should have a diameter of 14-16 mm. The length of warps to be shot is determined by the depth. The gear positioned in the right side of the vessel has 15 m of warp more than the other, in order to avoid possible interference between the two gears during the haul. The hauls are planned according to a depth-stratified sampling scheme with random allocation of the positions of sampling stations within each stratum. **Is the sampling design compliant with the 4S principle?:** NA **Regional coordination:** FAO AdriaMed Working Group is in charge of survey planning; participating MS: Italy, Slovenia and Croatia **Link to sampling design documentation:** https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/SOLEMON-Handbook_2019_Ver_4.pdf

Design follows international recommendations: Y

Link to sampling protocol documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/SOLEMON-Handbook_2019_Ver_4.pdf

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling is adjusted to take into account weather conditions during the survey (if necessary, number of days may be increased). SOLEMON is a mandatory survey that should be conducted according to the National Work plan that is in line with EU MAP Delegated Decision. National coordination is in charge to follow-up the progress of the survey and to establish the mitigation measures. Bilateral agreement with other MS or institutions could be established to resolve issues.

Data capture

Means of data capture: Beam trawl net, scales, electronic measuring board, CTD

Data capture documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/SOLEMON-Handbook_2019_Ver_4.pdf

Quality checks documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/SOLEMON-Handbook_2019_Ver_4.pdf

Data storage

National database: TruSt and AtrIS database software

International database: NA

Quality checks and data validation documentation:
https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf

Sample storage

Storage description: Age structures (otoliths) are stored in the IOF permanently, while soft tissue (biological specimens) is temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples is organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored.
Sample analysis: See descriptions at
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/SOLEMON-Handbook_2019_Ver_4.pdf

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists. It is expected that procedures will be developed at regional level in the framework of the FAO AdriaMed working group by the end of implementation period.

Editing and imputation methods: Y
https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets undergo multi-level validation, including internal scientific review at national level and external methodological and quality checks through relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS).

Related to Table 4.1 [and Text Box 4.1] (Stomach sampling)

Sampling scheme identifier: MEDITS stomachs

MS : HRV

Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: MEDITS stomachs

Sampling scheme type: Research survey at sea

Observation type: SciObsAtsea

Time period of validity: 2025-2027

Description of the population

Population targeted: The targeted poulations are European hake (*Merluccius merluccius*) and anglerfish (*Lophius piscatorius* and *Lophius budegassa*). The surveys focus on the continental shelf and upper slope areas, and channel areas where these species are predominantly found and commercially exploited.

Population sampled: The sampling scheme targets European hake (*Merluccius merluccius*) and anglerfish (*Lophius piscatorius* and *Lophius budegassa*) populations caught through experimental trawl surveys in the Mediterranean and when possible, from commercial fishery. The population is stratified by size class: juveniles, sub-adults, and adults for European hake, and small and large individuals for anglerfish. Stomach contents are analyzed to assess trophic relationships. The target ecosystem component includes demersal species, sampled from the continental shelf and slope during regular fishing activities and seasonal trawl surveys.

Stratification: At the time of submitting the WP, the information is not known but can be supplemented when the annual report will be sent.

Sampling design and protocols

Sampling design description:
The sampling design allocates samples based on size classes and seasonality. For European hake, three size groups are considered: juveniles (<20 cm TL), sub-adults (20-35 cm TL), and adults (>35 cm TL). For anglerfish (Lophius spp.), two size groups are used: small (<30 cm TL) and large (>30 cm TL). Primary Sampling Units (PSU): Sampling is carried out from experimental trawl surveys (like MEDITS in the Mediterranean), and when possible, from the commercial fishery on board or on the landing site. Secondary Sampling Units (SSU): Individual fish are selected, focusing on full stomachs for content analysis. The scheme applies to all catches with specific attention to size class and when possible, season.

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

Regional coordination:
The sampling design and protocols for European hake and anglerfish were developed as part of a regional sampling plan under the STREAM project (MARE/2016/22), aimed at strengthening regional cooperation in fisheries biological data collection in the Mediterranean and Black Sea. The protocols are coordinated across participating Member States, including Spain, Italy, Greece, Bulgaria, Romania, and others. These protocols were refined from the previous MARE/2014/19 project and were agreed upon in forums like the Workshop on Stomach Content Analysis (WKSTCON 2018), STREAM Plenary Meetings, RCG MED&BS ISSG/Workshop on RWP on fish stomachs collection and analysis ensuring standardized data collection methods across the region.

Link to sampling design documentation:
https://inale.gr/wp-content/uploads/2021/10/Stomach_contents_STREAM_Del.4.1.pdf

Reference: Guijarro, B., Sartor, P., Daskalov, G., Georgieva, I., Panayotova, M., & Rajkov, V. (2019). Deliverable D4.1: Updated protocols and guidelines for collection, processing and analysis of stomach contents. STREAM Project (MARE/2016/22)

Design follows international recommendations: Y

Link to sampling protocol documentation:
https://inale.gr/wp-content/uploads/2021/10/Stomach_contents_STREAM_Del.4.1.pdf

Reference: Guijarro, B., Sartor, P., Daskalov, G., Georgieva, I., Panayotova, M., & Rajkov, V. (2019). Deliverable D4.1: Updated protocols and guidelines for collection, processing and analysis of stomach contents. STREAM Project (MARE/2016/22)

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Sampling progress is monitored throughout the year. Sampling allocations are adjusted based on real-time assessments of sample collection targets, particularly if there are difficulties in reaching the required sample size (e.g., low catches, missed size classes), and when possible, the sample is acquired through other sources.

Data capture

Means of data capture: Bottom trawl net, scales, electronic measuring board

Data capture documentation:
https://inale.gr/wp-content/uploads/2021/10/Stomach_contents_STREAM_Del.4.1.pdf

Quality checks documentation:
https://inale.gr/wp-content/uploads/2021/10/Stomach_contents_STREAM_Del.4.1.pdf

Data storage

National database: NA

International database: NA

Quality checks and data validation documentation: At the time of submitting the WP, the information is not known, but can be supplemented when the annual report will be sent

Sample storage

Storage description: For European hake and anglerfish, stomach contents are collected, and sometimes entire specimens or only stomachs are stored. Samples are typically preserved by freezing, with the option for other preservation methods (e.g., ethanol) if freezing is not possible. Samples are stored at IOF facilities and kept for a variable duration depending on the research needs.
Sample analysis:
https://inale.gr/wp-content/uploads/2021/10/Stomach_contents_STREAM_Del.4.1.pdf

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists. It is expected that procedures will be developed at regional level in the framework of the RCG Med&BS

Editing and imputation methods:
https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets undergo multi-level validation, including internal scientific review at national level and external methodological and quality checks through relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS).

Sampling scheme identifier: Scientific monitoring of European eel in freshwater_electrofishing

MS: HRV

Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: Scientific monitoring of European eel in freshwater_electrofishing

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity: 2025-2027

Description of the population

Population targeted:
In 2025, sampling of European eel will be carried out seasonally (four times per annum) at random locations in each area, whereas, starting from 2026, sampling will be conducted two times per annum (April/May and September/October) (Table 2.3).

Population sampled:
Glass, yellow and silver eel.

Stratification:
Seasonal sampling will be carried out in the fishing area Jadran (Adriatic) including six rivers (Mirna, Raša, Cetina, Krka, Zrmanja and Neretva) and one lake (Prokljan Lake).

Sampling design and protocols

Sampling design description:
For 2025, sampling with electrofishing (Susan 835 MP (~1,5 kW), Susan 1030 SMP (~2,4 kW), Lj 4085 NP (~6 kW)) will be carried out from a vessel or from the shore (depending on the availability and depth) in freshwater systems (minimum length of the transect is 100 m). Starting from 2026, in addition to electrofishing, visual census may be applied. In case implemented, the sampling design for visual census will be provided after first year of implementation. Up to a maximum of 10 caught eel per waterbody will be sacrificed for the following measurements and analysis: length, weight, diameter of the left eye, length of the pectoral fin, reproductive status, presence of *Anguillicola crassus*, and age. The gonads will be analyzed macroscopically according to the protocol from the Sudoang project (https://sudoang.eu). Otoliths will be processed according to the recommendations of ICES (ICES: Manual for the Aging of Atlantic Eel, 2009 - https://www.ices.dk/sites/pub/CM%20Doccuments/CM-2009/ACOM/ACOM4809_Manual.pdf), and the protocol developed through the Sudoang project (https:/ /sudoang.eu/wp-content/uploads/2021/10/E613-workshop-lectura-otolitos-WKAREA3-Report.pdf).

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

Regional coordination: EIFAAC/ICES/GFCM Working Group on Eels (WGEEL), GFCM expert group on European eel in the Mediterranean (EGEMed), ISSG Diadromous (DCF subgroup for diadromous fishes)

Link to sampling design documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf

Design follows international recommendations: Y

Link to sampling protocol documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling progress is monitored jointly by the Ministry of Agriculture, Forestry and Fisheries (Directorate of Fisheries) and the scientific institutions responsible for implementing the monitoring activities.

Data capture

Means of data capture: Electrofishing (Susan 835 MP (~1,5 kW), Susan 1030 SMP (~2,4 kW), Lj 4085 NP (~6 kW)); Safety equipment (rubber boots, gloves, etc.); Ichthyometer; Digital scale; Nets; Buckets; Aerator, Statistical programs (Statistica, Excel).

Data capture documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University

of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Quality checks documentation: N
Quality documentation may be produced in the following WP period (2025-2027), in which case it will be published on the national DCF website:

Data storage

National database: MAFF-DoF database (FIS)

International database: GFCM, ICES

Quality checks and data validation documentation: EIFAAC/ICES/GFCM Working Group on Eels (WGEEL)

Sample storage

Storage description: The samples are going to be cooled to 4 ˚C after catch, and processed within 48 hours (length, weight, diameter of the left eye, length of the pectoral fin, reproductive status, presence of *A. crassus*). The gonads and parasites will be preserved in alcohol for further analysis of the development and sex of the gonads and the number and type of parasites
Sample analysis: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists.

