



**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 - Annual Report on data collection in the fisheries and aquaculture sectors

2023

Version 1

Zagreb, 31 May 2024

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SECTION 1: GENERAL INFORMATION

Data collection framework at national level

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

General framework:

The current document presents the revised Work Plan (WP) for data collection in the fisheries and aquaculture sectors for Republic of Croatia for the period 2023-2024. The WP incorporates planned activities based on the requirements set by Regulation (EU) 2017/1004 (recast Data Collection Framework, DCF), regional agreements and identified end-user needs, taking into account thresholds applied.

Based on the requirements of the new 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, the updated WP includes new elements compared to past national programmes, including a multispecies sampling scheme that enables the estimation of recreational catches for stocks agreed at regional level in accordance with the relevant end-user needs (Section 2), new data collection on fisheries impact on the marine habitat and improved sampling scheme for the scientific monitoring of commercial fisheries.

Data collection in fisheries in the Republic of Croatia in accordance with the provisions of the Common Fisheries Policy of the European Union and the Croatian Marine Fisheries Act is conducted by two main institutions, Ministry of Agriculture - Directorate of Fisheries and the Institute of Oceanography and Fisheries.

National Correspondent of Republic of Croatia is designated according to Article 7 of Regulation (EU) 2017/1004:

Ivana Vukov
Ministry of Agriculture
Directorate of Fisheries
ivana.vukov@mps.hr
+(385) 1 6443 177

Ministry of Agriculture - Directorate of Fisheries (MA-DoF):

The national authority responsible for implementing the National Data Collection Programme is the Ministry of Agriculture - Directorate of Fisheries (MA-DoF).

In Croatia all administrative duties involved in the fishing sector, including data collection, monitoring, control and surveillance and management of fisheries and aquaculture are undertaken by the DoF. Apart from the central office in Zagreb, DoF has seven field offices within each coastal County (Pula, Rijeka, Senj, Zadar, Šibenik, Split, Dubrovnik). The field offices are in charge of technical and administrative issues with regards to issuing, registering and administrating the licences (commercial fisheries), approvals (sports and recreational fisheries) and authorisations, entering the data from logbooks and catch reports into the central database, keeping registers of licences and fleet registers.

MA-DoF coordinates the implementation of data collection at the national level and is responsible for the implementation of the following sections of the WP:

- Section 1b. Other data collection activities
- Section 2.3. Diadromous species data collection in freshwater
- 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

General MA-DoF Contact:

Ministry of Agriculture
Directorate of Fisheries
10000 Zagreb
Republic of Croatia
+(385) 1 6443 185
General mailbox: uprava.ribarstva@mps.hr
MA-DoF web page: <https://ribarstvo.mps.hr/>

Institute of Oceanography and Fisheries (IOF):

The Institute of Oceanography and Fisheries in Split (IOF) implements monitoring and data collection programmes in the field of fisheries biology. IOF is a state-owned institution under the Ministry of Science and Education, covering a wide range of marine-related fields of research including fisheries.

IOF was founded in 1930 as the first national scientific and research institution dealing with research of the sea. Scientific activity of the Institute is extremely multidisciplinary, since it covers almost all fields of research. IOF carries out very complex research in the fields of biological, chemical and physical oceanography, sedimentology, and fisheries biology and aquaculture.

The fundamental scientific research of IOF is mostly conducted through projects of continuing research activities funded by the Croatian Ministry of Science and Education. Pursuant to the Marine Fisheries Act (OG 62/17, 130/17 – Act aquaculture and 14/19) IOF is responsible for the collection of biological data according to the national plan for data collection in fisheries in the Republic of Croatia, as well as in charge of monitoring required for the assessment of the effects of all or some forms of fisheries on the marine ecosystem.

IOF is responsible for the implementation of the following sections of the WP:

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

Scientific coordination: PhD Nedo Vrgoč is the leader of project activities and contact person for the overall implementation of the biological component of the WP in 2022-2024. PhD Igor Isajlović is assigned as scientific and technical coordinator. For each specific component implemented by IOF sub-coordinators are appointed.

General IOF contact:

Institute of Oceanography
Šetalište I. Meštrovića 63
21000 Split
Republic of Croatia
+(385) 2 14 08 000
General mailbox: office@izor.hr
IOF web page: www.izor.hr

National data collection website:

A national data collection website has been developed by MA-DoF: <https://podaci.ribarstvo.hr/>

Participation in Regional Coordination Groups:

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.

Table 1. National data collection organization

SECTIONS	RESPONSIBLE BODY
Section 1: General information	
<i>Text Box 1a: Study on red coral</i>	MA-DoF & IOF*
<i>Text Box 1b: Other data collection activities (RCG's Secretariat services)</i>	MA-DoF
Section 2: Biological Data	
<i>Text Box 2.3: Diadromous species data collection in freshwater</i>	MA-DoF*
<i>Text Box 2.4: Recreational Fisheries</i>	MA-DoF & IOF*
<i>Text Box 2.5: Sampling plan description for biological data</i>	IOF
<i>Text Box 2.6: Research surveys at sea</i>	IOF
Section 3: Fishing Activity Data	
<i>Text Box 3.1: Fishing activity variables data collection strategy</i>	MA-DoF
<i>Text Box 3.2: Fishing activity variables data collection strategy (for inland eel commercial fisheries)</i>	MA-DoF
Section 4: Impact of fisheries on marine biological resources	
<i>Text Box 4.2: Incidental catches of sensitive species</i>	IOF
<i>Text Box 4.3: Fisheries impact on marine habitats</i>	IOF*
Section 5: Economic and social data in fisheries	
<i>Text Box 5.2: Economic and social variables for fisheries data collection</i>	MA-DoF
Section 6: Economic and social data in aquaculture	
<i>Text Box 6.1: Economic and social variables for aquaculture data collection</i>	MA-DoF
Section 7: Economic and social data in fish processing	
<i>Text Box 7.1: Economic and social variables for fish processing data collection</i>	MA-DoF
<i>ANNEX 1.1 - Quality report for biological data sampling scheme</i>	IOF
<i>ANNEX 1.2 - Quality report for socioeconomic data sampling scheme</i>	MA-DoF

** Some of the planned activities may be assigned to other scientific bodies. Complete list of participating institutes will be provided in following revisions of the WP, after procurement procedures have been completed.*

Text Box 1a: Test studies description

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

Name of the study: Study on the exploitation of red coral

Exploitation of red coral (*Corallium rubrum*) in Croatia is regulated according to GFCM Multiannual Management Plan for Red Coral in the Mediterranean Sea (Rec. GFCM/43/2019/4), Council Regulation (EU) 2021/90 which set the maximum number of fishing authorisations for red coral harvesting (28), and annual harvest limits for red coral (1,226 tons) for 2021 and Council Regulation (EU) 2022/110 which set the same limits for 2022. National legislation further limits number of fishing authorizations to 10 fishing vessels, and reduces the national catch limit to 850 kg in 2021 and 425 kg in 2022. Conservation status of red coral is determined as endangered according to the IUCN "red list", and in Croatia is assessed as critically endangered (CR) (Ordinance on strictly protected species, OG 144/2013 and 73/2016). Taking into account the conservation status of red coral in Croatia, national catch limit was further reduced to 850 kg for 2021, and 425 kg for 2022 and 2023. Catch limits are determined per authorized vessel. Specific authorizations for red coral issued in 2021 to 10 vessels were valid from 1 April 2021 until 30 June 2022, from 1 September to 31 December 2022 and from 1 January until 31 December 2023 (Decision on authorization of vessels for harvesting red coral valid until 30 June 2022, OG 32/2021; Decision on authorization of vessels for harvesting red coral valid until 31 December 2023, OG 100/22). Furthermore, Ordinance on commercial fishing at sea by diving (OG 30/21, 72/21, 53/22 and 90/22) defined closures for red coral, in accordance with available biological information and ongoing national study on biology and distribution of red coral, and introduced conditions for harvesting (areas, depth, gears etc.). Several mechanisms are prescribed to facilitate monitoring and inspection, including electronic real time catch reporting, prior notification on arrival to port, limited number of landing places (11 fishing ports according to Order on the list of landing places for landing catches from fishing vessels engaged in commercial fishing at sea, OG 53/22). Prior to the described revision of the legal framework for red coral, there was a national set of provisions in force in 2020 setting the maximum annual catch per license to 200kg. According to the Annual report on balance between fishing capacity and fishing opportunities for 2021, additional management mechanisms are foreseen to further reduce the impact of fisheries on red coral.

1. Aim of the test study

Red coral exploitation in Croatia has a long tradition, however scientific monitoring of these activities has not been adequately organized so far. The aim of this test study is to collect basic information on the exploitation of red coral in Croatia including main harvesting areas, socio-economic data and basic biological data of red coral. The study will provide historical and recent overview of fishing activity of vessels harvesting red coral towards determining conservation and management measures.

2. Duration of the test study

Study was planned to start in 2022 however due to the prolonged procurement process, the start is postponed to the beginning of 2023 with a duration of 14 months in the framework of EMFAF.

3. Methodology and expected outcomes of the test study

Data collection for the implementation of this test study will be conducted as follows: (1) through questionnaires (interview), (2) biological sampling and (3) by analysing official catch and sales documentation. Questionnaire will cover all fishermen engaged in this activity, and data on fishing effort, harvesting areas, exploitation dynamics, coral gathering methodology, long-term trends, socio-economic data etc. Biological data (amount and biomass of harvested corals, diameter, length, age, etc.) will be collected on commercial catches of fishermen. Information from logbooks will be analysed as well as any trading and export information. In this way, the data necessary for a detailed description of this type of fishing and the realized catch will be collected, and based on that, a proposal for future management measures will be provided.

Name of the study: Study on the exploitation of red coral

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

Following internal MA-DoF procedures, the study underwent a public procurement process in early 2023, after which the contract was signed with the service provider (IOF) in late May 2023. Due to these circumstances, expected finalization of study was adjusted to late July 2024.

Study on the exploitation of red coral has two parts: socio-economic and biological. For the purpose of collecting biological and socio-economic data on the exploitation of red coral in the Republic of Croatia, IOF, in collaboration with MA-DoF, has prepared a survey questionnaire. The questionnaire consists of 33 questions, covering various aspects of red coral exploitation, including locations, population status, density, and more. In addition, the questionnaire explores market pathways, as well as the demand for coral in domestic and foreign markets. The questionnaire allows fishermen to express their opinions on changes in the availability and abundance of red coral, regulations, and coral protection. Through the questionnaire, fishermen are encouraged to share their suggestions and information related to the exploitation of red coral in the Adriatic Sea. In collaboration with the MA-DoF, IOF contacted all individuals who held permits for coral harvesting (valid up to December 31, 2023) and asked to participate in the survey. The questionnaire survey began in 2023 and is planned to be completed in 2024, when all collected data will be analysed.

In accordance with the grant agreement between IOF and MA-DoF, one progress report on the project was submitted to MA-DoF in 2023.

Since most authorised divers stated that they would not collect coral in 2023, IOF managed to purchase coral collected at one location. Those corals were used for further laboratory analysis. The laboratory analysis involved detailed measurements of samples (length, height, biomass), and a photo-catalogue of all collected colonies was created. For the coral age determination three protocols were tested: i) acetate replicas from coral cross-sections, ii) analysis of cross-sections stained with Mutvei's solution, iii) analysis of cross-sections stained with Toluidine blue. Of the three protocols, the most suitable method for determining growth lines was the Toluidine blue staining method. A total of 53 colonies of red coral were prepared for age analysis. The determination of the age of prepared samples is underway in 2024.

Preliminary results were presented during the GMC Working Group on Red Coral (WGREDCORAL) in April 2024.

Survey design and questionnaire (*hr*):



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

All activities planned in 2023 were carried out according to the work plan, and no deviations were recorded. The contacted fishermen were extremely approachable and cooperative in sharing their knowledge and information, and planned biological samples were collected.

Expected finalization of study is in late July 2024 after which the research team will compile and summarize findings, conclusions, and recommendations in a final report (as per grant agreement between IOF and MA-DoF). Summary of main findings will be made available on the national DCF web site (<https://podaci.ribarstvo.hr/>) while detailed data will be available on request.

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

The study will provide valuable information needed for decision making on the conservation and management of red coral harvesting in Croatia. Further monitoring will be incorporated in WP 2025-2027, if necessary, according to national and regional needs. Decision will be made after the GFCM SAC in June 2024.

Text Box 1b: Other data collection activities

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

Name of the study: Study on the impact of fishing tourism on marine ecosystem and fishery resources

1. Aim of the data collection activity

In accordance with the Marine Fisheries Act (OG 62/17, 130/17 – Act aquaculture and 14/19), commercial fishermen can also perform a special category of fishing: fishing for tourist purposes. The goal of these fishing activities is primarily touristic: demonstration of fishing, introducing tourists to fishing techniques and marine organisms found in the catch. At the same time during touristic fishery, leisure and entertainment activities take place on and around the boat, as well as tasting and consumption of food originating from the sea. Currently in Croatia several commercial fishermen are engaged in this activity and there is almost no more detailed information about what this type of fishing means in terms of fishery-biological and socio-economic terms, therefore the aim of this study is to describe it.