Editing and imputation methods: Y
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets are validated through a structured process involving national scientific review and external quality assessment by relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS, and the joint EIFAAC/ICES/GFCM Working Group on Eels – WGEEL).

Sampling scheme identifier: Scientific monitoring of European eel in freshwater_fyke nets

MS : HRV

Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: Scientific monitoring of European eel in freshwater_fyke nets

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity: 2025-2027

Description of the population

Population targeted:
In 2025, sampling of European eel will be carried out seasonally (four times per annum) at random locations in

each area, whereas, starting from 2026, sampling will be conducted two times per annum (April/May and September/October) (Table 2.3).

Population sampled:
Glass, yellow and silver eel.

Stratification:
Seasonal sampling will be carried out in the fishing area Jadran (Adriatic) including six rivers (Mirna, Raša, Cetina, Krka, Zrmanja and Neretva) and one lake (Prokljan Lake).

Sampling design and protocols

Sampling design description:
For 2025, sampling with with fyke nets (mesh diameter 4 mm) will be conducted in transitional (brackish) systems on suitable locations for a minimum of two to a maximum of seven days, with daily catch controls. Starting from 2026, in addition to fyke nets, visual census may be applied. In case implemented, the sampling design for visual census may be provided after first year of implementation. Up to a maximum of 10 caught eel per waterbody will be sacrificed for the following measurements and analysis: length, weight, diameter of the left eye, length of the pectoral fin, reproductive status, presence of *Anguillicola crassus*, and age. The gonads will be analyzed macroscopically according to the protocol from the Sudoang project (https://sudoang.eu). Otoliths will be processed according to the recommendations of ICES (ICES: Manual for the Aging of Atlantic Eel, 2009 - https://www.ices.dk/sites/pub/CM%20Doccuments/CM-2009/ACOM/ACOM4809_Manual.pdf), and the protocol developed through the Sudoang project (https:/ /sudoang.eu/wp-content/uploads/2021/10/E613-workshop-lectura-otolitos-WKAREA3-Report.pdf).

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

Regional coordination: EIFAAC/ICES/GFCM Working Group on Eels (WGEEL), GFCM expert group on European eel in the Mediterranean (EGEMed), ISSG Diadromous (DCF subgroup for diadromous fishes)

Link to sampling design documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Design follows international recommendations: Y

Link to sampling protocol documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling progress is monitored jointly by the Ministry of Agriculture, Forestry and Fisheries (Directorate of Fisheries) and the scientific institutions responsible for implementing the monitoring activities.

Data capture

Means of data capture: Fyke nets (mesh diameter 4 mm); Safety equipment (rubber boots, gloves, etc.); Ichthyometer; Digital scale; Nets; Buckets; Aerator, Statistical programs (Statistica, Excel).

Data capture documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Quality checks documentation: N
Quality documentation may be produced in the following WP period (2025-2027), in which case it will be published on the national DCF website:

Data storage

National database: MAFF-DoF database (FIS)

International database: GFCM, ICES

Quality checks and data validation documentation: EIFAAC/ICES/GFCM Working Group on Eels (WGEEL)

Sample storage

Storage description: The samples are going to be cooled to 4˚C after catch, and processed within 48 hours (length, weight, diameter of the left eye, length of the pectoral fin, reproductive status, presence of *A. crassus*). The gonads and parasites will be preserved in alcohol for further analysis of the development and sex of the gonads and the number and type of parasites.
Sample analysis: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists.

Editing and imputation methods: Y
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets are validated through a structured process involving national scientific review and external quality assessment by relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS, and the joint EIFAAC/ICES/GFCM Working Group on Eels – WGEEL).

Sampling scheme identifier: Scientific monitoring of European eel in freshwater_longlines

MS : HRV

Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: Scientific monitoring of European eel in freshwater_longlines

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity: 2026-2027

Description of the population

Population targeted:
Starting from 2026, sampling will be conducted two times per year (April/May and September/October) (Table 2.3).

Population sampled:
Yellow and silver eel.

Stratification:
Seasonal sampling will be carried out in the fishing area Jadran (Adriatic) including six rivers (Mirna, Raša, Cetina, Krka, Zrmanja and Neretva) and one lake (Prokljan Lake).

Sampling design and protocols

Sampling design description:
Starting from 2026, longlines will used in transitional waters. Two longlines (50 hooks per longline, hooks No. 12 and 13) will be deployed at each sampling site. Soak time is overnight, while bait includes worms, gobies, shrimp and green crab, depending on abailability and sampling location. Additionally, starting from 2026, visual census may be applied. In case implemented, the sampling design for visual census may be provided after first year of implementation. Up to a maximum of 10 caught eel per waterbody will be sacrificed for the following measurements and analysis: length, weight, diameter of the left eye, length of the pectoral fin, reproductive status, presence of *Anguillicola crassus*, and age. The gonads will be analyzed macroscopically according to the protocol from the Sudoang project (https://sudoang.eu). Otoliths will be processed according to the recommendations of ICES (ICES: Manual for the Aging of Atlantic Eel, 2009 - https://www.ices.dk/sites/pub/CM%20Doccuments/CM-2009/ACOM/ACOM4809_Manual.pdf), and the protocol developed through the Sudoang project (https:/ /sudoang.eu/wp-content/uploads/2021/10/E613-workshop-lectura-otolitos-WKAREA3-Report.pdf).

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

Regional coordination: EIFAAC/ICES/GFCM Working Group on Eels (WGEEL), GFCM expert group on European eel in the Mediterranean (EGEMed), ISSG Diadromous (DCF subgroup for diadromous fishes)

Link to sampling design documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Design follows international recommendations: Y

Link to sampling protocol documentation: Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian)
National methodology (hr):
https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf;
https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf
National methodological summary (en):
Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling progress is monitored jointly by the Ministry of Agriculture, Forestry and Fisheries (Directorate of Fisheries) and the scientific institutions

responsible for implementing the monitoring activities.
Data capture
Means of data capture: Longlines (50 hooks per longline, hooks No. 12 and 13), Safety equipment (rubber boots, gloves, etc.); Ichthyometer; Digital scale; Nets; Buckets; Aerator, Statistical programs (Statistica, Excel). **Data capture documentation:** Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian) *National methodology (hr):* https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf; https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf *National methodological summary (en):* Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN **Quality checks documentation:** Quality documentation may be produced in the following WP period (2025-2027), in which case it will be published on the national DCF website:
Data storage
National database: MAFF-DoF database (FIS) **International database:** GFCM, ICES **Quality checks and data validation documentation:** EIFAAC/ICES/GFCM Working Group on Eels (WGEEL)
Sample storage
Storage description: The samples are going to be cooled to 4˚C after catch, and processed within 48 hours (length, weight, diameter of the left eye, length of the pectoral fin, reproductive status, presence of *A. crassus*). The gonads and parasites will be preserved in alcohol for further analysis of the development and sex of the gonads and the number and type of parasites. **Sample analysis:** Glamuzina, B., Kresonja, M., Mrakovčić, M., Kušan, V., Bartulović, V., Pavličević, J. (2023) Monitoring of European eel in inland waters as part of the National Plan for Data Collection in Fisheries of the Republic of Croatia. Work package 3: Research plan. OIKON Ltd. and University of Dubrovnik. 7 pp. (in Croatian) *National methodology (hr):* https://podaci.ribarstvo.hr/wp-content/uploads/2025/05/Jegulja_Plan_istrazivanja.pdf; https://podaci.ribarstvo.hr/wp-content/uploads/2025/10/20250715_Jegulja_Plan_istrazivanja_Izmijenjeni.pdf *National methodological summary (en):* Methodology for Fishery Independent Monitoring of European Eel in Croatia_2023-2027_EN
Data processing
Evaluation of data accuracy (bias and precision): N No documentation on the evaluation of data accuracy exists. **Editing and imputation methods:** Y Web based application **Quality document associated to a dataset:** N **Validation of the final dataset:** Final datasets are validated through a structured process involving national scientific review and external quality assessment by relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS, and the joint EIFAAC/ICES/GFCM Working Group on Eels – WGEEL).

Related to Table 2.4 [and Text Box 2.4] (Recreational fisheries data collection)

Sampling scheme identifier: RECFISH

MS: HRV
Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: RECFISH

Sampling scheme type: Recreational (off site surveys)

Observation type: SelfAtSea

Time period of validity: 2025-2027

Description of the population

Population targeted:
Targeted population consists of users of licenses for recreational and sport fishery in the Republic of Croatia. Approximately 80 000 licenses are issued yearly for this type of fishery. This includes both annual and daily, weekly and monthly licenses as well as special licenses for certain gears. The database of licence holders is curated by DoF.

Population sampled:
Official database of license holders will be used for the random draw of fishers which will be asked to participate in the survey. Non-respondents will be recorded.

Stratification:
Fishing area under jurisdiction of the Republic of Croatia is divided into several fishing zones. Each zone has its own specific oceanographic and geomorphological characteristics and environmental conditions differ from one zone to another. Licensing system seeks from the user to state the fishing zone utilized for the fishing operations. This information will be used to stratify the sampling according to fishing zones

Sampling design and protocols

Sampling design description:
Sampling will be implemented according to recommendations provided in Grati et al. (2021). Off-site survey is envisaged by the means of the log-book. Fishers will be asked to fulfil log-books/questionnaires after each fishing operation or monthly/yearly by recall. A combination of log-book and recall survey will be implemented depending on the availability and willingness of fishermen. Sampling will be of probabilistic type, meaning that the participants will be selected by random draw from the database of licence holders. Sampling size will be calculated according to recommendations by Grati et al. (2021).