2. Duration of the data collection activity

Bearing in mind that fishing for tourism purposes is a seasonal activity, the duration of the field research is predicted during the tourist season (during July and August), and the processing of collected biological data and analysis of socio-economic aspects through the autumn period. Study was planned to start in 2022 however due to the prolonged procurement process, the start is postponed to the beginning of 2023 with a duration of 14 months in the framework of EMFAF.

3. Methodology and expected outcomes of the data collection activity

Field sampling for the purposes of this study will be performed on the commercial vessels engaged in fishing for tourist purposes. A qualitative and quantitative structure of the catch will be performed on board, which will include catch, discard and bycatch as well as possible marine litter. Also, the demographic structure (length, weight, sex, maturity, etc.) of the most important populations in the catches will be described. These data will be compared with the qualitative and quantitative structure as well as the demographic structure of the key populations collected through the DCF during commercial fishing in the same fishing area in the same season. In this way, it will be possible to assess the impact of this fishery on marine ecosystems and fishery resources and to correlate it with commercial fishing.

Through the survey, but also using data from official log-books, data on economic and social aspects of fishing will be collected, primarily information on earnings (catch value, tourism) and costs (fuel, fishing equipment, operating costs, etc.). Also, information will be collected from fishermen engaged in this activity on the problems they face and suggestions for possible solutions with the aim to establish adequate management mechanisms.

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

Following internal MA-DoF procedures, the study underwent a public procurement process in early 2023, after which the contract was signed with the service provider (IOF) in late May 2023. Due to these circumstances, expected finalization of study was adjusted to second half of 2024.

In accordance with the grant agreement between IOF and MA-DoF, a progress report on the project was submitted to MA-DoF in 2023, summarizing the survey methodology and target population.

Survey design and questionnaire (hr):



The aim of this study collection of data needed to determine the impact of fishing tourism on the state of local fish stocks, the environment and sensitive species, the economic benefits of fishermen and local communities from fishing tourism, the profile of tourists who are involved in fishing tourism and their patterns of consumption, preferences and satisfaction with the services and products provided, possibilities and potential of fishing tourism outside the tourist season and determination of strengths, weaknesses, opportunities and threats for the promotion and development of fishing tourism in the Republic of Croatia.

In addition to planned activities, MA-DoF updated the Ordinance on keeping and submitting catch documentation in commercial marine fisheries (OG [114/2023](#)) to incorporate information on fishing tourism. By doing so, MA-DoF will be able to compare the effort of an individual vessel and fishing gear during commercial fishing to the fishing activities conducted during fishing tourism.

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

All activities planned in 2023 were carried out according to the work plan, and no deviations were recorded. Expected finalization of study is second half of 2024, upon collection of data in summer tourist season 2024. After finalization of data collection and analysis, the research team will compile and summarize findings, conclusions, and recommendations in a final report (as per grant agreement between IOF and MA-DoF). Summary of main findings will be made available on the national DCF web site (<https://podaci.ribarstvo.hr/>) while detailed data will be available on request.

Incorporation of study results into regular sampling by the Member State. The study will provide valuable information needed for the promotion and development of fishing tourism in the Republic of Croatia, aiming to reduce the impact of commercial fisheries and pressure on the environment and resources, by way of diversification of fishing activities.

Further activities will be incorporated in WP 2025-2027, if necessary, after finalization of current study.

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

Name of the study: RCG's Secretariat services

1. Aim of the data collection activity

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

2. Duration of the data collection activity

01/01/2023 – 31/12/2025

3. Methodology and expected outcomes of the data collection activity

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

RCGs has been boosted with the development of a dedicated website and the consolidation of a visual identity.

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

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

Overall expected outcomes:

- A full-time dedicated Secretariat support service for the RCGs enables a consistent approach to administering RCG activities, facilitates communication, and enhances the intersessional work, supporting also the work of sub-groups.
- A dynamic and permanently updated website will be kept available including as features:
 - Integration – allowing seamless synchronization with third-party information needs and requests.
 - Responsive display – to serve content across multiple devices, screens, and browsers.
 - User experience- maintaining a satisfactory user experience throughout the website sections.
 - Accessibility – To any interested visitor in a user-friendly way across the website sections.
 - Retention- keeping visitors coming back to the website.
 - Links to relevant restricted access sites and virtual environments.
- The Visual identity for the RCGs is increasingly consolidated and visibility and understanding of the work by the RCGs is enhanced for the relevant stakeholder groups.
- A regularly updated Stakeholders' database improves the communication function among the RCGs' experts and the stakeholders' community.
- Internal communication protocols and help-desk in place makes it easier for any new comer to efficiently join, adopt responsibilities, and contribute to the RCGs objectives and work commitments.

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

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

During 2023 the RCGs Secretariat services and tools were financed by a short-term/low value contract by the individual Member States (23 out of 26 MS) together with a European Commission service contract running from the end of August 2023 to end of February 2024. These contracts enabled the full-scale operation of the RCGs Secretariat along the year (from March 2023 until Feb 2024). The pan regional ISSG National Correspondents continued the discussions on how to implement the long-term stabilization of the services and tools and ran several consultations with the MS. A main conclusion from these, is the fact that the administrative procedures at national level are a continuous and complex constraint for some of the MS. Further discussions on the long-term funding scenarios are planned during 2024. The objective is to develop and implement the long-term funding solution for the RCGs Secretariat and the tools, while simultaneously, a suitable approach needs to be found to keep the services and tools working continuously to guarantee the support to the RCGs and the LM.

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

Service offer for the “*Administrative support services of Regional Coordination Groups for Data Collection Activities in European Union Fisheries- Allocation for the Republic of Croatia in 2023*” was received from CETMAR on March 16th, 2023, and included the following:

1. Daily regular operations and processes related to the management of daily communication and correspondence with stakeholder, maintenance and management of records of interactions, preparation of official letters and reports, management of legal, financial and personnel obligations of the RCG Secretariat, maintenance of work tools and databases, maintenance of basic protocols and organizational procedures, communication activities and elaboration of the year-long action plan.
2. Support to RCG meetings and meetings' reporting (support in preparing, setting up, announcing and

managing technical aspects of meetings and reporting).

3. Support intersessional activity (organization and monitoring of work, administrative support for designing and launching new initiatives of the RCG network).

The order form for the service in 2023 was issued to CETMAR by MA-DoF in July 2023.

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

Not applicable.

SECTION 2: BIOLOGICAL DATA

Text Box 2.1: List of required species/stocks

(Region/RFMO/RFO/IO: Mediterranean Sea and Black Sea/GFCM)

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

Deviations from the work plan

List the deviations (if any) in the achieved data collection (lengths only) compared to what was planned. The general reasons for deviations from the work plan in terms of planned vs. achieved data collection should be summarised in this section, while detailed comments on deviations on particular species/stocks should be included in the 'AR comments' column in Table 2.1.

Atherina sp. was not sampled due to the legal restriction for the fishing gear to be near the coast. Mugilidae and *Sarpa salpa* was undersampled due to the low catches with sampled gears.

Trachurus sp. and *Scomber colias* were sampled through PS srdelara as bycatch species as there was no sampling with PS lokardara and was undersampled in the 2023.

Sardinia pilchardus and *Engraulis encrasicolus* were oversampled without any additional cost and was sampled during on-board sampling not on the shore (landing). *Auxis rochei* was also oversampled without additional cost.

Merluccius merluccius and *Mullus barbatus* were oversampled without any additional cost.

Solea solea was sampled according to the plan, but about half of specimens sampled for biological data originated from on-board observations and therefore this species may appear undersampled in the tables. However, since the whole catch represents a commercial and therefore a landed component, there was no undersampling.

Boops boops and *Spicara smaris* were undersampled for biological data (age, maturity, sex ratio) due to limited use of gears targeting these species (a ban on the usage of beach seines).

Anguilla anguilla was undersampled due to exceptionally poor catches of this species in the fyke nets (the period when this species appears in the catches is very short and unpredictable).

Actions to avoid deviations

Describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Atherina spp. is sampled according to national needs for the purpose of national Management plan for shore seine fishing in the Republic of Croatia - net "oližnica" and Management plan purse seine fishing in the Republic of Croatia - net "oližnica". Refers to *A. boyeri* and *A. hepsetus*.

Due to lack of fishermen activity and cooperation with them using purse seine nets and seine nets targeting this species were not sampled. Actions regarding sampling of these gears will be in line with actions as described in Text Box 2.5. In addition, an ad-hoc national research project will be introduced if needed, focusing specifically on these gears.

Purse seine net "lokardara" is no longer planned in updated WP 2022-2024. Information needed for any future evaluation of the management plan will be collected by ad-hoc research activities conducted on a national level and not included in WP for DCF.

(Region/RFMO/RFO/IO: Mediterranean Sea and Black Sea/ICCAT)

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

Deviations from the work plan

List the deviations (if any) in the achieved data collection (lengths only) compared to what was planned. The general reasons for deviations from the work plan in terms of planned vs. achieved data collection should be summarised in this section, while detailed comments on deviations on particular species/stocks should be included in the 'AR comments' column in Table 2.1.

Catches that were sampled following the annual work plan had more caught individuals of *Xiphias gladius* per catch than what was initially planned, and scientific observers were able to sample the majority of the catch which is not always the case. Since the amount of caught *Xiphias gladius* with this gear is unpredictable and varies from trip to trip this kind of deviation is common and it does not affect the financial plan since the total number of sampling trips is planned and accounted for while the number of the individuals sampled varies from catch to catch.

Actions to avoid deviations

Describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Deviations did not have a negative effect; therefore, no actions are needed.

Text Box 2.2: Planning of sampling for biological variables

(Region/RFMO/RFO/IO: Mediterranean Sea and Black Sea/GFCM)

General comment: This text box fulfils Article 5(2)(a), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Deviations from the work plan

List the deviations (if any) in the achieved collection of biological data (other than lengths), compared to what was planned.

The general reasons for deviations from the work plan in terms of planned vs. achieved data collection should be summarised in this section, while detailed comments on deviations on particular species/stocks should be included in the 'AR comments' column in Table 2.2.

Cases of undersampling and oversampling of biological variables are described in Table 2.2. Additional comments by species are listed below.

Species_Biological parameter_Metier_MS comment:

Anguilla anguilla_Weight/Sex_FYC_CAT_Undersampled due to low number of specimens in catches. Although successful cooperation was established between fishermen and scientific observers for fyke net sampling, in the period when work with this fishing gear was allowed (winter period), the eel catch was very small to none, and it was impossible to collect the planned number of specimens. Regardless of this, the data collected were used for the purpose of developing an eel management plan in the Republic of Croatia.

Atherina spp._Weight_Purse seine net "oližnica" & Seine net "oližnica"_Sampling was not sampled due to the legal restriction for the fishing gear to be near the coast.

Sarpa salpa_Sex/Age/Maturity_PS_MPD_"CIPLARA"_Sampling was not successful due to the lack of cooperation with fisherman using purse seine net "ciplara"

Boops boops_Sex/Maturity_Beach seine nets "migavica" and "girarica"_Undersampled due to very limited use of the gear by fishermen (somewhat compensated through onboard sampling).

Spicara smaris_Sex/Age/Maturity_Beach seine nets "migavica" and "girarica"_Undersampled due to very limited use of the gear by fishermen (somewhat compensated through onboard sampling).

Trachurus sp._Weight/Sex/Maturity/Age_PS srdelara_PS lokardara was not sampled and low number of the species was found in the PS srdelara as bycatch species. Fishing activity of fisherman using lokardara

fishing gear was significantly limited in 2023 to certain areas and time periods, and it was not possible to carry out sampling.

Scomber colias_Weight/Sex/Maturity/Age_PS srdelara_PS lokardara was not sampled and low number of the species was found in the PS srdelara as bycatch species. Fishing activity of fisherman using lokardara fishing gear was significantly limited in 2023 to certain areas and time periods, and it was not possible to carry out sampling.

Mugilidae_Sex/Age/Maturity_PS_MPD_"CIPLARA"_Sampling was not successful due to the lack of cooperation with fisherman using purse seine net "ciplara".

Actions to avoid deviations.

Describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

For *Engraulis encrasicolus* and *Sardina pilchardus* deviations did not have a negative affect since sampling was achieved at-sea instead on-shore.

Issue with *Boops boops* and *Spicara smaris* will heavily depend on the usage of beach seines which currently have significant temporal and spatial restrictions which also does not allow for proper sampling. Catches of *Anguilla anguilla* are very variable and majority of the catch occurs in just a few days. Therefore, timing of the sampling is essential and can be improved by better cooperation with the fishermen.

For *Solea solea* more specimens were collected at-sea, so undresampling at-shore did not have a negative effect. Actions as described in Text Box 2.5. are relevant for *Auxis rochei*, *Atherina* spp., *Scomber colias*, *Trachurus mediterraneus*, *Trachurus trachurus*, Mugilidae and *Sarpa salpa*.