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

Regional coordination: RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs

Link to sampling design documentation:

https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

Design follows international recommendations: Y
Agreed sampling protocol according to RCG Med&BS 2021 Recommendation 7 (Agreement on methodologies for data collection in recreational fisheries):

Grati, F., Carlson, A., Carpentieri, P. & Cerri, J. 2021. Handbook for data collection on recreational fisheries in the Mediterranean and the Black Sea. FAO Fisheries and Aquaculture Technical Paper No 669. Rome, FAO: https://www.fao.org/gfcm/publications/series/technical-paper/669/en/

Link to sampling protocol documentation:

https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: The progress will be monitored by means of expert consilium from IOF, MAFF-DoF and CSSFA.

Data capture

Means of data capture: Log books, questionnaires, scales, measuring board, etc.

Data capture documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-

gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

Quality checks documentation: https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/

Data storage

National database: IOF database https://vrtlac.izor.hr/ords/riba

International database: JRC&GFCM

Quality checks and data validation documentation: Internal database documentation, access is granted only to project partners (IOF and DoF) with authorized credentials:
https://vrtlac.izor.hr/ords/riba/DCF_DOKUMENTACIJA

Sample storage

Storage description: Age structures (spine segments) are stored in the IOF permanently, while soft tissue (biological specimens) are temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples are organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored.
Sample analysis:

https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists.

Editing and imputation methods: 'Y'
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Datasets are validated by scientific consilium on the national and international level (STECF EWGs & GFCM WG, SCRS).

Sampling scheme identifier: RECFISH recall survey

MS: HRV

Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: RECFISH recall survey

Sampling scheme type: Recreational (off site surveys)

Observation type: SelfAtSea

Time period of validity: 2025-2027

Description of the population

Population targeted:
The targeted population consists of all holders of recreational and sport fishing licences in the Republic of Croatia. Approximately 80,000 licences are issued annually, including annual, daily, weekly, monthly and special gear licences. The MAFF-DoF maintains the central database of licence holders, which serves as the sampling frame for the annual recall survey.

Population sampled:
Official database of license holders will be used for the random draw of fishers which will be asked to participate in the survey. Non-respondents will be recorded.

Stratification:
Fishing area under jurisdiction of the Republic of Croatia is divided into several fishing zones. Each zone has its own specific oceanographic and geomorphological characteristics and environmental conditions differ from one zone to another. Licensing system seeks from the user to state the fishing zone utilized for the fishing operations. This information will be used to stratify the sampling according to fishing zones

Sampling design and protocols

Sampling design description:
Sampling will be implemented through an annual recall survey, following the recommendations of Grati et al. (2021). The survey will be based on a probabilistic sampling design, with participants selected by random draw from the MAFF-DoF licence database. The sample size will be determined according to Grati et al. (2021) to ensure representative estimates of catch by species and fishing modality for the national recreational and sport fisheries. The annual recall survey constitutes the primary data collection method, while data collected through the gradually introduced mobile application mRECFISH may be used in a scientific context to support validation of recall-survey estimates.

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

Regional coordination: RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs

Link to sampling design documentation:
National methodologies (hr):
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/
https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

National methodological summary (en):
Methodology for Recall Survey in Marine Recreational Fisheries in Croatia_EN

Design follows international recommendations: Y
Agreed sampling protocol according to RCG Med&BS 2021 Recommendation 7 (Agreement on methodologies for data collection in recreational fisheries):

Grati, F., Carlson, A., Carpentieri, P. & Cerri, J. 2021. Handbook for data collection on recreational fisheries in the Mediterranean and the Black Sea. FAO Fisheries and Aquaculture Technical Paper No 669. Rome, FAO: https://www.fao.org/gfcm/publications/series/technical-paper/669/en/

Link to sampling protocol documentation:
National methodologies (hr):
https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

National methodological summary (en):
Methodology for Recall Survey in Marine Recreational Fisheries in Croatia_EN

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: N

Monitoring of sampling progress within the sampling year: Sampling progress is monitored through coordinated expert review by the Institute of Oceanography and Fisheries (IOF), the Ministry of Agriculture, Forestry and Fisheries – Directorate of Fisheries (MAFF-DoF), and the Croatian Sports and Sea Fisheries Agency (CSSFA).

Data capture

Means of data capture: Logbooks, questionnaires, scales, measuring board, etc.

Data capture documentation:
National methodologies (hr):
https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/
National methodological summary (en):
Methodology for Recall Survey in Marine Recreational Fisheries in Croatia_EN

Quality checks documentation: https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/

Data storage

National database: IOF database https://vrtlac.izor.hr/ords/riba

International database: JRC&GFCM

Quality checks and data validation documentation: Internal database documentation, access is granted only to project partners (IOF and DoF) with authorized credentials:
https://vrtlac.izor.hr/ords/riba/DCF_DOKUMENTACIJA

Sample storage

Storage description: NA

Sample analysis: NA

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists.

Editing and imputation methods: 'Y'
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets are validated through national scientific review and external assessment by relevant regional and international expert groups (STECF EWGs, GFCM working groups, and ICCAT SCRS).

Sampling scheme identifier: BFT BGF REC

MS: HRV

Region: Mediterranean Sea and Black Sea (ICCAT)

Sampling scheme identifier: BFT BGF REC

Sampling scheme type: Biological parameters specific

Observation type: SciObsOnShore

Time period of validity: 2025-2027

Description of the population

Population targeted:
Big game fishing competitions with BFT quota. Around 10 BGF competitions are held annually, it is planned to sample every catch during each BGF competition (including around 25 fishing days in total monitored by scientific observers).

Population sampled:
Every declared catch from all participants of each BGF competition will be sampled.
Stratification:
No stratification.

Sampling design and protocols

Sampling design description:
During the implementation of the project activities within monitoring of biological variables (in BGF competitions), the sampling design and protocols of the activities follow the outcomes of expert groups (RCG MED & BS; RCG LP) and existing common standard criteria are used (Age determination protocols).

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

Regional coordination: RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs

Link to sampling design documentation:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/Metodologija-za-prikupljanje-i-obradu-podataka-u-sportskom-i-rekreacijskom-ribolovu-na-moru-za-2022.-2024.-godinu.pdf
https://podaci.ribarstvo.hr/wp-content/uploads/2025/03/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljvim-vrstama_verzija-1_2021-1.pdf

Design follows international recommendations: Y
Agreed sampling protocol according to RCG Med&BS 2021 Recommendation 7 (Agreement on methodologies for data collection in recreational fisheries):

Grati, F., Carlson, A., Carpentieri, P. & Cerri, J. 2021. Handbook for data collection on recreational fisheries in the Mediterranean and the Black Sea. FAO Fisheries and Aquaculture Technical Paper No 669. Rome, FAO: https://www.fao.org/gfcm/publications/series/technical-paper/669/en/

Link to sampling protocol documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/
https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling progress is monitored through coordinated expert review by the Institute of Oceanography and Fisheries (IOF), the Ministry of Agriculture, Forestry and Fisheries – Directorate of Fisheries (MAFF-DoF), and the Croatian Sports and Sea Fisheries Agency (CSSFA).

Data capture

Means of data capture: Log books, questionnaires, scales, measuring board, etc.

Data capture documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/
https://podaci.ribarstvo.hr/metodologije-i-protokoli/protokoli-sportskog-rekreacijskog-ribolova/

Quality checks documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Data storage

National database: IOF database https://vrtlac.izor.hr/ords/riba

International database: JRC&GFCM

Quality checks and data validation documentation:
Internal database documentation, access is granted only to project partners (IOF and DoF) with authorized credentials:
https://vrtlac.izor.hr/ords/riba/DCF_DOKUMENTACIJA.

Sample storage

Storage description: Age structures (spine segments) are stored in the IOF permanently, while soft tissue (biological specimens) are temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples are organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored.

Sample analysis:
https://podaci.ribarstvo.hr/wp-content/uploads/2025/04/Metodologija-za-prikupljanje-i-obradu-podataka-u-sportskom-i-rekreacijskom-ribolovu-na-moru-za-2022.-2024.-godinu.pdf

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists. It is expected that procedures will be developed at regional level in the framework of the Regional sampling plan during 2022.

Editing and imputation methods: Y
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets are validated through national scientific review and external assessment by relevant regional and international expert groups (STECF EWGs, GFCM working groups, and ICCAT SCRS).

Related to Table 2.5 [and Text Box 2.5] (Commercial fisheries data collection)