(Region/RFMO/RFO/IO: Mediterranean Sea and Black Sea / ICCAT)

General comment: This text box fulfils Article 5(2)(a), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 2.1(a) of the EU MAP Delegated Decision annex. This text box applies to the annual report and complements Table 2.2.

Deviations from the work plan

List the deviations (if any) in the achieved collection of biological data (other than lengths), compared to what was planned.

The general reasons for deviations from the work plan in terms of planned vs. achieved data collection should be summarised in this section, while detailed comments on deviations on particular species/stocks should be included in the 'AR comments' column in Table 2.2.

Catches that were sampled following the annual work plan had more caught individuals of *Xiphias gladius* per catch than what was initially planned, and scientific observers were able to weight and take the spine sample for the age determination from the majority of the catch which is not always the case. Since the amount of caught *Xiphias gladius* with this gear is unpredictable and varies from trip to trip this kind of deviation is common and it does not affect the financial plan since the total number of sampling trips is planned and accounted for while the number of the individuals sampled varies from catch to catch. The undersampling of the sex determination is due to the practice of fishermen to gut and clean the swordfish on sea, immediately upon pulling the longline and the catch on board which makes it impossible to determine the sex when sampling on the landing site unless fishermen agree to leave some catch whole which happens only in rare occasions. However, the planned number of samples was fulfilled by the samplings done on the sea.

Actions to avoid deviations.

Describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Deviations did not have a negative effect; therefore, no actions are needed.

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.

European eel / Inland waters

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

Method selected for collecting data.

It is planned to collect biological variables from two sources, commercial fisheries (fishery dependant data) and scientific surveys (fishery independent data).

Fishery dependent data collection

Collection of fishery dependent data is carried out annually by on-site sampling for the following biological variables: length, weight, sex ratio and age. In addition, data on the fishing gear (number, technical characteristics), fishing effort (catch per unit effort, number of fishing licences for economic exploitation of eel), fishing capacity (number of business entities, vessels and fishers who exploit eel) as well as quantitative composition of catches (target species, by-catch and discarded catch). Monitoring of commercial fishery is carried out by the Institute of Oceanography and Fisheries in the area of Neretva river delta for metiere FYC_CAT (Table 2.5) as Croatia considers this area as marine area in line with the Marine Fisheries Act (OG 62/17, 130/17, 14/19). The data collection will be carried out by IOF scientific observers for the permanent stock (yellow eel) and migratory silver eel.

Fishery independent data collection

Fishery independent on-site sampling of biological variables according to Table 2.3 will be carried out in defined areas of river basins, which also include transitional waters starting from 2023.

In general, the collection of fishery independent data in Croatia is currently carried out as part of the Fish stock monitoring program in freshwater fisheries, in accordance with the Croatian Freshwater Fisheries Act (OG 63/19) and relevant national ordinance (OG 79/20). The methodology of sampling and processing of biological data on ichthyofauna includes:

- Number and type of fishing gears as well as time and fishing areas,
- Fish sampling using electrofishing, traps and other gears,
- Sampling and processing of the collected data, as well as the estimation of the biomass of ichthyofauna which is performed according to EU standards (EN 14962, 14011 and 14757) and EIFAAC methods in fisheries, and
- Calculation of Shannon's index of ichthyofauna diversity.

Areas of implementation of the Fish stock monitoring program in freshwater fisheries include the Drava-Dunav fishing area, Sava fishing area, Kupa fishing area (rivers and catchments of the Black Sea Basin), Lika fishing area and Adriatic fishing area (rivers and catchments of the Adriatic Sea Basin). Although the current Fish stock monitoring program in freshwater fisheries includes the collection of data on European eel, monitoring of eel in inland waters has not previously been conducted as a targeted sampling activity aimed at providing relevant scientific advice for the purpose of national management plan in accordance with Council Regulation (EC) No 1100/2007 establishing measures for the recovery of the stock of European eel.

After reviewing the available data in 2022 collected through the Fish stock monitoring program in freshwater fisheries from 2005 to 2022, as well as other national projects and available information from scientific publications, it was determined that European eel does not naturally inhabit the Croatian waterways belonging to the Black Sea Basin. In addition, although historically European eel inhabited the Lika fishing area, data shows the absence of the species in this area. Therefore, starting from 2023, a targeted scientific monitoring program of collection biological data specific for European eel is planned on an annual basis for a

period of three consecutive years in the Adriatic Sea Basin (including rivers Mirna, Raša, Zrmanja, Krka, Cetina, and Neretva) (Table 2.3). It is planned to collect group and individual biological data (length, weight, sex ratio and age) according to different life stages (glass, yellow and silver eel) on two locations per river/water body, except on river Neretva, where sampling will be conducted on three locations. On-site sampling for biological data on each location is planned to be carried out four times per year (i.e. seasonally) by electrofishing. Additionally, fyke nets may be used as a complementary sampling method.

More information on sampling design is provided in Table 2.3.

Were the planned numbers achieved? Yes/ No

Yes

If the answer is No, explain why not, and what measures were taken to avoid non-conformity.

Not applicable.

Text Box 2.4: Recreational Fisheries

(Region: Mediterranean Sea and Black Sea)

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

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

HRV REC FISH Survey

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 daily, weekly, monthly or annual licenses. 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 Ministry of Agriculture (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 MA-DOF. Approximately 75 000 licenses are issued yearly. Of these, approx. 45 000 are annual recreational/sportive licenses while approx. 30 000 are daily, weekly or monthly licenses.

Currently, there is no obligation for recreational and sports fishers in Croatia to report their catches nor any other data in relation to fishing. 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 MA-DoF and IOF.

Starting from 2022, a systematic monitoring of recreational and sports fisheries in Croatia is envisaged, with the gradual introduction of new elements including electronic system of data collection in the following years which implies the amendment of the national legal framework.

In the present study, four main objectives are determined: (1) to collect all information about recreational and sport fishing (license type, duration, number issued), (2) design and implement survey for 2022-2024, (3) analysis of collected data and comparison with catches in commercial fisheries (4) create an application for long-term monitoring and design of specific electronic application for data collection and database.

Survey is divided into four modules:

Module 1 - general data collection on recreational and sport fishing (license type, duration, number issued) to be carried out in 2022 and first half of 2023. Legislative and literature review of recreational and sport fishing license system and existing regulations will be conducted in depth. Educational and promotional campaign will be carried out for the purpose of informing participants in recreational and sports fisheries. Activities will be coordinated with MA-DoF, IOF and Croatian Sea Sport Fishing Association (CSSFA).

Module 2 - survey for recreational fisheries data collection will be designed by taking into consideration the recommendations and procedures proposed by the GFCM Handbook for data collection on recreational

fisheries in the Mediterranean and the Black Sea (<https://www.fao.org/gfcm/publications/series/technical-paper/669/en/>).

Simplified methodology will be carried out in 2022, and gradually coverage will be increased and methodologies improved.

The non-binding Regional Work Plan (RWP) on recreational fisheries (RFs) in the Mediterranean and Black Sea is aimed at:

- Estimating the population of recreational fishers by segment (fishing gear-technique; e.g., shore, boat, spear fishing, etc.): there is no need to estimate the population of fishers since Croatia already has licencing system in place.
- Identification of the list of priority species by sub-region: list of priority species in recreational fisheries in Croatia included in Work Plan Table 2.4 is determined according to Table 4 of the EU MAP (Eel, elasmobranchs, highly migratory ICCAT species), priority species by sub-region identified by the RCG Med&BS WKRF in 2021, species of interest determined by the GFCM SAC in 2021 and 2022, list of protected elasmobranch species on national level, and additional species important on national level determined according to scientific advice.

With the aim of facilitating aims of the RWP and the setting of minimum standards for Med&BS EU Member States, standardized protocols for performing the surveys were provided and shared by the STREAMLINE regional grant (Deliverable D2.3). The protocols are also attached here:



Streamline-proposed
offsite questionnaire.c



Streamline-proposed
onsite questionnaire.c

In 2022, a recall survey is planned taking advantage of the MA-DoF license database which will be used for a random draw of subjects to participate in the survey in 2022. 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 400 sampling units (fishers) will be sampled in the survey on a yearly basis. Non-respondents will be recorded. 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 MA-DOF. Additionally, data collected by CSSFA during sport competitions will be analysed.

In the following years, a combination of recall survey and self-sampling by the means of log-books is planned to be implemented. Both recall survey questionnaires and log-books will be designed and hosted on an on-line platform specifically designed for this purpose. Recall surveys will be aimed at the users of daily, weekly or monthly licenses since their engagement is unpredictable (licenses can be obtained throughout the year) while holders of yearly licenses will be provided with electronic identity which will enable access to the log-book. The log-book will be conceived on the basis of recommendations presented in the GFCM Handbook. Most important data will be extracted by the log-book such as general socio-economic information (age, gender, employment status) of the fisherman, fishing effort and details about the daily catches in terms of species and their weight.

Module 3 - data collection and analysis of collected data (i.e. assessment of catches in recreational and sport fishing) will be carried out for each implementation year to the extent possible and taking into account applied methodology.

Module 4 - at a later stage, MA-DoF plans to implement an official system of electronic reporting for recreational and sports fishery. Activities included in Module 4 will be aimed at the design and production of mobile application for future submission of data in recreational fisheries and sport fisheries and appropriate database, developed in cooperation with MA-DoF and IOF.

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 observer on shore by sampling every BGF competition held during the year. All of the landed LP fish during the competitions will be sampled for biological data and variables.

Data collection on the incidental catch of vulnerable species will be conducted both in HRV REC FISH and BFT BGF surveys.

Deviations from the work plan

List the deviations (if any) in the achieved data collection, compared to what was planned in the work plan and explain the reasons for the deviations.

HRV REC FISH Survey:

Funding of this activity was planned from the new European Maritime, Fisheries and Aquaculture Fund (EMFAF) given that Croatia used up all allocated EMFF funds for data collection for the period 2014-2020.

In the course of 2022, informal consultation with the Commission was initiated on the adoption of the Partnership Agreement 2021-2027 with Croatia, and during this period the documentation for the initiation of the public procurement procedure was also prepared. Given there were some delays in the consultation process for the Partnership Agreement 2021-2027 with Croatia, and consequently the Croatian EMFAF Programme, the Programme was informally agreed, including DCF financing, and officially adopted in the end of November 2022.

Following internal MA-DoF procedures, the HRV REC FISH survey underwent a public procurement process in early 2023, after which the contract was signed with the service provider (IOF) in late May 2023. Due to these circumstances, all planned activities have been adjusted. Expected duration of the HRV REC FISH survey was adapted to 26 months, 24-month period for the implementation of activities and an extra two months for reporting of final results.

Recall survey planned in 2023 for reference year 2022 was carried out successfully. For 2022, as a reference year, data collection was carried out through online survey questionnaires, with the target population being users of annual sports and recreational fishing licenses in 2022. The questionnaire contained 367 questions, which were divided into three groups depending on whether the respondent fishes from a boat, from the shore or with a speargun. Number of respondents was 889 (489 more than initially planned according to FAO methodology). In addition to data on fishing activities (effort, catch), basic socio-economic data were collected as well as data on incidental catch of vulnerable species.

Survey questionnaire for 2022 (hr):



The survey questionnaire for 2023 was adapted according to experience for 2022 reference year to enable more precise estimation of released catches and other parameters essential for the raising procedures. In the course of 2024, Croatia is developing an information system (mobile app for catch reporting, database and web interface), which will be implemented from January 2025, following legislative changes.

Sport big game fishing competitions of large pelagic fish (BFT BGF REC):

No deviations, activities were carried out as planned.

Action to avoid deviations

Describe the actions that will be considered/have been taken to avoid the deviations in the future and when these actions are expected to produce results.

Based on the recall survey for 2023, collected information will be used to more precisely re-estimate catch quantities for 2022 reference year (especially concerning data on releases of protected species). Scientific catch estimates for each reference year will be available for end-users on the national DCF web site <https://podaci.ribarstvo.hr/statistika/studije/>

Text Box 2.5: Sampling plan description for biological data

(Region/RFMO/RFO/IO: Mediterranean Sea and Black Sea/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.

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

Additional information on sampling schemes

Member State may add specific contextual information related to a region and the implementation year(s), for instance highlighting new developments not yet detailed in the quality document, regional adaptation and/or perspectives for the future. Insert the information under the same sampling scheme identifier as in Table 2.5.

For Croatia, under sampling schemes type is noted commercial fishing for all stated metiers. 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 in order 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.

In comparison to monitoring conducted in previous years, the sampling scheme for 2022-2024 was adjusted in order to increase the number of PSUs for on-board sampling by scientific observers for those metiers which have a higher risk of incidental catch of vulnerable species. In comparison to 2021, the number of planned sample units (fishing trips) for 2022-2024 has been increased by 25% in total (mostly due to increasing the number of PSU for on-board sampling by 65%). The highest increase of on-board observations is planned for metiers with higher risk of bycatch, including incidental catch of vulnerable species. More information is provided in section 4.2.

In addition to increasing PSU on shore, in the period 2023-2024 on-board sampling for commercial fisheries for key fishing gears will further increased as follows:

- for bottom trawl an increase of on board sampling from 48 to 72 trips per year,
- purse seine for small pelagic fish from 54 to 66 trips per year,
- fixed nets GNS from 18 to 24 trips per year,
- fixed net GTR from 22 to 28 trips per year.

Based on the activities performed under Task 2.1 of the STREAMLINE regional grant (MARE/2020/08), and agreement of the RCG Med&BS on the non-binding Regional Work Plan for 2023 on the collection of commercial fisheries data, Croatia amended the sampling plan for 2023-2024.

STREAMLINE Task 2.1 refined the R tools and routines (SD Tool and BioSim Tool) and performed analyses on sampling strategy optimization in four case studies identified in cooperation with the RCG Med&BS, of which two are applicable for Croatia:

GSAs	Countries	Stocks	Métiers
17-18	Croatia, Italy, Slovenia	<i>Merluccius merluccius</i> , <i>Mullus barbatus</i> , <i>Nephrops norvegicus</i> , <i>Parapenaeus longirostris</i> , <i>Solea solea</i>	OTB_DES, FPO, TBB, GNS, GTR, LLS
17-18	Croatia, Italy, Slovenia	<i>Engraulis encrasicolus</i> , <i>Sardina pilchardus</i>	PTM, PS

The analyses on the four case studies were performed by STREAMLINE grant taking advantage from the data sent by all the Med&BS EU Member States through the Data Call launched by STREAMLINE in 2021. The results obtained by Task 2.1 are presented in the attached document (Task_2_1_Summary_results.docx):



Task_2_1_Summary_results.docx

Results of Task 2.1 are considered as preliminary, and further work will be performed in the future by the RCG Med&BS scientific network to better refine the analyses and propose future sampling plans based on an optimized sampling strategy for the period 2025-2027.

However, Croatia incorporated the proposed improvements, in line with sampling optimization carried out under STREAMLINE regional grant, into the sampling plan for 2023-2024 in order to improve sampling design. In addition, improvements of sampling plan were made with the aim of reaching minimum coverage of fishing effort (0.5% target suggested in the FAO-GFCM Handbook 2019 for GFCM metiers, and 5% for ICCAT metiers) by scientific observers.

Additional description on sampling frames

Member State may add complementary description to what includes the 'Sampling frame description' column of Table 2.5. Insert the information under the same identifier and name as in columns 'Sampling frame identifier' and 'Sampling frame description' of Table 2.5, and in the same order (Sampling frame identifier + Sampling frame description).

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).

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. The main target species of metier PS "srdelara" are sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*), this gear is managed under GFCM MAP.

Several other metiers were selected for sampling in previous period based on the Management plans such as the purse seine called "igličara" with the main target species *Belone belone*, PS "oližnica" that targets *Atherina* spp. PS "ciplara" that targets the Mugilidae species, PS "lokardara" whose main target species is *Scomber colias*. PS "palamidara" targets the LPF *Sarda sarda*. This fishery is carried out in inner seas and territorial waters mostly on a seasonal basis. All of the mentioned metiers will be sampled in the period 2023-2024 as well, except for PS "lokardara" which had very low activity in previous years leading to difficulties in sampling. In case it will be needed for the evaluation of effects of national management plan, this gear will be sampled at a later stage in the framework of other national projects.

Purse seine "srdelara": PS_SPF "SRDELARA" Sampling for purse seine for small pelagic fish species is planned to be conducted in 6 most important (in amount of landings) fishing zones in 9 months (three month in year are with fishing ban for this fishing gear) (66 on board), and once in quarter in each of four marine districts on landing place (16 samplings).

Purse seine "oližnica": PS_SPF "OLIŽNICA" Sampling will be carried out on landing place 4 times a year (once in the quarter). There will be no on-board sampling.

Purse seine "igličara": PS_SPF "IGLIČARA" Sampling will be done on the landing place 4 times a year

(once in the quarter).

Purse seine “lokardara”; PS_SPF_“LOKARDARA” is not planned for sampling in the period 2023-2024 as this gear is almost never used and in recent years planned sample units could not be achieved due to unavailability of fisherman.

Purse seine “palamidara”: PS_LPF_“PALAMIDARA” Sampling is planned to be twice in the quarter in the landing place (in total 8 samplings).

Purse seine “ciplara”: PS_MPD_“CIPLARA” With this fishing gear sampling will be done twice a year on board of the vessel (2 samplings), and each quarter once on the landing place (4 times).

Demersal bottom 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.

Dredges: DRB_MOL_“RAMPON”

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. Beam trawl catch contributes relatively little to total production in Croatia (<1%), it is important in the northern Adriatic (Croatia) area wherein 116 vessels have a licence for this type of fishing. Among active vessels in 2019, the majority of 91 % belong to the smaller vessels, smaller than 15.

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 in order to achieve optimum quarterly distribution of data.

Fixed nets: GNS/GTR 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 “bukvara” which are similar but of different mesh sizes. Overall, catches are dominated by hake (*Merluccius merluccius*), bogue (*Boops boops*), horse mackerel (*Trachurus* spp.), picarel (*Spicara maena*), dogfish (*Mustelus mustelus* and *Squalus acanthias*) and mullets (*Mullus* spp.). 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, scorpion fish, hake, dogfish, and sparids, but the main target species is European hake. The trammel net “sipara” mainly targets the common cuttlefish (*Sepia officinalis*).

Trammel nets: GTR metiers

GTR_DEF_“LISTARICA”: Trammel nets “LISTARICA” will be sampled during the entire year - 12 times on-board and 12 times at landing places.

GTR_DEF_“POPONICA”: Trammel nets “POPONICA” will be sampled depending on the season when the gear is allowed to be used. Sampling will be carried out 10 times on board and 10 times at landing places.

GTR_DEF_“SIPARA”: Trammel nets “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 6 times at landing places.

Gillnets: GNS metiers

GNS_DEF_"POLANDARA": Gillnets "POLANDARA" will be sampled during the entire year 4 times on-board and 8 times at landing places.

GNS_DEF_"PROSTICA": Gillnets "PROSTICA" will be sampled during the entire year 10 times on-board and 16 times at landing places.

GNS_DEF_"PSARA": Gillnets "PSARA" will be sampled during the entire year 10 times on-board and 10 times at landing places.

Seine nets: SB-SV metiers

Beach and boat seines for demersal species is also a grouping of various traditional beach seine gears in use in small-scale fisheries. However, the type called "migavica" dominates with a varied catch composition dominated by picarel (*Spicara* spp.) and including bogue, horse mackerel, red mullet, and various sparids. The remaining beach seines listed per share in the effort are "girarica" with the main target species *Spicara smaris*, "šabakun" is another type of seine net that is targeting the large fish (*Seriola dumerilii*, *Sarda sarda* etc.). This fishery is carried out predominantly in the inner seas.

SB_SV_DEF_"GIRARICA": Seine nets "GIRARICA" will be sampled depending on the season when the gear is allowed to be used. Sampling will be carried out 5 times on board and 8 times at landing places.

SB_SV_DEF_"MIGAVICA": Seine nets "MIGAVICA" will be sampled depending on the season when the gear is allowed to be used. Sampling will be carried out 5 times on board and 10 times at landing places.

SB_SV_DEF_"ŠABAKUN": Seine nets "ŠABAKUN" is not planned for sampling in the period 2023-2024 as since October 2021 there is a ban on the use of seine net "šabakun".

Set longlines: LLS_DEF

This metier consists mostly of small scale fishery vessels that usually operate both in inner and open waters. The main target assemblages are demersal species such as *Merluccius merluccius*, *Trigla lucerna* and *Scophthalmus rhombus*.

Set longlines will be sampled during the entire year 20 times on landing places.

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 12 times at landing places targeting catches of *Nephrops norvegicus*, *Homarus gammarus* and *Palinurus elephas*.

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 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 the 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 MA-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.

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

Population out of sampling frame

Sampling frames (metiers) presented above were selected according to metier ranking procedure performed for the reference period (2018-2020) prior to submitting the WP 2022-2024. Cumulatively they represent more than 90% of landing, value, effort and discard or were selected due to other reasons (ie. gears included in national fishing gear management plans (MP)).

The only metiers which have not been selected by ranking procedure (out of frame) and will not be sampled are the following: FYK_DEF, LHP-LHM_CEP, LHP-LHM_FIF, LLD_LPF and MISC. For these metiers there is currently no specific management need related to fishing gear or target species. In addition, for the period 2023-2024 seine net “šabakun” and purse seine net “lokardara” are excluded from the sampling plan in 2023-2024 as these nets are no longer in use.

Deviations from the work plan

List deviations (if any) in the achieved data collection compared to what was planned in the work plan and explain the reasons for the deviations.

Purse seine net lokardara and oližnica were not sampled at all. Unfortunately, fishermen are not inclined to cooperate with scientists on the collection for the *Atherina* spp (oližnica) and lokardara has very limited working area and period. PS ciplara was undersampled (50%) on board - there was a problem (lack of fisherman cooperation) in boarding the fishing vessel.

OTB_DEF was undersampled (short of 14 boarding) due to bad weather and malfunction of the vessel. In some areas, fishermen are not inclined to cooperate with scientific observers due to the small vessels and lack of safe work conditions for scientific observers.

GTR_DEF_"SIPARA": 2 instead of 6 on-board observations. On-board observations are challenging in this fishery due to the utilization of very small vessels, making it challenging to accommodate scientific observers at all times.

GNS_DEF_"PROSTICA": 5 instead of 10 on-board observations. This is the most sampled type of gill-net and due to the small vessels utilized in this fishery, it is highly susceptible to local weather fluctuations, making boarding the vessels challenging in certain periods.

SB_SV_DEF_"GIRARICA" and SB_SV_DEF_"MIGAVICA" was sampled or undersampled (10 instead of 15 observations), respectively. There was a lack of fishing activity with these gears due to the ban on the fishing activity with these gears.

Fyke nets for eel: FYK_CAT – beside the collection of biological variables, characteristics of the fishing gear, fishing effort and qualitative and quantitative composition of catches, during the field sampling of European eel, a screening for parasitic nematode worm *Anguillicoloides crassus* was carried out. This was conducted with the aim of determining the health status of eel in the study area (Neretva River Delta).

Actions to avoid deviations

Describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

In 2023, Croatia adopted the Ordinance on conditions and working methods of authorized observers in fisheries ([OG 52/2023](#)). With the aim of promoting cooperation with fisherman to participate in the scientific monitoring programme, the Ordinance contains a provision on the publication of an annual list of fishing vessels that are prioritized to participate in the scientific monitoring, based on the catch in the previous year and authorizations issued for particular fishing gears, and in accordance with the sampling plan for individual fishing zones of the Republic of Croatia established by IOF.

Immediately after the adoption of the Ordinance, MA-DoF published the [list of vessels for scientific monitoring](#) for 2023, including also an [information leaflet](#). Although IOF had established a cooperation with a group of fishers prior to the publication of the list of vessels, the aim of the list of vessels was to increase the number of fishers participating in monitoring, taking also into account that they are not compensated in any

way.

Continuing on these activities, [list of vessels for scientific monitoring](#) for 2024 was published in the beginning of 2024. In addition, the Ministry of Agriculture printed and distributed [information leaflets](#) while the Institute of Oceanography and Fisheries distributed the promotional materials among fisherman with the main aim of educating fisherman and increasing cooperation.

At the beginning of 2024, the Ministry of Agriculture conducted a survey of fishermen's engagement with scientific observers and an analysis of the entry of new fishing vessels into scientific monitoring after the entry into force of the new Ordinance and the introduction of the list of vessels. In total, 52 new vessels were introduced into scientific monitoring in 2023 after the adoption of the new Ordinance in May 2023.

Result of these combined activities is an increase of up to 40% in the number of fishing vessels actively participating in scientific which has the effect of reducing the bias and higher quality of collected data.

Although increased cooperation is evident, more effort is needed to tackle specific fishing gears with smaller population of vessels. With the aim of resolving remaining issues, in the course of 2024, the Ministry of Agriculture will officially contact individual vessel owners, which have thus far not cooperated with IOF.

Further educational activities are planned during 2024.

(Region: Mediterranean Sea and Black Sea/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.

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

Additional information on sampling schemes

Member State may add specific contextual information related to a region and the implementation year(s), for instance highlighting new developments not yet detailed in the quality document, regional adaptation and/or perspectives for the future. Insert the information under the same sampling scheme identifier as in Table 2.5.

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: 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. Only a small percentage (less than 1%) of the fish is recorded as a mortality which will be sampled by IOF scientific observers on board.

LHP-LLD_SWO: This metier includes commercial catch of SWO by drifting longlines and hand and pole lines. Sampling programme will target individual quota of vessels registered 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.