Sampling scheme identifier: Sci Obs Shore Commerc Sel Stock

MS: HRV
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: Sci Obs Shore Commerc Sel Stock
Sampling scheme type: Commercial fishing trip
Observation type: SciObsOnShore
Time period of validity: 2025-2027
Description of the population
Population targeted: Official statistics (catch, discards, landings, effort and value data) have been used to apply the ranking system. Sampling strategy for each metier is designed partly as concurrency-at-sea (sampling directly on board by observers and scientists) and concurrency-at-landing site (sampling directly on landing site, at market etc.), taking also into account the Croatian fishing zones and their specificities. Vessel list is established according to list authorisations issued by gear type in accordance with relevant national management plans (demersal trawl, purse seine nets and seine nets), authorisations issued by vessel/gear type according to individual quota allocation (purse seine net for Bluefin tuna and swordfish hook and line vessels and longline vessels), authorisations issued by vessel/gear type in fisheries restricted area (FRA) and other authorizations. **Population sampled:** The target population for the reference year will be the number of fishing trips (fishing days) by metier (sampling frame) of the previous years. The frame population is a subsample of the target population: it will be a selection of fishing trips, mainly on spatial (Croatian fishing zones and subzones) and time stratification basis (monthly, quarterly or seasonally) with measurements of the composition of the catch in order to detect seasonal differences in the demographic structure and composition of the landings for different metiers. The sampling will be accomplished as stratified random sampling: the sampling unit belonging to the metier (primary unit) will be the fishing trip (secondary unit). The number of fishing days to be sampled has been defined proportionally to the effort (number of days at sea for each metier) and the landings. For demersal trawl and purse seine nets the entire population of vessels is not available for sampling in certain periods of the year due to periods of temporary cessation of fishing activities and spatio-temporal closures implemented on a national level in accordance with management plans. Sampling plan design takes into account mentioned restrictions. **Stratification:** Fishing area under jurisdiction of the Republic of Croatia is divided into several fishing zones. Each zone has its own specific oceanographic and geomorphological characteristics and environmental conditions differ from one zone to another. Selected species for monitoring are not equally distributed across the Adriatic Sea due to its biological and ecological characteristics. For some species there is strong variation in distribution between seasons due to migrations patterns, recruitment, spawning etc. Sampling scheme is designed to cover quarterly all fishing zones in Croatia in order to achieve representative length frequency distribution and to cover different life stages as well. Croatian fishing vessels operate exclusively in the Northern Adriatic Sea (GSA 17).
Sampling design and protocols
Sampling design description: During the implementation of the project activities within monitoring of biological variables, the sampling design and protocols of the activities follow the outcomes of sampling expert groups (RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs, ICCAT) and existing common standard criteria are used (MEDITS and MEDIAS scientific surveys sampling protocols; Age determination protocols, etc.). Sampling at landing sites is performed in order to determine the composition of the catch of the target species, and is carried out according to the National Plan at the landing sites / fishing zones in which they are determined, as well as the dynamics of sampling at landing sites. Scientific observers (in agreement with the authorized person) go to each individual landing site and take a representative sample of the target species landed that day at that landing site. Depending on the technical capabilities at the landing site, scientific observers measure the length and weight structure of the target species or, if this is not feasible, this part of the representative sample is transported to IOF in Split for analysis in the Laboratory. At the landing site, observers record the total catch of one fishing trip of at least one vessel per metier. The length structure of the target species is then measured. Ideally, the SO measures all individuals of the target species, or a representative

sample is taken according to the commercial categories for each species. The number of individuals to be sampled must ensure well defined length distribution.

Complementary activities for PETS species monitoring (to supplement on-shore sampling):
In addition to standard on-shore sampling, several complementary activities are implemented to enhance the monitoring of PETS species:

1. *Video-based monitoring (pilot EMAtSea):*
   Scientific observers collect and analyse video recordings from selected vessels (e.g. OTB and LLS) to document handling and release practices, verify gear deployment characteristics and identify potential interactions with PETS species. Extracted information is reviewed and validated by IOF and stored in the national database.
2. *Onshore interviews and structured questionnaires conducted by scientific observers:*
   Scientific observers carry out structured interviews with fishers during landing operations to collect qualitative and quantitative information on possible PETS interactions. These questionnaires follow GFCM and ICCAT guidance for complementary observation methods. All data are processed, quality-checked and entered into the IOF database.
3. *Analysis of ICCAT ROP observer reports:*
   For purse seiners (PS_LPF_BFT), 100% observer coverage under ICCAT ROP provides detailed operational and PETS-relevant information. IOF analyses these reports and integrates the extracted data with national observer datasets to achieve comprehensive métier-level PETS monitoring.

These complementary methods enhance the spatial and temporal representativeness of PETS monitoring and ensure the robustness of PETS-related data by supplementing the core on-shore and at-sea scientific observer sampling.

Scientific observers – authorisation, status and planning obligations
All on-shore and at-sea sampling, including complementary PETS-related activities under (video review, on-shore interviews and questionnaires), is carried out exclusively by authorised scientific observers in accordance with the Ordinance on the Conditions and Modalities of Work of Authorised Observers in Fisheries (Croatian: Pravilnik o uvjetima i načinu rada ovlaštenih promatrača u ribarstvu, NN 52/2023 and 35/2025). Scientific observers must meet the qualification requirements defined by the Ordinance, and for scientific observer status they must be qualified experts employed at the Institute of Oceanography and Fisheries (IOF), with formal authorisation issued under the national framework.
Under the Ordinance, IOF is responsible for preparing a detailed annual sampling plan specifying fishing gears, métiers and Croatian fishing zones; this plan must be finalised by 31 December each year for implementation in the following year. Scientific observers are responsible for the collection, verification and entry of data into the IOF database, in accordance with the methodologies and protocols prepared by IOF and published by the Ministry. The Ordinance ensures full alignment with EU monitoring and control requirements, including Regulation (EU) 2017/1004, Regulation (EU) 2016/1627 and Council Regulation (EC) 1224/2009.
At the beginning of 2025, a total of 40 scientific observers employed at IOR were formally authorised in accordance with the Ordinance, ensuring sufficient national capacity for both at-sea and on-shore sampling activities.
https://narodne-novine.nn.hr/clanci/sluzbeni/2023_05_52_875.html
https://narodne-novine.nn.hr/clanci/sluzbeni/2025_02_35_430.html

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

Regional coordination: RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs

Link to sampling design documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Design follows international recommendations: Y

Link to sampling protocol documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling plan is constantly monitored using online applications in which information of sampling trips are inputted in real time.
Sampling plan is adjusted in case of deviations.

Data capture

Means of data capture: Fishing gear, scales, measuring board, etc.

Data capture documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Quality checks documentation:
https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/

Data storage

National database: IOF database https://vrtlac.izor.hr/ords/riba

International database: JRC&GFCM&ICCAT

Quality checks and data validation documentation:
Internal database documentation, access is granted only to project partners (IOF and DoF) with authorized credentials:
https://vrtlac.izor.hr/ords/riba/DCF_DOKUMENTACIJA.

The biological data collected during the sampling activities of the commercial catches and the discards was archived and validated using different data entry and processing programs which are constantly being updated and are suited for each métier and stock. Data with limited values are inserted using drop down list with predefined values (métier, type of sampling, species, etc.). Times and dates data are inserted using time picker insuring the same format. Numeric data are checked for value range if such is specified (coordinates, weight, etc.). In cases of errors in data entries, data will not be committed and will be marked with red notice and cannot be uploaded until the error is corrected. Visual check of graphic data representation is also available during data entry.
Automatic checks are in line with possible missing data and/or eventual errors regarding calculations. Operator managing database applications, before the final validation, can use graphic representation of data sets for easier notice of out of range data.
Improvements in sampling procedures and data analysis were implemented starting from 2020 according to the results of the European project MARE / 2016/22 STREAM “Strengthening Regional cooperation in the area of fisheries biological data collection in the Mediterranean and Black Sea”.

Sample storage

Storage description: Age structures (otoliths and spine segments) are stored in the IOF permanently, while soft tissue (biological specimens) is temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples is organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored.

Sample analysis:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists.

Editing and imputation methods: Y
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets are validated through national scientific review and external assessment by relevant regional and international expert groups (STECF EWGs, GFCM working groups, and ICCAT SCRS).

Sampling scheme identifier: Sci Obs Sea Commerc Sel Stock

MS: HRV

Region: Mediterranean Sea and Black Sea

Sampling scheme identifier: Sci Obs Sea Commerc Sel Stock

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: 2025-2027

Description of the population

Population targeted:
Official statistics (catch, discards, landings, effort and value data) have been used to apply the ranking system. Sampling strategy for each metier is designed partly as concurrency-at-sea (sampling directly on board by observers and scientists) and concurrency-at-landing site (sampling directly on landing site, at market etc.), taking also into account the Croatian fishing zones and their specificities. Vessel list is established according to list authorisations issued by gear type in accordance with relevant national management plans (demersal trawl, purse seine nets and seine nets), authorisations issued by vessel/gear type according to individual quota allocation (purse seine net for Bluefin tuna and swordfish hook and line vessels and longline vessels), authorisations issued by vessel/gear type in fisheries restricted area (FRA) and other authorizations.

Population sampled:
The target population for the reference year will be the number of fishing trips (fishing days) by metier (sampling frame) of the previous years. The frame population is a subsample of the target population: it will be a selection of fishing trips, mainly on spatial (Croatian fishing zones and subzones) and time stratification basis (monthly, quarterly or seasonally) with measurements of the composition of the catch in order to detect seasonal differences in the demographic structure and composition of the landings for different metiers.
The sampling will be accomplished as stratified random sampling: the sampling unit belonging to the metier (primary unit) will be the fishing trip (secondary unit). The number of fishing days to be sampled has been defined proportionally to the effort (number of days at sea for each metier) and the landings.
For demersal trawl and purse seine nets the entire population of vessels is not available for sampling in certain periods of the year due to periods of temporary cessation of fishing activities and spatio-temporal closures implemented on a national level in accordance with management plans. Sampling plan design takes into account mentioned restrictions.

Stratification:
Fishing area under jurisdiction of the Republic of Croatia is divided into several fishing zones. Each zone has its own specific oceanographic and geomorphological characteristics and environmental conditions differ from one zone to another. Selected species for monitoring are not equally distributed across the Adriatic Sea due to its biological and ecological characteristics. For some species there is strong variation in distribution between seasons due to migrations patterns, recruitment, spawning etc. Sampling scheme is designed to cover quarterly all fishing zones in Croatia in order to achieve representative length frequency distribution and to cover different life stages as well. Croatian fishing vessels operate exclusively in the Northern Adriatic Sea (GSA 17).

Sampling design and protocols

Sampling design description:
During the implementation of the project activities within monitoring of biological variables, the sampling design and protocols of the activities follow the outcomes of sampling expert groups (RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs, ICCAT) and existing common standard criteria are used (MEDITS and MEDIAS scientific surveys sampling protocols; Age determination protocols, etc.).
Sampling on board (at sea) is carried out during fishing activities with the main objective of assessing the qualitative and quantitative composition of the discarded part of the catches and taking biological samples for further sampling collection. The data for each fishing operation should contain, depending on the metier: date, name and characteristics vessel, port of departure, fishing trip ode, number of hauls, name of observer, metier, whether the haul is sampled or not, coordinates of the beginning and end of fishing activities, direction (degrees), speed (knots), technical characteristics of the fishing gear (length of steel-face and turner, spreading (cm / m) or length and height of the net, number hooks, mesh size, etc.), duration of fishing, additional notes, etc. After the fishing operation, once the catch is on the deck of the vessel, sampling may be carried out - collecting data on the weight and length composition of catches (retained and discarded catch). Retained catch is the share of the total catch that goes on sale and is measured with the aim of comparison in relation to the discarded part of the catch. It is ideal to weigh the total weight of discarded catch if possible and measure the length of all target species. Besides measurements of discarded catches, scientific observers are trained to record incidental catches of vulnerable and endangered species under the GFCM protocol (FAO, 2019) and perform

this activity during all on-board sampling in all meters. Sampling of vulnerable species is performed according to the GFCM methodology for data collection on vulnerable species and ICCAT protocols. Attached to the methodology are forms for recording biological data of vulnerable species of marine mammals, birds, turtles, elasmobranchs and macrobenthic invertebrates. Every scientific observer is obliged and educated to record any interaction with vulnerable species.

Scientific observers – authorisation, status and planning obligations
All on-shore and at-sea sampling, including complementary PETS-related activities under (video review, on-shore interviews and questionnaires), is carried out exclusively by authorised scientific observers in accordance with the Ordinance on the Conditions and Modalities of Work of Authorised Observers in Fisheries (Croatian: Pravilnik o uvjetima i načinu rada ovlaštenih promatrača u ribarstvu, NN 52/2023 and 35/2025). Scientific observers must meet the qualification requirements defined by the Ordinance, and for scientific observer status they must be qualified experts employed at the Institute of Oceanography and Fisheries (IOF), with formal authorisation issued under the national framework.
Under the Ordinance, IOF is responsible for preparing a detailed annual sampling plan specifying fishing gears, métiers and Croatian fishing zones; this plan must be finalised by 31 December each year for implementation in the following year. Scientific observers are responsible for the collection, verification and entry of data into the IOF database, in accordance with the methodologies and protocols prepared by IOF and published by the Ministry. The Ordinance ensures full alignment with EU monitoring and control requirements, including Regulation (EU) 2017/1004, Regulation (EU) 2016/1627 and Council Regulation (EC) 1224/2009.
At the beginning of 2025, a total of 40 scientific observers employed at IOR were formally authorised in accordance with the Ordinance, ensuring sufficient national capacity for both at-sea and on-shore sampling activities.
https://narodne-novine.nn.hr/clanci/sluzbeni/2023_05_52_875.html
https://narodne-novine.nn.hr/clanci/sluzbeni/2025_02_35_430.html

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

Regional coordination: RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs

Link to sampling design documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Design follows international recommendations: Y

Link to sampling protocol documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year:
Sampling plan is constantly monitored using online applications in which information of sampling trips are inputted in real time.
Sampling plan is adjusted in case of deviations.

Data capture

Means of data capture: Fishing gear, scales, measuring board, etc.

Data capture documentation:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Quality checks documentation:
https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/

Data storage

National database: IOF database https://vrtlac.izor.hr/ords/riba

International database: JRC&GFCM&ICCAT

Quality checks and data validation documentation:

Internal database documentation, access is granted only to project partners (IOF and DoF) with authorized credentials:
https://vrtlac.izor.hr/ords/riba/DCF_DOKUMENTACIJA.

The biological data collected during the sampling activities of the commercial catches and the discards was archived and validated using different data entry and processing programs which are constantly being updated and are suited for each métier and stock. Data with limited values are inserted using drop down list with predefined values (métier, type of sampling, species, etc.). Times and dates data are inserted using time picker insuring the same format. Numeric data are checked for value range if such is specified (coordinates, weight, etc.). In cases of errors in data entries, data will not be committed and will be marked with red notice and cannot be uploaded until the error is corrected. Visual check of graphic data representation is also available during data entry.
Automatic checks are in line with possible missing data and/or eventual errors regarding calculations. Operator managing database applications, before the final validation, can use graphic representation of data sets for easier notice of out of range data.
Improvements in sampling procedures and data analysis were implemented starting from 2020 according to the results of the European project MARE / 2016/22 STREAM "Strengthening Regional cooperation in the area of fisheries biological data collection in the Mediterranean and Black Sea".

Sample storage

Storage description: Age structures (otoliths and spine segments) are stored in the IOF permanently, while soft tissue (biological specimens) are temporarily stored in the IOF cold storage (max 6 months) until processing in the laboratory after they are discarded. Access to samples are organised to scientists by IOF staff. No samples are stored under the auspices/responsibility of an international organization. There is no link on information on quantities of samples stored.

Sample analysis:
https://podaci.ribarstvo.hr/metodologije-i-protokoli/bioloski-protokoli/

Data processing

Evaluation of data accuracy (bias and precision): N
No documentation on the evaluation of data accuracy exists. It is expected that procedures will be developed at regional level in the framework of the Regional sampling plan during 2022.

Editing and imputation methods: Y
Web based application

Quality document associated to a dataset: N

Validation of the final dataset: Final datasets undergo multi-level validation, including internal scientific review at national level and external methodological and quality checks through relevant regional and international expert groups (STECF EWGs, GFCM working groups, ICCAT SCRS).

ANNEX 1.2 - QUALITY REPORT FOR SOCIOECONOMIC DATA SAMPLING SCHEME

The quality report fulfils Article 6 (3) (d) of the Regulation (EU) 2017/1004. This document is intended to specify data to be collected under chapter II, points 3, 5, 6, and 7 of the Delegated Decision annex: Socioeconomic data on fisheries, aquaculture and any complementary data collection of fishing activity and fish processing.

Use this document to describe quality aspects of the data collection process (design, sampling implementation, data capture, data storage and data processing etc.). The annex should be filled for each sampling scheme. Where applicable, use the handbook on sampling design (Deliverable 2.1 from MARE/2016/22 SECFISH study), available on the DCF website.

Provide information under each point in all sections.

Please indicate sampling scheme identifier (e.g combination of 'sector' and 'sampling scheme' or 'variables' from the annex table). Each identifier is unique and can be used only once; records with identical scheme identifiers are overwritten in the platform. Do not add any tables others than from the template.

Create a first survey specification record as a reference to the regional WP, add 'RWP ECON' in the 'sector name' field and leave the other fields empty.

Sampling scheme identifier: RWP_ECON

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): RWP ECON 2025-2027
Sampling scheme:
Variables:
Supra region(s):
Survey planning
Survey design and strategy
1. Data sources: 2. Sample sizes: 3. Survey methods: 4. Additional information used in the survey strategy:

Estimation design
1. Calculation method for population estimate: 2. Calculation method for derived data: 3. Nonresponse handling:
Error checks
Data storage and documentation
1. Data storage: 2. Documentation:
Revision
Confidentiality

Sampling scheme identifier: Fishing activity and economic data for 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: Fishing activity variables and economic variables for the fishing fleet (Consumption of fixed capital, Days at sea, Energy consumption, Energy costs, Gross value of landings, Mean age of vessels, Mean LOA of vessels, Number of fishing enterprises/units, Number of vessels, Operating subsidies, Subsidies on investments, Total vessel power, Total vessel tonnage, Value of physical capital).
Supra region(s): Mediterranean Sea and Black Sea
Survey planning
Survey is performed by MAFF-DoF according to the Ordinance on the content, form and manner of delivery of socio-economic data in fisheries (OG 79/2020). Respondents are required to submit data by June 1st for the previous year.
Survey design and strategy
1. Data sources: fishing fleet register, logbooks, monthly catch reports (coastal logbooks), sales notes, VMS, blue diesel/fuel records, records of paid subsidies, and questionnaires stored in the Fishery Information System administered by MAFF-DoF and financial accounts obtained from FINA. Collection of the fishing activity and economic variables of the fleet is based on two major data sources: a) Fishery Information System administered by DoF (fishing activity variables, volume and value of blue diesel/fuel consumed per vessel/aquaculture farm; information on paid subsidies etc.); and b) Questionnaires for economic data collection. The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.

2. Sample sizes: Data is collected on census level for all fleet segments.
Based on the basic data on the population and data on the use of fishing gears retrieved and stored, after data has been validated and verified, a segmentation of the fishing fleet is performed. In some cases fleet segments are clustered for sampling purposes or reporting purposes for confidentiality reasons. As clustering depends entirely on the activity of vessels, in cases where clustering is needed, vessel activity is reviewed on a vessel-to-vessel case. In cases where a vessel changes its activity from one year to another inconsistently, it is directly reflected in the clustering.
Based on determined fleet segments, the procedure for determining sample sizes is carried out.
To estimate the sample size for the collection of economic variables, the variability of GT and kW is calculated. Coefficient of GT variation is used as a basis to define the sample size of the total fleet.
The sample is distributed among the relevant strata with the principal objective of minimizing the sampling error to be obtained for the stratification variable. The optimum Neyman allocation, which guarantees a minimum variance for the variable used in the stratification, is used for this purpose.
The sample size for each stratum is adjusted in accordance with several minimum rules: not less than 10% of each stratum, not less than 5 observations per segment with <50 active vessels assuming the response rate of 50%.
Stratification based on representative sub-sample per coastal county will be made which should result in a somewhat higher sample rate overall. This must be done in order to try to reach a representative sample size for each coastal county for two reasons: 1) efficiently organize sampling among data collectors in seven DoF field units and 2) enable economic analysis at the level of smaller units for the purposes of evaluating FLAG strategies, different development plans at municipal level etc.
For fleet segments under strict management measures all licence holders are contacted, due to the importance of a higher response rate.
3. Survey methods: questionnaire forms by post, by email, on website (national DCF and DoF), by phone, notice boards in DoF field units, directly in DoF field units.
Economic data is collected by questionnaire forms; the type of data collection scheme is probability sample survey by stratified random sampling.
4. Additional information used in the survey strategy: Financial accounts are used for data cross-checking.