LHP-LLD_BFT: Sampling programme will encompass commercial catch that is part of the TAC used by a number of registered vessels that catch BFT by drifting longlines 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.

For all the above mentioned metiers minimum number of 100 samples of BFT and minimum of 30 samples of swordfish is planned to be collected as indicated in Table 2.2.

Additional information on sampling schemes

Member State may add specific contextual information related to a region and the implementation year(s), for instance highlighting new developments not yet detailed in the quality document, regional adaptation and/or perspectives for the future. Insert the information under the same sampling scheme identifier as in Table 2.5.

NA.

Additional description on sampling frames

Member State may add complementary description to what includes the 'Sampling frame description' column of Table 2.5. Insert the information under the same identifier and name as in columns 'Sampling frame identifier' and 'Sampling frame description' of Table 2.5, and in the same order (Sampling frame identifier + Sampling frame description).

LHP-LLD_SWO, LHP-LLD_BFT:

Change from the previous years is integration of different fishing gears in the same metier based on the targeted species they catch. Since most registered fishing vessels are under 15m 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 based on targeted species should provide better results. This includes incorporating drifting longlines and hand and pole lines in the same metier, one that targets Bluefin tuna and second metier that targets swordfish.

Population out of sampling frame

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

Deviations from the work plan

List deviations (if any) in the achieved data collection compared to what was planned in the work plan and explain the reasons for the deviations.

LHP-LLD_BFT Catches (All fractions): There were less onboard samplings than it was planned. With the ongoing inflation and rising fuel price the cost of a single fishing trip has greatly increased for fishermen, and they started practising multiple days at sea instead of one day as was usual in the previous years. As all the fishing vessels are under 15 metres and they cannot accommodate additional people except the fishing crew it is not possible for a scientific observer to perform onboard sampling most of the time. Attempts were made to arrange onboard sampling for one day fishing trips, however due to bad weather conditions, issues with the fish distributions and constant change of fishermen's plans those attempts ended up unsuccessful and it was only possible to sample the current catch at landing.

LHP-LLD_SWO Catches (All fractions): There were less onboard samplings than it was planned. With the ongoing inflation and rising fuel price the cost of a single fishing trip has greatly increased for fishermen, and they started practising multiple days at sea instead of one day as was usual in the previous years. As all the fishing vessels are under 15 metres and they cannot accommodate additional people except the fishing crew it is not possible for a scientific observer to perform onboard sampling most of the time. Attempts were made to arrange onboard sampling for 1 day fishing trips, however due to bad weather conditions and constant accommodations in fishermen plans those attempts ended up unsuccessful.

While the sampling on sea was unsuccessful, additional sampling on landing was made to cover this. Furthermore, during the days when the landing sampling was made by observers more than one fisherman had their catches landed and due to the good communication, it was possible to make multiple samplings per day which resulted in their higher number than planned while maintaining the financial plan.

Actions to avoid deviations

Describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Constant communication with the fishermen is essential to arrange onboard sampling for the one-day long fishing trips as they happen since the multiple day fishing trip practice will continue as the economic situation is still serious. Furthermore, where the planned trips are not achieved according to schedule, additional landing samplings will be made to cover the planned total number of PSU sampling and/or number of individuals that are designed to be sampled.

Text Box 2.6: Research surveys at sea

(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.

1. Objectives of the survey

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. 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 scrutinization, 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.medias-project.eu/medias/website/handbooks-menu.html>, and it contains a graphical map of the surveys.

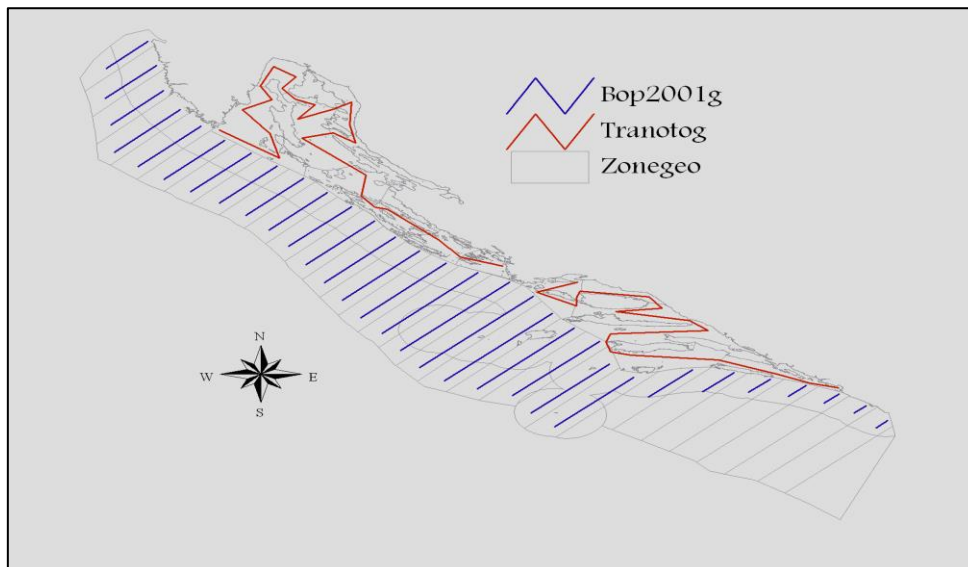


Figure 1. Map of acoustic survey in eastern part of GSA 17 during MEDIAS-DCF survey. Blue transects in the open sea and red transects in inner sea.



Figure 2. Example of spatial position of the CTD stations at which the measurements were made during the echo-monitoring DCF MEDIAS. The number and positions of stations can vary from year to year. Source: <http://jadran.izor.hr/roscop/>.

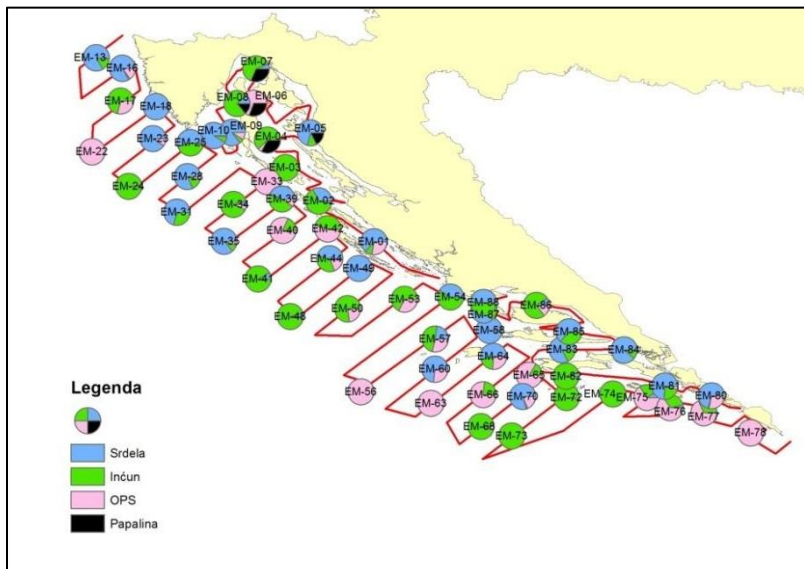


Figure 3. Example of spatial distribution of sampling and composition of catches achieved with the pelagic trawl along acoustic transects (green - anchovy, blue - sardine, black - sprat, and pink - OPS). The number and positions of stations can vary from year to year.

Survey protocol is available at the national DCF webpage:

<https://podaci.ribarstvo.hr/files/MEDIASHandbookApril2021.pdf>

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

Croatia is participating in MEDIAS by conducting an acoustic survey in the eastern part of GSA 17 area (Adriatic Sea), covering an area of 13,578 Nm². International MEDIAS Steering Committee is in charge of surveys planning.

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

<http://acta.izor.hr/wp/istrazivacki-brodovi/bios-dva/>

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

Not applicable.

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

Provide a link to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group, etc.). For surveys that are not internationally coordinated, refer to any status report (e.g. Cruise report).

Meeting of MEDIAS (MEDiteranean International Acoustic Surveys) Steering Committee was held in Palermo, Italy, while participation was possible both in person and through Zoom. Meeting was held from 9th to 11th of April 2024. It was chaired by Tarek Hattab (IFREMER). Meeting report is available at <http://www.medias-project.eu/medias/website/meetingrep.html>

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

If presenting maps of the achieved research survey stations is necessary, provide them as an annex. Refer clearly to the annex and map numbers.

Results of the survey are used in international context (GFCM and STECF) as contribution to analytical stock assessments of anchovy and sardine in the Adriatic Sea. Results are used for assessment tuning purposes.

7. Extended comments

Extended AR comments can be placed under this section.

Oceanographic data (CTD) currently are not used for advice but are potentially useful if could be related to recruitment index. These data are currently used to calculate sound speed as an input parameter for the echo sounder and to describe oceanography of the area surveyed.

(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.

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 (Figure 1). 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 sub-sample of the catch. This sub-sample should be not less than 100 individuals.

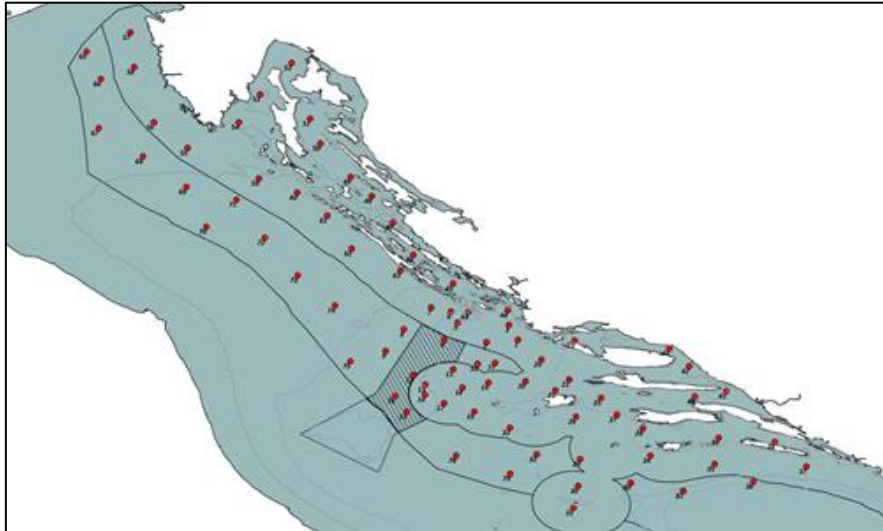


Figure 4. Map of sampling positions during the MEDITS survey in GSA 17 (Eastern side).

Survey protocol is available at the national DCF webpage:

https://podaci.ribarstvo.hr/files/Medits_Handbook_2017_version_9.pdf

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

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. MEDITS Working Group is in charge of survey planning.

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

<http://acta.izor.hr/wp/istrazivacki-brodovi/bios-dva/>

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

Not applicable.

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

Provide a link to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group, etc.). For surveys that are not internationally coordinated, refer to any status report (e.g. Cruise report).

Meeting of MEDITS (MEDiteranean International Bottom Trawl Surveys) Steering Committee was held in Salina, Malta, while participation was possible in person. Meeting was held from 03 to 04 April 2024. Meeting report is not available online.

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

If presenting maps of the achieved research survey stations is necessary, provide them as an annex. Refer clearly to the annex and map numbers.

Results of the survey are used in international context (GFCM and STECF) as contribution to analytical stock assessments of demersal species in the Adriatic Sea, for assessment tuning purposes.

7. Extended comments

Extended AR comments can be placed under this section.

Not relevant.

(Research survey: Adriatic Rapido 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.

1. Objectives of the survey

Solea solea is an important resource in the GFCM area. About 22% of the GFCM landings of soles come from the Adriatic Sea. In the GSA17 soles are targeted by “rapido” trawl and set nets by around 500 vessels, for a total of 1,600 fishermen and an annual value of landings of around 40 million Euros.

The main survey objectives are:

- Assessing abundance, distribution in GSA17 of sole and other important demersal resources by surveys with “rapido” gears suitable to seize flatfish and other benthic animals.
- Pursuing the studies on the ecosystem impact of the “rapido” trawl fishery.
- Contribution 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 Marine Strategy Framework Directive - MSFD (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 will cover the sole presence within the GSA 17 that, according to the genetic information, pertains as a single stock (Figure 5). The survey is planned to be conducted in the autumn period (October - December). All this holds also for benthic fish and shellfish of commercial interest, including rays and other selachians, since the EU greatly focuses on such vulnerable resources. Since 2005 the same gear and protocol has been used. The gear was a modified beam trawl named as “rapido” trawl. The gear was appositely planned to be fished on different types of bottom. 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.

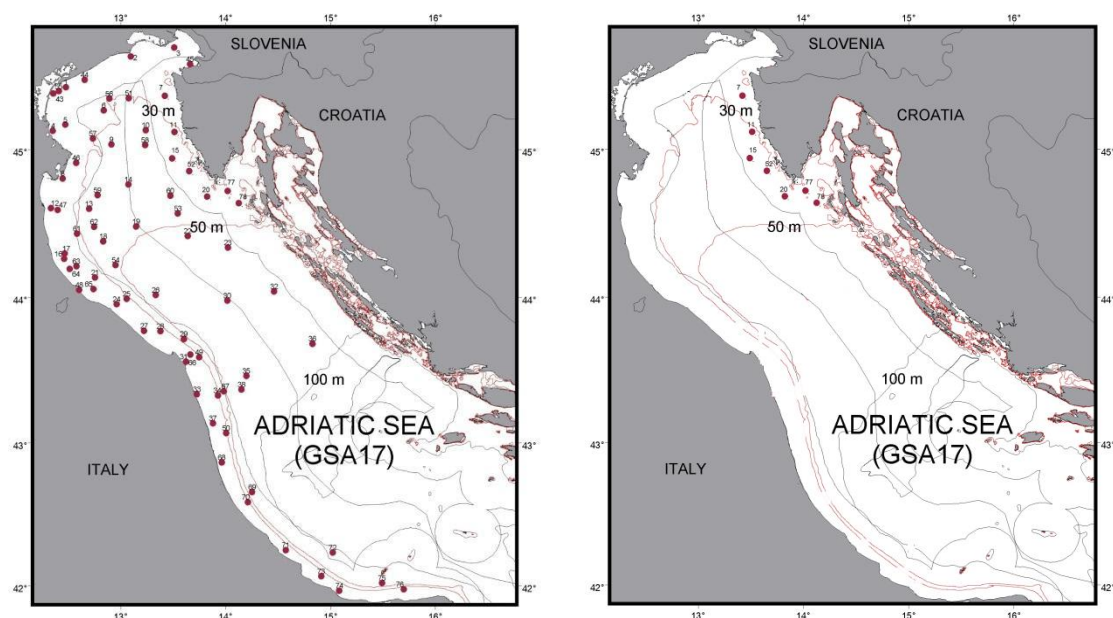


Figure 5. (left) Map of SOLEMON hauls in the Adriatic, GSA 17 (74 hauls). Borders between MS are indicative and without prejudice to territorial boundaries.

Figure 6. (right) Croatian hauls in the Adriatic Sea, GSA 17 (7 hauls).

Survey protocol is available at the national DCF webpage:

https://podaci.ribarstvo.hr/files/SOLEMON-Handbook_2019_Ver_4.pdf

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

Data will be shared in working groups both at EU (STECF and ICES) and Mediterranean level (FAO-GFCM), and with all Member States of AdriaMed through common database AtrIS.

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

Not applicable.

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

Provide a link to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group, etc.). For surveys that are not internationally coordinated, refer to any status report (e.g. Cruise report).

Not applicable.

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

If presenting maps of the achieved research survey stations is necessary, provide them as an annex. Refer clearly to the annex and map numbers.

Results of the survey are used in international context (GFCM and STECF) as contribution to analytical stock assessments of demersal species in the Adriatic Sea, for assessment tuning purposes.

7. Extended comments

Extended AR comments can be placed under this section.

Not relevant.

SECTION 3: FISHING ACTIVITY DATA

Text Box 3.1: Fishing activity variables data collection strategy

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

Data collection in Croatia implemented according to the Control Regulation (EC) No 1224/2009 and national regulation prescribed in the Marine Fisheries Act (OG 62/17, 130/17 – Act aquaculture and 14/19) 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. Therefore, no complimentary data collection is foreseen.

Table 3.1 is provided for national purposes as an overview of data needed for DCF reporting.

Deviations from the work plan

List the changes from the work plan (if any) and explain the reasons.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid deviations in the future and

when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Not applicable.

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.

In Croatia, fisheries for European eel (*Anguilla anguilla*) is permitted both in sport and commercial fisheries.

Fishing activity variables on inland eel commercial fisheries - landings, effort and capacity data collection according to Table 6 of Commission Delegated Decision (EU) 2021/1167, including number of licences, fishing days, number of trips and landings by gear, will be collected by MA-DoF according to Articles 46 and 47 of the Croatian Freshwater Fisheries Act (OG 63/2019). Relevant national bylaws including Ordinance on sport fishing in freshwater fisheries (OG 81/2021) and the Ordinance on commercial fishing in freshwater fisheries regulate the obligation of fishermen to record and submit data on retained catches of fish via mobile application in sports and commercial fisheries.

Inland sport fisheries

Freshwater fishing right holders have an access to the database through the application, so that they can plan restocking and organization of the fish protection service and other elements of fish stock management in the fishing zone for which they obtained a fishing right. Finally, the data will be used for the needs of fisheries inspection in the supervision of the work of fishing rights holders. The retained catch of allochthonous (foreign) fish species is recorded as well, which will contribute to monitoring the incidence of catches and the expansion of the range of these species in the Republic of Croatia.

Authorized mobile data collection system m-Ribič, and an identical web application is designed so that MA-DoF and fishing right holder can have real-time data on the retained catch of the fisherman in his fishing zone so that he can plan restocking and better organize fisheries supervision. Accurate and up-to-date data are the basis for rational and sustainable management of the fish stock for the purpose of sport fishing and conservation of fish populations.

Inland commercial fisheries

Mobile and web application m-Alas has been developed in accordance with the Ordinance on commercial fishing in freshwater fisheries. Licence holder is obligated to report on retained catches (weight in kg and number by species) after returning from fishing, and immediately after sorting caught (retained) fish on board, and before disembarkation in real time. In addition to the data on retained catch, the licence holder is obliged to report relevant fishing zone where the catch was made, date, time and place of departure, date, time and place of return from fishing, fishing gear, registration number of the vessel, the make / type of propulsion machine and the power expressed in kW, and the date, time and place of landing of the retained catch. This application is important for monitoring traceability of fish in accordance with market regulations as well as food safety. Landing data by eel life stage will be derived according to monitoring data.

Deviations from the work plan

List the changes from the work plan (if any) and explain the reasons.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid deviations in the future and

when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Not applicable.

SECTION 4: IMPACT OF FISHERIES ON MARINE BIOLOGICAL RESOURCES

Text Box 4.2: Incidental catches of sensitive species

(Region/RFMO/RFO/IO: Mediterranean Sea and Black Sea/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 4.1 of the EU-MAP Delegated Decision annex. This text box complements Table 2.5.

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

Additional information on planning the observation of incidental catches of sensitive species (if already filled in in Annex 1.1, please indicate where it can be found):

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

Yes.

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

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.

Following metiers are considered to be high risk metiers according to national assessment, based on the results of monitoring in the previous period and pilot study. For all listed “high risk” metiers Croatia increased on-board sampling coverage during scientific monitoring and introduced additional sampling methods (presented in Section 4.3) in order to achieve the coverage of fishing effort by PETS observation as suggested by the GFCM methodology for data collection (FAO. 2019. *Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries*). Planned sampling coverage for most metiers considered “high risk” is over the suggested minimum coverage (0,5% of fishing effort) as presented in the tables below.

Sampling frame identifier (Metier)	PETS group	Coverage
OTB_DEF	E, T, INB	1,0%
PS_SPF_"SRDELARA"	E	0,8%
DRB_MOL_"RAMPON"	INB	1,2%
GTR_DEF	M, E, T	0,5%
GNS_DEF	M, E, T	0,7%
LLS_DEF	B, E	0,6%
LHP-LLD_BFT	B, E, T	27%
LHP-LLD_SWO	B, E, T	30%
PS_LPF_BFT	E, T	100%
BFT_BGF_REC	E	100%

PETS groups: M - marine mammals, E - elasmobranchs, T - marine turtles, B - marine birds, INB - macrobenthic invertebrates.

During the implementation of STREAMLINE regional grant a quali-quantitative approach was attempted to identify the Gears by means of the review process performed under STREAMLINE Task 2.2. However, further work is needed to better define and identify hot spot areas of interaction between fisheries and vulnerable species. The incoming ISSG on RWP that will be supporting the RCG Med&BS will represent the suitable platform to further progress towards this goal. Activities carried out in the framework of GFCM working groups

will also be followed.

- What are the methods to calculate the observation effort?

The observation effort proposed by STREMLINE regional grant is based on two scenarios aimed at achieving, in general, the 0.5% (target suggested in the FAO-GFCM Handbook 2019) and 1% coverage of the total number of PSUs performed by gear and GSA (according to FDI data 2015-2020). In some cases, lower thresholds could be, such as in the monitoring of set nets, where the number of trips expected at 1% coverage would be too high to be achieved. In contrast, higher targets (1.5%) could be fixed for some fisheries (e.g., pelagic pair trawl).

In any case, the level of monitoring will ultimately be determined by the financial and human resources available to address the task and the collaboration offered by fisheries stakeholders (FAO-GFCM Handbook 2019). In both the Mediterranean and Black Sea, attention shall be paid to the interaction between cetaceans and set nets (e.g., depredation) that could possibly lead to cases of incidental bycatch and stranding (e.g., due to ingestion of parts of the nets).

Planned sampling design/coverage is financially viable and is in line with coverage required by GFCM/ICCAT, i.e. reaches relevant targets.

PETS incidental catch observation effort is calculated taking into account the number of sampled fishing trips (landing and on-board) during which scientific observers record incidental catch of vulnerable species, including additional sampling methods presented in Section 4.3. Assessment grid by metier/ species group and calculation of sampling coverage is presented in the table below.

Table 2. Complete overview of PETS bycatch observation effort for 2023-2024

Sampling frames		Risk assessment		WP SECTIONS 2.4, 2.5, 4.2 & 4.3					Other*	Total observation effort		
Sampling frame identifier (Metier)	Effort (avg. 2018-2020)	High risk metiere	PETS group	IOF scientific observers			Experimental recording using cameras	Total PSU for PETS		Total planned sampling coverage for PETS	PETS incidental catch estimation	
				Landing	On-board	Questionnaires	Self sampling					
OTB_DEF	22.749	Yes	E, T, INB	72	72	40	40	-	224	1,0%	Yes	
PS_SPF_"SRDELARA"	16.903	Yes	E	16	66	60	-	-	142	0,8%	Yes	
DRB_MOL_"RAMPON"	2.691	Yes	INB	6	6	20	-	-	32	1,2%	Yes	
FPO_CRU	18.825	No	-	12	0	-	-	-	12	0,1%	No	
PS_MPD_"CIPLARA"	931	No	-	4	2	-	-	-	6	0,6%	No	
PS_SPF_"OLIŽNICA"	90	No	-	4	0	-	-	-	4	4,4%	No	
PS_SPF_"IGLIČARA"	111	No	-	4	0	-	-	-	4	3,6%	No	
PS_LPF_"PALAMIDARA"	556	No	-	8	0	-	-	-	8	1,4%	No	
GTR_DEF_"LISTARICA"	31.546	Yes	M, E, T	12	12	40	-	-	156	0,5%	Yes	
GTR_DEF_"POPONICA"				10	10	40	-	-			Yes	
GTR_DEF_"SIPARA"				6	6	20	-	-			Yes	
GNS_DEF_"POLANDARA"	41.735	Yes	M, E, T	8	4	60	-	-	278	0,7%	Yes	
GNS_DEF_"PROSTICA"				16	10	100	-	-			Yes	
GNS_DEF_"PSARA"				10	10	60	-	-			Yes	
SB_SV_DEF_"GIRARICA"	1.491	No	-	8	5	-	-	-	28	1,9%	No	
SB_SV_DEF_"MIGAVICA"				10	5	-	-	-			No	
LLS_DEF	10.330	Yes	B, E	20	0	40	-	-	60	0,6%	Yes	
LHP-LLD_BFT	442	Yes	B, E, T	29	6	85	-	-	120	27,1%	Yes	
LHP-LLD_SWO	291	Yes	B, E, T	19	4	65	-	-	88	30,2%	Yes	
PS_LPF_BFT	77	Yes	E, T	0	10	-	-	77	77	100,0%	Yes	
FYK_CAT	85	No	-	4	0	-	-	-	4	4,7%	No	
BFT_BGF_REC	25	Yes	E	25	0	-	-	-	25	100,0%	Yes	
Total	148.878			303	228	630	40	77	1.268	0,9%		

*Effort is presented as average fishing trips in reference period 2018-2020. PSU-planned sample unit. PETS groups: M - marine mammals, E - elasmobranchs, T - marine turtles, B - marine birds, INB - macrobenthic invertebrates. "Other" refers to Regional ICCAT observer (ROP) and national ICCAT observer).

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

Yes. For metiers listed in Table 2.5 on board sampling bycatch is recorded by scientific observers for the entire duration of the fishing trip (observation effort equals sampling effort). Additionally, a questionnaire will be developed and used in order to extract information about bycatch at landing sites. Fishermen will be asked to provide information about quantitative and qualitative structure of the bycatch as well as the faith of caught individuals. They will also be instructed to photograph bycatch for the purpose of accurate identification of species. Sampling methods are based according to GFCM protocol. The scientific observer is indicated to monitor all of the bycatches during the entire fishing trip.