Estimation design

1. Calculation method for population estimate: Estimation procedures are performed according to agreed methodologies published on the official DCF web site.
2. Calculation method for derived data: The calculation of variables Consumption of fixed capital and Value of physical capital is based on data from questionnaires and financial accounts in accordance with the PIM methodology, proposed in the report of study No FISH/2005/03. The age data is available per each vessel in the Fleet register. The data on the value of physical capital (replacement, insurance and purchase is collected through the questionnaire by DoF). The proposed DCF Excel template for the calculation of the capital costs will be used.
Estimation of subsidies: DoF records on direct subsidies are used as well as questionnaires. In cases where enterprises have more than one vessel, the amount of subsidies is allocated to vessels based on GT, as subsidies are collected on an enterprise level. The estimations are cross-checked by allocating the total amount of subsidies paid to respective fleet segments using the share of landings value of the fleet segment. In the end, three sets of estimations are compared to reach a sound conclusion.
Estimation of energy consumption and energy costs: For the estimation of energy consumption and energy cost blue diesel/fuel records are used. The register of blue diesel/fuel is updated annually on the amount of fuel consumed per vessel. No estimation to determine totals is used, as data is collected on a census basis. Energy consumption and information on subsidies (as a second data source) was excluded from DoF questionnaires to avoid duplication of data collection. According to several years of cross-check, FINA and DoF records are proven to be sufficient and there is no need to keep two data sources. PGECON was consulted on the change of methodology in 2019.
Response rates: To ensure the quality of data collected accuracy of the data that will be calculated. The data quality evaluation depends on the data collection scheme. In all cases (census and probability sampling) unit response rate (number of enterprises responded/total sample) and item response rate (response rate per each variable) is calculated as follows:

– Response rate (per item j);
N – Total number of vessels in the sample;
n – Number of vessels which provided the data (questionnaire/per each variable).

Coverage rate (number of responses/total population) is calculated in case of probability sampling survey. It is planned that random samples be used and the sample size adjusted in accordance with the response rate during the implementation.

3. Nonresponse handling: For nonresponses, administrative sources are used (Fishery Information System administered by MAFF-DoF, financial accounts)

Error checks

Croatia has a national plan for the validation systems as per Article 109 (8) of the Control Regulation. The National Plan for the Implementation of the Validation and Verification System in Republic of Croatia was approved by Commission Implementing Decision (EU) 2015/2277 of 2 December 2015. During 2015 Croatia started implementing the VALID system which is continuously being developed further and is used to control data quality. VALID automatic cross-check procedures operate in addition to local validations on data-entry and are based on several validation rules packages (EC core rules, national VMS rules, fleet registrations/licensing, catch report/qualitative statistical analysis etc.).

Statistical cross-check procedures are performed prior to reporting according to data collection on-demand validation reports and internal procedures for statistical and reporting purposes for data end users (EC, ICCAT, GFCM, EUROSTAT, FAO etc.) under DCF and include specific rules developed for each report in order to verify and validate data.

In 2016 the upgrading of the national FIS (Fisheries Information System) in regard to the fleet register and the new FIS module used for license issuing has been finalized. Both registers, fleet register and register of licences, are directly linked which enables efficient data verification of data. Catch reporting requirements in Croatia for all vessels less than 10 m LoA are based on monthly catch reports that are particularly suited for passive gears. Small-scale vessels for personal needs, that were transferred to the commercial fleet in 2015 also fall under the national requirement. As the current calculation of fishing days previously slightly exaggerated fishing days for passive gears, the methodology was harmonized with results of the DCF Workshops on transversal variables in 2017. Starting from 2017 and 2018 a full traceability system of fisheries products up until first sale was planned to be established in 2019 and 2020. This process started in 2016 by implementing an electronic transport document and linking first sale with logbooks and catch reports. The aim is to enhance the estimation of economic indicators and monitor fish prices in domestic market as well as import and export more efficiently.

In addition to obligations pursuant to Article 9 of the Basic Regulation, the following vessels are equipped with a VMS device and e-logbook: every authorized active demersal trawler (OTB), purse seiner (PS) and vessel with dredges (DRB) regardless of LoA, HL and LL vessels with BFT/SWO quota, vessels with quota for recreational fisheries of BFT. The e-logbook has greatly improved catch reporting and timely availability of catch and effort data in recent years. In addition to elements as required by the Basic regulation, the information on fish size of sardine and anchovy was added to the e-logbook for purse seiners. As fisheries in Croatia are managed through national fishing zones, fish size is an important element in terms of indirectly monitoring the stocks. As this data is linked with VMS data, the indication of the movement of fish of a certain size in certain periods and fishing zones is obtained.

Croatia is currently developing mobile applications (mTransportDocument, mSalesNote, mCatchReport and mLogbook) to facilitate reporting by the sector. This should lessen the administrative burden of data entry into FIS and enable the DoF to focus more resources on data validation and verification.

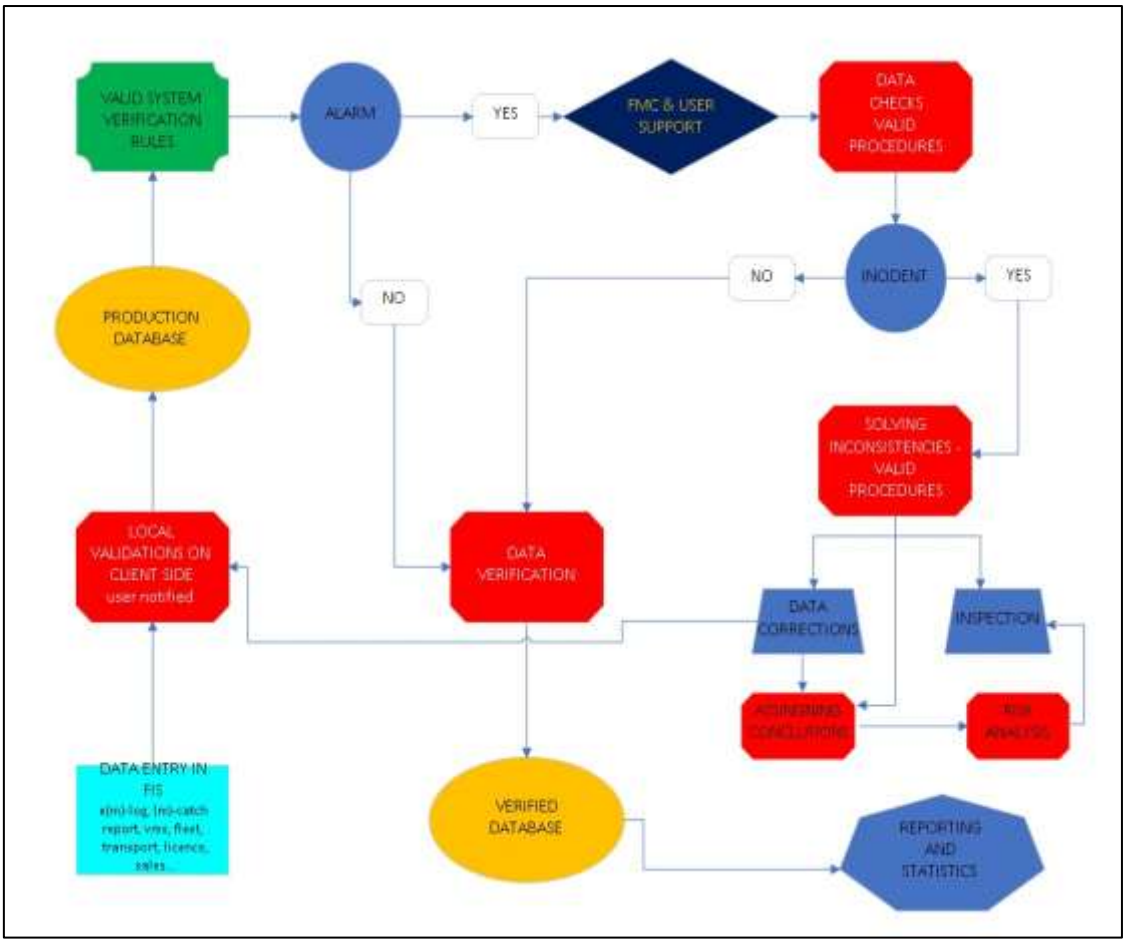


Chart 1. Flow chart of the data validation and verification system for fisheries

All questionnaires are checked by DoF employees, and all strange or unknown data reviewed and compared to financial accounts. An analysis of the entire time series of economic data for individual CFRs was made during the course of data-check, to reveal nonconformities, as well as an analysis of outliers and missing data at the fleet segment level. In some cases, respondents were asked to clarify information they submitted. Intermediate results and output are regularly compared to previous year's results.

Prior to reporting, extensive statistical validation procedures are done with the support of the Fisheries Monitoring Centre and DoF field units. This process is started after data input has been confirmed and data base is closed for new inputs and lasts for 2 months. Validation of data in the main production FIS database is carried out in two steps: DCF unit performs statistical validation analysis and requests from the Fisheries Monitoring Centre and MAFF-DoF field units to check specified documentation and resolve any errors. Check is performed for a second time to resolve any new errors resulting from data corrections.

For the purpose of reporting preliminary data for the previous year the validation procedure is performed in January-March, and for the purpose of finalizing data for the previous year (after all documentation is entered in FIS and main production database is locked) final validation is performed in November-December. Final dataset for N-1 referent year is available after 15th December.

Validation procedures are divided into several categories:

- checking of data according to management regulatory mechanisms (authorized gears, fishing day limits, catch limits, fishing in prohibited areas etc.)
- completeness and errors of data in logbooks, fishing reports and sales notes
- cross-checking of data between e-logbooks and VMS
- cross-checking of data between logbooks, fishing reports and sales notes
- verification of reported PET species and discards
- cross-checking of data reported for species under TACs (BFT and SWO)
- detailed data check for all species under stock assessments
- validation of landing data by species/fishing gear
- verification of data in sales notes (price outliers by species, month, fleet segment, double reporting etc.)
- validation of socio-economic data (outliers by variable and fleet segment, consistency of historical data by

vessel etc.)
- checking completeness of blue diesel/fuel records
- checking of specific errors for each type of documentation (e-logbooks, paper logbooks, m-logbooks, catch reports, m-catch reports), and
- collecting all relevant metadata necessary for reporting.