RCG MED & BS 2021 Recommendation 8: Agreement on methodology for data collection on incidental catch

of vulnerable species on the following methodology:

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/>

List of national protocols:

https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf

National methodology:

https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

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

Member State may add specific contextual information related to a region and the implementation year(s), for instance highlighting new developments not yet detailed in the quality document, regional adaptation and/or perspectives for the future. Insert the information under the same sampling scheme identifier as in Table 2.5.

Sampling plan is improved for 2023-2024 according to results of STREAMLINE regional grant (non-binding RWP for 2023).

Based on the review of the available information performed under STREAMLINE Task 2.2, WP2 and WP4 identified the areas (GSAs and/or Countries) where bycatch data have been recorded and reported for different groups of vulnerable species, thus the areas most susceptible to this negative interaction.

Then, for each candidate group of vulnerable species, the draft non-binding RWP proposes, by gear and area, the numbers of primary sampling units, PSU (i.e. the fishing trip and/or the fishing day), that should be carried out to improve the current coverage. Depending on the group of vulnerable species, the gear and the reported fishing effort, and with the aim of achieving a standard coverage among different areas, two possible scenarios were presented (0.5 and 1.0% coverage).

The proposed number of observations can be achieved following different methods, not only through on-board observations, but also through questionnaires, logbook, self-reporting by fishers, etc., following the approaches and methodologies proposed by the FAO-GFCM Manual (2019) "Monitoring the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries: Methodology for data collection".

As a starting point, a preliminary list of species to be considered has also been agreed, and is based on the one provided by the FAO-GFCM Manual (2019). However, the final list of species shall be defined according to all relevant international conventions and EU regulations considered in EU MAP (e. g., Commission Delegated Decision (EU) 2021/1167).

Additional description on sampling frames

Member State may add complementary description to what includes the 'Sampling frame description' column of Table 2.5. Insert the information under the same identifier and name as in columns 'Sampling frame identifier'

and 'Sampling frame description' of Table 2.5, and in the same order (Sampling frame identifier + Sampling frame description).

Not applicable.

Please see Text Box 4.3.4 where it is explained how different methodologies will be combined to estimate rate of incidental catch in fisheries according to FAO-GFCM Manual (2019).

Results

Provide additional information, if available, in this text box. For example, summary information on the number of individuals recorded as bycaught per species, gear group and monitoring method with information about the state of the animals (i.e. were they released alive, dead, or collected for sampling).

Detailed results are not available at the time of the submission of AR 2023 on 31 May 2024. Expected data availability is June 30th, 2024, in line with planned activities (Table 1.1).

All planned activities were carried out and data is being processed at the time of the submission of AR-2023.

After finalizing the data processing in June 2024, the results will be made available to end-users (EC, GFCM, ICES). More importantly, Croatia plans to present the results on a national level to the environmental authorities, relevant NGOs, and fishing sector, as well as on the level of GFCM, at the earliest possible opportunity.

Deviations from the work plan

The Member State shall list the deviations (if any) in the achieved data collection compared to what was planned in the work plan and explain the reasons for the deviations.

Deviations are related to undersampling of relevant metiers, as explained in Text Box and Table 2.5. However, a very high overall sampling rate of fishing trips including combined PETS observation methodologies was achieved (around 90% of the planned sampling trips were realised, corresponding to over 1.000 sampling trips).

Actions to avoid deviations

The Member State shall describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Following the presentation of results in relevant national, RCG and GFCM meetings, Croatia will amend planned activities as needed. Cooperation with fisherman is expected to be improved in the future period given that as of May 2023 Croatia adopted the Ordinance on the conditions and method of work of authorized observers in fisheries (OG 52/2023). The new Ordinance is aimed at improving cooperation with fisherman to participate in the scientific monitoring programme, and it includes provisions of conduct in cases of recurrent non-cooperation.

In addition, Croatia included in the mandatory professional training of commercial fisherman a curriculum unit for nature and environment protection since 2019, with a module – Identification of vulnerable species, toolkit, and safe handling practices (Ordinance on professional training for commercial fishing, OG 11/19 and 23/22) and well as basic information on the scientific monitoring programme.

In 2023, with the support of several scientific institutions, and the environmental authority, the Directorate of Fisheries developed a national [guide for identifying and dealing with the sensitive species in sea fishing](#) as well Instructions for reporting and procedure for accidental catch of cetaceans, marine turtles, marine birds and sharks and rays. These have been printed and are distributed to fisherman, and are available online on the national DCF website and official DoF website.

(Region: Mediterranean Sea and Black Sea/ICCAT)

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

This text box is complementary to information on the sampling schemes provided in the quality document (Annex I.1). It serves to highlight information on sampling schemes and sampling frames related to incidental catches of sensitive species.

Additional information on planning the observation of incidental catches of sensitive species (if already filled

in in Annex 1.1, please indicate where it can be found):

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

Yes.

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

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.

- What are the methods to calculate the observation effort?

For BFT purse seiner there is no need to calculate the effort since there is 100% coverage of all fishing operations by ICCAT (ROP) regional observers and national ICCAT observers on BFT towing vessels that record the bycatch. For all the other fishing gears that catch highly migratory ICCAT species, including drifting longlines, bycatch is recorded by IOF scientific observers that perform sampling during the fishing trips and questionnaires on occurrence of PETS species bycatch for every landing that is sampled.

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

Yes.

ICCAT Recommendations relating to observer programmes and duties of observers.

Recommendation by ICCAT amending the recommendation 18-02 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.

RCG MED & BS 2021 Recommendation 8: Agreement on methodology for data collection on incidental catch of vulnerable species on the following methodology:

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/>

List of national protocols:

https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf

National methodology:

https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

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?

Not applicable.

- 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"?

Not applicable.

Additional information on sampling schemes

Member State may add specific contextual information related to a region and the implementation year(s), for instance highlighting new developments not yet detailed in the quality document, regional adaptation and/or

perspectives for the future. Insert the information under the same sampling scheme identifier as in Table 2.5.
Not applicable.

Additional description on sampling frames

Member State may add complementary description to what includes the 'Sampling frame description' column of Table 2.5. Insert the information under the same identifier and name as in columns 'Sampling frame identifier' and 'Sampling frame description' of Table 2.5, and in the same order (Sampling frame identifier + Sampling frame description).

Not applicable.

Results

Provide additional information, if available, in this text box. For example, summary information on the number of individuals recorded as bycaught per species, gear group and monitoring method with information about the state of the animals (i.e. were they released alive, dead, or collected for sampling).

LHP-LLD_BFT: Information on 94 bycatch observations was collected through scientific observation on-board and landing and PETS bycatch questionnaires with fishermen. Total of 13 *Prionace glauca*, 2 *Alopias vulpinus*, 1 *Mobula mobular*, 2 *Caretta caretta* were caught by hook. All of those were subsequently released alive without landing them on the fishing vessel except for one *Alopias vulpinus* which was released dead.

LHP-LLD_SWO: Information on 71 bycatch observations was collected through scientific observation on-board and landing and PETS bycatch observations on landing. There were 59 recorded catches by hook of *Prionace glauca*, 1 *Isurus oxyrinchus*, 2 *Mobula mobular* and 11 of *Caretta caretta*. All of the caught individuals were released from the hook, majority alive but with the exact state of the animal unknown due to the nature of the fishing tool.

PS_LPF_BFT: Information on bycatch observations for all fishing operations made in the year 2023 was collected through on-board observations by regional observers. There were a total of 2 *Prionace glauca* that were released from the net alive, 7 *Caretta caretta* that were released from the net alive and 2 *Caretta caretta* that were seen only in transfer video.

BFT_BGF_REC: Information on bycatch observations for all held competitions in 2023 was collected through PETS bycatch observations on landing. There were a total of 2 *Prionace glauca*, 3 *Alopias vulpinus* and 2 *Dasyatis pastinaca* caught by hook that were released alive without landing them on the fishing vessel.

Deviations from the work plan

The Member State shall list the deviations (if any) in the achieved data collection compared to what was planned in the work plan and explain the reasons for the deviations.

For LHP-LLD_BFT and LHP-LLD_SWO there were slightly less PETS bycatch observations than it was planned. These observation are made through interaction with fishermen and some of them are still wary and discreet which lowers the credibility of the observation and such results are discarded from the data collection.

Actions to avoid deviations

The Member State shall describe the actions that will be considered/have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Confidence of fishermen is slowly building up and the interrealtions are improving, additionally the discarded observations have been taken into account for future data collection. When all of this is taken into account, it is fully expected that these deviations in data collection will be corrected fully in the next year.

Text Box 4.3: Fisheries impact on marine habitats

General comment: This text box fulfils Article 5 paragraph 2(a) and 2(b), Article 6 paragraph 3(a), 3(b) and 3(c) of Regulation (EU) 2017/1004 and Chapter 2, section 4.2 of the EU MAP Delegated Decision annex. It contains information on additional studies on the fisheries impact on marine habitats.

Name of the study: Study on the impact of beach seines on *Posidonia* meadows

1. Aim of the study

Beach seines are active fishing gear that operate in extremely sensitive coastal areas where there are also sensitive habitats of *Posidonia oceanica* meadows which are known as nursery grounds and spawning area for many coastal species. *Posidonia* habitat is classified as priority habitat according to the Habitats Directive (annex 1) (Council Directive 92/43/EEC), Marine Strategy Framework Directive - MSFD (Directive 2008/56/EC) and Common Fisheries Policy (Regulation (EU) No 1380/2013) and is protected under international conventions (RAMSAR convention, Berne convention (annex 1) and Barcelona convention (annex 2)). The aim of the study is to describe the impact of beach seine on *Posidonia* meadow habitats and on coastal ichthyofaunal populations.

2. Duration of the study

Sampling is planned to be carried out in the colder part of the year, when this gear is allowed for use, from winter 2022 until spring 2023.

3. Methodology and expected outcomes of the study

Sampling is planned to be carried out at 5 different locations along the Adriatic coast. At each location, sampling is planned 3 times for a minimum of three hauls.

During the data collection, an analysis of the qualitative and quantitative composition of the catch, as well as the population structure of the target species will be performed. Also, during fishing operations, the work of the net and the impact on *Posidonia* and habitat will be recorded using scuba divers and cameras.

In this way, it will be possible to describe the composition of beach seine catches and gear's impact on *Posidonia* meadows and coastal benthic habitats and ichthyofaunal populations.

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

For the purposes of this research in 2022 and 2023, research was carried out in 4 different areas: the island of Vis, the island of Šolta, the island of Drvenik Veliki and in the area of Rogoznica and Primošten, totaling 10 field surveys. The southern part of the Adriatic is not covered in the survey, as it was planned due to the fact that shore seine fisheries stopped in that area in 2022 due to the fact that there was no longer a permitted area for work, the so-called "green dots". The composition, abundance and biomass analyses of the shore seine catches were made with special emphasis on the target species (especially *Spicara smaris*) in the area of the islands of Vis, Rogoznica and Primošten, only due to the fact that the entire area of the island of Vis is protected under Natura 2000, while the entire area around Primošten is allowed for work with shore seines and no areas under Natura 2000 to work on. In the area of the islands of Šolta and Drvenik Veliki, a total of 46 different species of fish and other organisms were found in catches, the dominant species were *S. smaris* and *Boops boops*, mostly caught at stations with high and medium fishing effort. *S. smaris* is almost entirely caught under the NATURA 2000 area, in stations overgrown with *Posidonia* meadows. Its catches at the stations under the NATURA 2000 area with low fishing effort (poorly covered by *Posidonia oceanica*) are extremely low and indicate fisher's knowledge of target species fishing grounds. *B. boops*, contrary, is noticeably fished outside the NATURA 2000 area, even in areas where fishers don't usually fish (low fishing effort). Different species show different distribution depending on the degree of protection and fishing effort, indicating that other environmental and biological factors influence the distribution of target species. The results of the statistical analysis of the target species catches under the NATURA 2000 area and outside that area do not indicate differences between the catches according to the degree of protection and fishing pressure. The areas with the lowest catches were singled out, namely in the NATURA 2000 area, where shore seine nets are not normally used (weaker overgrown of *Posidonia*, < 30%). The presence of *Posidonia oceanica* meadows was in some cases very limited, (patched) in the NATURA 2000 area, and on the other hand, dense

meadows were recorded at stations that are not under NATURA 2000 protection.

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

Achievements are in line with expected outcomes. The results indicate absence of statistical differences between the catches considering the protection level. It is clear that the target species, especially *Spicara smaris*, are mostly caught in habitats significantly covered by *Posidonia oceanica*, regardless of whether the catches are achieved within the ecological network or outside. Also, better catches of *Spicara smaris* were found in December compared to November, regardless of protection and fishing effort. As the research was done in the autumn months, there was almost no bycatch at all. The percentage of immature species was below 1%.

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

Since, from autumn 2023, fishing with shore seines stopped in Croatia, collected data will be used for future assessment of the state of the coastal fisheries resources in NATURA 2000 areas. We will be in a position to see the effect of shore seine fishing, that is, whether anything has recovered with the cessation of work with those fishing gears related to protected areas. Also, collected data and their interpretation will be used for other projects we are currently implementing in order to gain a comprehensive insight of the current state of coastal fisheries resources.