Data storage and documentation

1. Data storage: FIS
2. Documentation:
   Additional methodological information on fishing activity data:
   https://podaci.ribarstvo.hr/statisticki-podaci/politike-sluzbene-statistike/
   Additional methodological information on socio-economic data:
   https://podaci.ribarstvo.hr/metodologije-i-protokoli/socio-ekonomski-protokoli/

Revision

Croatia updates each year N-2 capacity/landing/effort data. Croatia implements catch reporting for all fishing vessels (including passive gears below 10 m LoA), all fisherman are required to submit logbooks or catch reports for passive gears. While all active gears and gears under management regimes are obligated to submit electronic real time logbooks, in the case of passive gears fisherman submit paper catch reports which have to be processed by MAFF-DoF. Therefore, data for the N-1 is finalized by the end of year N. This means that Croatia resubmits N-2 data after it is finalized to avoid discrepancies each reporting year.

Confidentiality

1. Are procedures for confidential data handling in place and documented? Y
2. Are protocols to enforce confidentiality between DCF partners in place and documented? NA
3. Are protocols to enforce confidentiality with external users in place and documented? Y
4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. N

Sampling scheme identifier: Socio-economic data for 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: Economic and social variables for the fishing fleet (Full-time equivalent (FTE), Gross debt, Income from leasing out quota or other fishing rights, Investments in tangible assets (net purchase of assets), Lease/rental payments for quota or other fishing rights, Other income, Other non-variable costs, Other variable costs, Paid labour, Personnel costs, Repair and maintenance costs, Total hours worked per year (optional), Total assets, Unpaid labour, Value of quota and other fishing rights, Value of unpaid labour).

Supra region(s): Mediterranean Sea and Black Sea

Survey planning

Survey is performed by MAFF-DoF according to the Ordinance on the content, form and manner of delivery of socio-economic data in fisheries (OG 79/2020). Respondents are required to submit data by June 1st for the previous year.

Survey design and strategy

1. Data sources: questionnaires, financial accounts.
   Collection of the economic variables of the fleet is based on two major data sources:
   a) Fishery Information System administered by DoF (fishing activity variables, volume and value of blue diesel/fuel consumed per vessel/aquaculture farm; information on paid subsidies etc.); and
   b) Questionnaires for socio-economic data collection (annually) and detailed questionnaires for social data collection (every three years).
   The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.
2. Sample sizes: Based on the basic data on the population and data on the use of fishing gears retrieved and stored, after data has been validated and verified, a segmentation of the fishing fleet is performed. In some cases, fleet segments are clustered for sampling purposes or reporting purposes for confidentiality reasons. As clustering depends entirely on the activity of vessels, in cases where clustering is needed, vessel activity is reviewed on a vessel-to-vessel case. In cases where a vessel changes its activity from one year to another inconsistently, it is directly reflected in the clustering.
   On the basis of determined fleet segments, the procedure for determining sample sizes is carried out.
   In order to estimate the sample size for the collection of economic variables, the variability of GT and kW is calculated. Coefficient of GT variation is used as a basis to define the sample size of the total fleet.
   The sample is distributed among the relevant strata with the principal objective of minimizing the sampling error to be obtained for the stratification variable. The optimum Neyman allocation, which guarantees a minimum variance for the variable used in the stratification, is used for this purpose.
   The sample size for each stratum is adjusted in accordance with several minimum rules: not less than 10% of each stratum, not less than 5 observations per segment with <50 active vessels assuming the response rate of 50%.
   Stratification on the basis of representative sub-sample per coastal county will be made which should result in a somewhat higher sample rate overall. This has to be done in order to try to reach a representative sample size for each coastal county for two reasons: 1) efficiently organize sampling among data collectors in seven DoF field units and 2) enable economic analysis at the level of smaller units for the purposes of evaluating FLAG strategies, different development plans at municipal level etc.
   For fleet segments under strict management measures all licence holders are contacted, due to the importance of a higher response rate.
3. Survey methods: questionnaire forms by post, by email, on website (national DCF and DoF), by phone, notice boards in DoF field units, directly in DoF field units.
   Socio-economic data is collected by questionnaire forms; the type of data collection scheme is probability sample survey by stratified random sampling and in some cases a census survey. For the variables Consumption of fixed capital and Value of physical capital Indirect survey is applied.
4. Additional information used in the survey strategy: Financial accounts are used for data cross-checking

Estimation design

1. Calculation method for population estimate: Estimation procedures are performed according to agreed methodologies published on the official DCF web site (https://datacollection.jrc.ec.europa.eu/docs-links/socio-eco-var). In cases where response rate is inadequate to reach a statistically sound estimation, a simple regression is used to cross-check results or estimate totals. Low response rate is typically a problem of data collection for the small-scale fleet, for which questionnaire return rate is low, data in questionnaires inconsistent, unreliable and sometimes unreadable as in most cases there is no professional accounting. To tackle these issues, considerably more effort is placed into data collection for the fishermen involved in small scale fisheries, including direct contact, reviewing questionnaires, cross checking data to ensure a more complete data sets, higher quality and more reliable results.
2. Calculation method for derived data: Estimation of FTE: The number of hours worked during the year, collected from the enterprises through the economic questionnaire, is divided by national annual full-time working hours (based on the CBS methodology).
   Response rates: To ensure the quality of data collected accuracy of the data that will be calculated. The data quality evaluation depends on the data collection scheme. In all cases (census and probability

sampling) unit response rate (number of enterprises responded/total sample) and item response rate (response rate per each variable) is calculated as follows:

– Response rate (per item j);
N – Total number of vessels in the sample;
n – Number of vessels which provided the data (questionnaire/per each variable).
Coverage rate (number of responses/total population) is calculated in case of probability sampling survey.
It is planned that random samples be used and the sample size adjusted in accordance with the response rate during the implementation.

3. Nonresponse handling: For nonresponses, administrative sources are used (Fishery Information System administered by MAFF-DoF, financial accounts)

Error checks

Statistical cross-check procedures are performed prior to reporting according to data collection on-demand validation reports and internal procedures for statistical and reporting purposes for data end users (EC, ICCAT, GFCM, EUROSTAT, FAO etc.) under DCF and include specific rules developed for each report in order to verify and validate data.
All questionnaires are checked by DoF employees and all strange or unknown data reviewed and compared to financial accounts. An analysis of the entire time series of economic data for individual vessels is made during the course of data-check, to reveal nonconformities, as well as an analysis of outliers and missing data at the fleet segment level. In some cases, respondents are asked to clarify information they submitted. Intermediate results and output are regularly compared to previous year's results.

Data storage and documentation

1. Data storage: FIS
2. Documentation:
   Additional methodological information on fishing activity data:
   https://podaci.ribarstvo.hr/statisticki-podaci/politike-sluzbene-statistike/
   Additional methodological information on socio-economic data:
   https://podaci.ribarstvo.hr/metodologije-i-protokoli/socio-ekonomski-protokoli/

Revision

Historical data is revised in case new methodologies are applied according RCG ECON methodologies, or in cases previous estimated were revised according to updated data.

Confidentiality

1. Are procedures for confidential data handling in place and documented? Y
2. Are protocols to enforce confidentiality between DCF partners in place and documented? NA
3. Are protocols to enforce confidentiality with external users in place and documented? Y
4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. N

Sampling scheme identifier: Socio-economic data for 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: Economic variables for marine and freshwater aquaculture (Number of enterprises by size category, Operating subsidies, Subsidies on investments, Weight of sales per species)

Supra region(s): Mediterranean Sea and Black Sea

Survey planning

The survey is performed by MAFF-DoF according to the Ordinance on the content, form and manner of delivery of socio-economic data in fisheries (OG 79/2020). Respondents are required to submit data by June 1st for the previous year.

- Number of enterprises by size category: DoF registry of licences.
- Weight of sales per species: logbook in aquaculture (DoF records on breeding and hatching),
- Operating subsidies, Subsidies on investments: DoF records on paid subsidies.

Survey design and strategy

1. Data sources: aquaculture logbooks, records of paid subsidies, registry of licences.
   Administrative sources of data available to MAFF-DoF:
   Data is collected from administrative sources of data available to MAFF-DoF including:
   - Number of enterprises by size category: DoF registry of licences.
   - Weight of sales per species: logbook in aquaculture (DoF records on breeding and hatching),
   - Operating subsidies, Subsidies on investments: DoF records on paid subsidies.
2. Sample sizes: Data collection for all techniques and species groups shall be carried out on the basis of a census. Segmentation will be based on species and technique. Since a large number of enterprises are producing more than one species, additional segmentation is based on the value of production attributed to one species.
3. Survey methods: Fishery Information System administered by MAFF-DoF (aquaculture farm registry and logbooks; information on paid subsidies etc.).
4. Additional information used in the survey strategy: Financial accounts are used for data cross-checking.

Estimation design

1. Calculation method for population estimate: No estimation on census data is planned, administrative sources are complete for all enterprises in the population. Since some enterprises are producing more than one species with significantly different market value, in order to make the segmentation more precise, the additional criteria shall be applied, based on the value of production attributed to one species.
2. Calculation method for derived data: No estimation on census data is planned, administrative sources are complete for all enterprises in the population.
3. Nonresponse handling: For nonresponses, administrative sources are used (Fishery Information System administered by MAFF-DoF, financial accounts)

Error checks

Data on aquaculture sector are regularly checked with data from the Financial agency and starting from 2017 with Structural Business Statistics Data (SBS) from Croatian Bureau of Statistics aggregated by company size (number of employees). SBS data related to population is also checked by detailed insight into companies' activities during the reference year.
The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.

Data storage and documentation

1. Data storage: Local database at MAFF-DoF with backups
2. Documentation: Additional methodological information on socio-economic data: https://podaci.ribarstvo.hr/metodologija/socioekonomski/

Revision
So far data has not been revised.
Confidentiality
1. Are procedures for confidential data handling in place and documented? Y 2. Are protocols to enforce confidentiality between DCF partners in place and documented? NA 3. Are protocols to enforce confidentiality with external users in place and documented? Y 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. N

Sampling scheme identifier: Socio-economic data for 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: Economic and social variables for marine and freshwater aquaculture (Consumption of fixed capital, Energy costs, Financial expenditures, Financial income, Fish feed used, Full-time equivalent (FTE), Gross debt, Gross sales per species, Investments in tangible assets (net purchase of assets), Livestock used, Number of hours worked by employees and unpaid workers (optional), Other income, Other operating costs, Paid labour, Personnel costs, Raw material: feed costs, Raw material: livestock costs, Repair and maintenance costs, Total assets, Unpaid labour, Value of unpaid labour)
Supra region(s): Mediterranean Sea and Black Sea
Survey planning
The survey is performed by MAFF-DoF according to the Ordinance on the content, form and manner of delivery of socio-economic data in fisheries (OG 79/2020). Respondents are required to submit data by June 1st for the previous year. Data collection for all techniques and species groups shall be carried out on the basis of a Probability Sample Survey. Data collection will be conducted by phone or e-mail contact with subjects, introducing them to the data collection, and sending questionnaires together with guidelines by post or email. To ensure data consistency for all segments, together with each variable defined in the guidelines, a link to accounting code in financial accounts is provided. The prepared documentation is submitted by e-mail or post to DoF and cross-checked with financial accounts and data on aquaculture production collected through Fisheries Information System.
Survey design and strategy
1. Data sources: questionnaires, financial accounts. There are two main sources of data - some variables will be collected from DoF database and subsidies register while some will be taken from questionnaires. For cross-checking, data from the Croatian Financial Agency (FINA) will be used, mostly regarding the financial accounts, of companies which are obliged to submit the data due to their size category or net profit. 2. Sample sizes: Data collection for all techniques and species groups shall be sampled on the basis of a

Probability Sample Survey.

3. Survey methods: Questionnaire forms by post, by email, on website (national DCF and DoF), by phone, notice boards in DoF field units, directly in DoF field units.
   Socio-economic data is collected by questionnaire forms; the type of data collection scheme is probability sample survey by stratified random sampling.
   Collection of the economic variables of the segment is based on two major data sources:
   a) Fishery Information System administered by DoF (aquaculture farm registry and logbooks, volume and value of blue diesel consumed per aquaculture farm; information on paid subsidies etc.); and
   b) Questionnaires for socio-economic data collection.
   The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.
   Segmentation will be based on species and technique. Since a large number of enterprises are producing more than one species, additional segmentation is based on the value of production attributed to one species.
4. Additional information used in the survey strategy: The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources; data from the Croatian Financial Agency (FINA) will be used, mostly regarding the financial accounts, of companies which are obliged to submit the data due to their size category or net profit.

Estimation design

1. Calculation method for population estimate: Estimation procedures are performed according to agreed methodologies published on the official DCF web site (https://datacollection.jrc.ec.europa.eu/docs-links/socio-eco-var).
2. Calculation method for derived data: One of the main problems is low response and cooperation so estimation needs to be used. Missing variables can be estimated from the FINA database and from Croatian national statistics bureau. Also, additional attention will be made on collecting data, especially on small-scale companies in marine aquaculture, so as in freshwater aquaculture. Since in Croatia there are different levels of enterprises legal registration with different accounting methods, it came clear during data collecting that is necessary to adjust guidelines for each of them. Two different questionnaires with different approach shall be devised. The first one, for small-scale companies, tailored to their business activities and the way of leading accounting records. Other for larger companies where it is easier to respond to inquiries and requests submitted to them.
   Estimation of FTE: The number of hours worked during the year, collected from the enterprises through the economic questionnaire, is divided by national annual full-time working hours (based on the CBS methodology).
   Response rates: To ensure the quality of data collected accuracy of the data that will be calculated. The data quality evaluation depends on the data collection scheme. In all cases (census and probability sampling) unit response rate (number of enterprises responded/total sample) and item response rate (response rate per each variable) is calculated as follows:
   – Response rate (per item j);
   N – Total number of aquaculture enterprises in the sample;
   n – Number of aquaculture enterprises which provided the data (questionnaire/per each variable).
   Coverage rate (number of responses/total population) is calculated in case of probability sampling survey.
   It is planned that random samples be used and the sample size adjusted in accordance with the response rate during the implementation.
3. Nonresponse handling: In cases where response rate is inadequate to reach a statistically sound estimation, a simple regression is used to cross-check results or estimate totals.

Error checks

Data on processing industry and aquaculture sector are regularly checked with data from the Financial agency and starting from 2017 with Structural Business Statistics Data (SBS) from Croatian Bureau of Statistics aggregated by company size (number of employees). SBS data related to population is also checked by detailed insight into companies' activities during the reference year.
The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.
Data collection will be performed through questionnaires created for this purpose. To ensure data consistency

for all segments, together with definition of each variable in guidelines, link is made to accounting code in financial accounts. Some of variables also will be collected from the DoF subsidies register, since it is mandatory for all aquaculture producers in Croatia to report the production in volume and value each year at the farm level. Some of the variables will be taken from questionnaires. Some other variables, e.g. subsidies, will be collected through DoF register and questionnaires. For some segments with small-scale companies, it will be necessary to put additional effort in future data collection since they have difficulties in recording financial documents.
Data storage and documentation
1. Data storage: Local database at MAFF-DoF with backups 2. Documentation: Additional methodological information on socio-economic data: https://podaci.ribarstvo.hr/metodologije-i-protokoli/socio-ekonomski-protokoli/
Revision
So far data has not been revised.
Confidentiality
1. Are procedures for confidential data handling in place and documented? Y 2. Are protocols to enforce confidentiality between DCF partners in place and documented? NA 3. Are protocols to enforce confidentiality with external users in place and documented? Y 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. N

Sampling scheme identifier: Socio-economic data for 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: Economic and social variables for processing
Supra region(s): Mediterranean Sea and Black Sea
Survey planning
Survey is performed by MAFF-DoF according to the Ordinance on the content, form and manner of delivery of socio-economic data in fisheries (OG 79/2020). Respondents are required to submit data by June 1st for the previous year. As data from the Business Register is not necessarily updated, data from the Register of approved establishments, maintained by Ministry of Agriculture, the Veterinary and Food Safety Directorate, will be considered when defining the population for reference years 2025-2027. Socio-economic data is collected by questionnaire forms; the type of data collection scheme is probability sample survey by stratified random sampling and in some cases a census survey.
Survey design and strategy

1. Data sources: There are two main sources of data - some variables will be collected from DoF database and subsidies register while some will be taken from questionnaires. For cross-checking, data from the Croatian Financial Agency (FINA) will be used, mostly regarding the financial accounts of companies who are obliged to submit the data due to their size category or net profit.
2. Sample sizes: As data from the Business Register is not necessarily updated, data from the Register of approved establishments, maintained by Ministry of Agriculture, the Veterinary and Food Safety Directorate, will be taken into account when defining the population for reference years 2025-2027.
3. Survey methods: questionnaire forms by post, by email, on website (national DCF and DoF) and by phone. Data collection will be conducted by phone contact with subjects, introducing them with the data collection, and sending questionnaires (forms) together with guidelines by post or email. In the case of processing industry, it is not necessary to visit subjects since most companies have an accounting service and have much better data than some aquaculture segments or the small-scale fishing fleet. The exact size of the active population will be determined only after data collection, since all companies that have fish processing as main or as part of their activities will be contacted.
4. Additional information used in the survey strategy: The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources; data from the Croatian Financial Agency (FINA) will be used, mostly regarding the financial accounts, of companies which are obliged to submit the data due to their size category or net profit.

Estimation design

1. Calculation method for population estimate: Estimation procedures are performed according to agreed methodologies published on the official DCF web site (https://datacollection.jrc.ec.europa.eu/docs-links/socio-eco-var).
2. Calculation method for derived data: In cases where response rate is inadequate to reach a statistically sound estimation, a simple regression is used to cross-check results or estimate totals. All questionnaires will be checked by DoF employees and all strange or unknown data reviewed. In some cases, respondents need to be asked to clarify submitted data. If needed, questionnaires will be filled with telephone consultation and send to DoF by e-mail. Also, some data collection can be made through financial accounts and profit and loss accounts.
3. Nonresponse handling: In cases where response rate is inadequate to reach a statistically sound estimation, a simple regression is used to cross-check results or estimate totals.

Error checks

Data on processing industry are regularly checked with data from the Financial agency and starting from 2017 with Structural Business Statistics Data (SBS) from Croatian Bureau of Statistics (CBS) aggregated by company size (number of employees). SBS data related to population is also checked by detailed insight into companies' activities during the reference year.
The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.
Data collection will be performed through questionnaires created for this purpose. To ensure data consistency for all segments, together with definition of each variable in guidelines, link is made to accounting code in financial accounts.
A new type of questionnaire should provide data that maximum corresponds to the actual operation of enterprises in the fish processing industry. Many companies whose main activity is processing, have also many other activities, as well as aquaculture and fishing activities. In this manner, data placed in questionnaires are actually balanced. Data coming from CBS can however only be used in cross-checking procedures since DCF data call deadlines are usually well before the CBS data availability.

Data storage and documentation

1. Data storage: Local database at MAFF-DoF with backups
2. Documentation: Additional methodological information on socio-economic data: https://podaci.ribarstvo.hr/metodologije-i-protokoli/socio-ekonomski-protokoli/

Revision

So far data has not been revised.

Confidentiality
1. Are procedures for confidential data handling in place and documented? Y 2. Are protocols to enforce confidentiality between DCF partners in place and documented? NA 3. Are protocols to enforce confidentiality with external users in place and documented? Y 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. N