Results were presented by IOF at the national coordination meeting in February 2024.

Final study report will be made available to end-users by June 2024.

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: Monitoring of small-scale coastal fisheries impact on the composition and structure of coastal ichthyocommunities by comparing the marine protected areas and surrounding sea open to fisheries (SSCF impact)

1. Aim of the study

Coastal marine areas are strongly influenced by a number of human activities, of which fishing significantly contributes to the impoverishment and structural changes in fish communities. The conventional approach to fisheries management, which tries to control the catches primarily by prescribing the type, quantity and construction characteristics of fishing gear, has not proven to be sufficient to prevent overfishing and ensure the sustainability of resource exploitation. For this reason, marine protected areas have an increasing role and importance as a tool for the recovery and preservation of coastal ichthyocommunities.

Of all the fisheries sectors, small-scale coastal fisheries (SSCF) have historically been the most under-reported, under-monitored, and under-managed. The very characteristics of this fishery, i.e. numerous boats using diverse fishing gears, multi-species catches and extremely heterogeneous landing sites and marketing, make it also the most challenging to research and monitor. Therefore, despite its importance, the knowledge of SSCF and the extent of impacts it has on littoral ecosystems and resources is still limited. Especially there is a lack of spatial information as SSCF vessels are not subject to electronic monitoring, unlike the large-scale fisheries, preventing thus reliable and accurate assessment of the fishing effort.

An assessment of the impact of SSCF on coastal fish communities, on the one hand, and on the other hand an assessment of the role of protected marine areas for their recovery, can be obtained by analyzing the state of littoral ichthyocommunities in marine protected areas in relation to nearby unprotected marine areas, the so-called fishing sea. As the state of littoral fisheries resources is in close relation to the currently exerted fishing effort of the SSCF, it is important to collect quantitative and spatially explicit information. To overcome the challenges related to sheer magnitude of SSCF spatial distribution and consequent pragmatic and budgetary constraints, participatory approach involving fishers in data collection may be the most effective way to

improve data quality and accessibility. Through fishers participation their knowledge can be accessed to map the SSF fishing effort and provide a better understanding of spatially explicit patterns of fishing.

The purpose of the proposed study would be (i) give an overview of small-scale fisheries regulation in marine protected areas (ii) to assess the effects of protective measures for the recovery of coastal ichthyocommunities by analyzing their composition, abundance and structure directly comparing the selected marine protected areas and their surrounding areas without protection (iii) spatial representation of SSF fishing effort in and around the selected marine protected areas (iv) to establish a permanent monitoring program in order to gain insight into long-term temporal and spatial changes of coastal fish communities and the effectiveness of protected marine areas.

2. Duration of the study

Study was planned to start in 2022 however the beginning of the study was postponed to 2023 due to prolonged procurement process. Twenty-six months are planned for the current study duration, beginning in 2023, in the framework of EMFAF. The study is organised within the following 4 modules, of approximate duration of 6 months each:

Module 1 – An overview of small-scale coastal fisheries regulations in marine protected areas,

Module 2 – *In situ* assessment of the state of the coastal fisheries resources within and around the selected marine protected areas,

Module 3 – Mapping the small-scale coastal fishing effort in selected marine protected areas,

Module 4 – Final report: Monitoring the small-scale coastal fisheries impact on the composition and structure of coastal ichthyocommunities by comparing the marine protected areas and surrounding sea open to fisheries.

3. Methodology and expected outcomes of the study

In **Module 1** overview of small-scale fisheries regulation in marine protected areas will be conducted by in-depth legislative and literature review and providing a synthesis of existing regulations in the form of a report.

Based on the synthesis report of **Module 1** marine protected areas to be analysed in **Module 2** will be selected. The use of non-destructive methodologies (e.g. underwater visual census), in accordance with the preservation of natural values in protected areas, will be preferred. This module will analyze the biological responses of fish to different levels of protection by comparing the composition, abundance and structure of coastal ichthyofauna, as well as the population structure of dominant commercially exploited fish species between the selected protected marine areas and their nearby ecologically similar areas that are not protected.

Collection of relevant data on SSF, in **Module 3**, to produce fishing effort spatial representation, which will be related to the observed state of littoral resources, will be achieved through participatory approach involving local fishermen of the selected marine protected areas. The expert knowledge of the local fishers will be harnessed to gather spatially explicit information and produce cartographic outputs.

In **Module 4**, based on the data collected in the previous modules, the impact of conservation measures on the recovery of coastal fish communities will be evaluated, while the establishment of an ongoing monitoring program will provide insight into long-term temporal and spatial changes in coastal fish communities and the effectiveness of marine protected areas.

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

In 2023, Module 1 and the first half of Module 2 of the SSF Impact study were successfully completed without any deviations from the plan. As planned, the study activities began by preparing a report that provided a synopsis of the regulations of small-scale coastal fishing in marine protected areas in Croatia. Based on this overview, the report identified the most suitable areas to begin field studies to assess the impact of coastal fishing and the response of coastal fish communities to the applied conservation measures.

More specifically, the Module 1 report described the legislative framework, providing an overview of relevant laws, regulations, and international agreements that regulate fishing activities in marine protected areas. The report also provided an overview of Croatian marine protected areas, grouped according to the level of restriction on fishing activities. Taking into account the aforementioned synthesis of fishing restriction regulations and the areas where they are applied, the final part of the report identified the areas where it was

most logical to begin monitoring the effects of small-scale coastal fishing and, on the other hand, the effectiveness of their protection.

Based on the report and in collaboration with relevant ministries (Directorate of Fisheries, Ministry of Agriculture, and Ministry of Economy and Sustainable Development), it was decided that the assessment of the impacts of small-scale coastal fishing and the response of coastal fish communities to conservation measures would start in marine areas with the highest protection categories: National Parks Brijuni and Kornati, and Nature Park Telašćica.

The sampling design for the fieldwork was planned in accordance with the protection zoning schemes of each of these areas. In other words, the sampling design was structured according to the different levels of permitted fishing activities to gain insights into the status of coastal fish populations under varying intensities of coastal fishing. The sampling itself was conducted during the early fall of 2023 using a non-destructive research method called visual census. Visual census is a standardised diving method that collects data on the abundance and size composition of coastal fish species through direct underwater observation.

To ensure the representativeness of the data, spatially structured and repetitive visual censuses were performed, totaling 216 observations at Kornati, 144 at Brijuni, and 108 at Telašćica, reflecting their size and zoning. Currently, the collected data on the abundance and size composition of coastal fish species are being prepared for statistical analysis.

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

All the planned outcomes for this phase of the study implementation were achieved as described above.

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

The institute of Oceanography and Fisheries will proceed with the analysis and the interpretation of the collected data, which will by the end of July 2024 be prepared in the form of a report for the Ministry of Agriculture giving the assessment of the state of the coastal fisheries resources within and around the selected marine protected areas. Also, during 2024 information on fishing effort in and around those marine protected areas will be gathered collaborating with local fishermen in order to gain a comprehensive insight of the observed state of coastal fisheries resources.

Results were presented by IOF at the national coordination meeting in February 2024.

Final study report will be made available to end-users by June 2025.

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: Monitoring of fisheries impact on the Fishery Restricted Area (FRA) Jabuka/Pomo Pit

1. Aim of the study

Fisheries restricted area (FRA) in Jabuka Pit area has been established by GFCM in 2017 (Recommendation GFCM/41/2017/3 on the establishment of a fisheries restricted area in the Jabuka/Pomo Pit in the Adriatic Sea), and by GFCM decision FRA became an integral part of the MAP for trawling in the Adriatic Sea (Recommendation GFCM/43/2019/5 on a multiannual management plan for sustainable demersal fisheries in the Adriatic Sea (geographical sub areas 17 and 18). FRA Jabuka/Pomo Pit was permanently established according to Recommendation GFCM/44/2021/2 on the establishment of a fisheries restricted area in the Jabuka/Pomo Pit in the Adriatic Sea (geographical subarea 17), amending Recommendation GFCM/41/2017/3.

This decree completely prohibits demersal fishing in the central part of the FRA Jabuka, and two buffer zones in which trawl fishing can be performed only two days a week. In the buffer zones, fishing with set nets and

longlines is also allowed (again two days per week).

The aim of this research is to describe the effects of the establishment of FRA on renewable resources and marine ecosystems.

2. Duration of the study

01/01/2022 – 31/12/2024. Adjustments in planned activities from 2023 as specified below.

3. Methodology and expected outcomes of the study

Scientific survey is planned to be carried out twice a year in order to take into account the seasonal aspect of the state of renewable resources and marine ecosystems. Scientific survey is planned during the summer period and will be carried out through MEDITS survey and additional survey according to MEDITS protocol in the winter period. The summer aspect is performed during early summer period (June-July), and the late winter period (during February – March) at 10 stations in 2022, and at 16 stations in 2023 and 2024 located in different parts of the FRA and the surrounding sea. Sampling is performed using a scientific research vessel and the methodology prescribed for MEDITS survey (fishing gear, sampling methodology, on board analysis, laboratory analysis, etc.).

Additionally to the scientific surveys, the collected data would be analysed from several other sources:

- Data from scientific monitoring of commercial fishery
- Data on fishing effort, catch and landing
- Data from Vessel Monitoring System (VMS)
- Complementary data collected by Italian researchers (if available).

The aim of this study is to obtain a complete picture of the state of resources and marine ecosystems in the central Adriatic, as well as the effects of the establishment of FRA Jabuka/Pomo Pit.

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

Monitoring of the state of biological resources in accordance with GFCM Recommendations is carried out twice a year to consider the seasonal aspect of the state of renewable resources and marine ecosystems. Monitoring is conducted by the Institute of Oceanography and Fisheries of Split, Croatia, and the Marine Biology and Fisheries Laboratory of Fano, Italy following the MEDITS sampling protocol.

The results include data from 2000–2022 in the spring-summer period, and from 2019–2022 in the winter period.

From the Italian side, the 2023 survey has not been conducted, in both summer and winter period, therefore this data is missing from the analysis.

The data analysis has been done for determined zones that differ considering the level of protection and fishing effort, in order to better explain the impact of protection level on the recovery of biological resources.

The results of this study indicate an increase in total biomass in the investigated area. Furthermore, the increase in biomass is evident for all fish species, selachian species, and crustaceans, as for commercially most important species. A decline in biomass index was observed only for cephalopod species.

The increase in biomass is most evident in the NO – TAKE zone, as is in the eastern (Croatian) part of the Pit declining towards the western (Italian) part. This is in accordance with the degree of protection and the fishing effort that the resources are exposed to.

For European hake (*Merluccius merluccius*) the positive effect of the closure is evident, a certain decline inside the NO – TAKE zone was observed after an initial distinct increase. Simultaneous increase is evident in adjacent zones from the Croatian side which can be explained by a spillover of the population from the NO - TAKE zone to the surrounding waters.

For Deep water rose shrimp (*Parapenaeus longirostris*) a strong positive influence of the closure of the Jabuka/Pomo Pit area can be also observed. The most significant increase occurred in the NO-TAKE zone and in Croatian territorial waters.

In the case of the Norway lobster (*Nephrops norvegicus*), the positive effect of the closure is the most significant of all analysed species. Biomass indices rose from extremely low values in 2014 followed by a constant rise, especially in the NO – TAKE zone, to the end of the investigated period in 2023.

A significant increase in biomass is also observed for selachian species, especially in the NO – TAKE zone and in the Croatian part of the pits.

It is in general safe to say that the positive effects of fishery closure, especially for the key species, are most evident in the NO – TAKE zone. Also, positive increases in biomass are evident in the Croatian “buffer” zone and in Croatian territorial waters, making the spillover effect from closed area to adjacent waters evident.

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

Field sampling in the scope of this study in 2023 has been carried out as planned in the winter period from 23/03/2023 to 30/03/2023 on 18 stations following the random stratified survey design, as well as in the spring-summer period within the annual MEDITIS survey. All the expected outcomes were achieved.

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

The positive results show the justification for the establishment of the FRA, and we are of the opinion that it is an appropriate mechanism for the protection and restoration of resources, and that the example of FRA Jabuka can serve as a template for the establishment of similar measures in other areas of the Adriatic, namely Solea sanctuary and FRA area in the deep south Adriatic.

It is of the utmost importance to continue the protection regime in the Jabuka Pit, and the monitoring of the state of resources as prescribed by the GFCM Recommendations. Alongside the winter and summer monitoring of the state of resources, monitoring of fishing effort, preferably via VMS data, considering that all vessels fishing in the Jabuka pit area are obliged to be equipped with VMS. In this way, it would be made possible to also describe the changes in the fishing effort and the redistribution of the effort as an aftereffect of FRA establishment.

Results were presented by IOF at the national coordination meeting in February 2024.

Final study report of the three-year implementation of monitoring will be made available to end-users by June 2025.

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: Study on bycatch rates of vulnerable species in commercial and recreational fisheries and additional sampling of incidental catch (PETS BYC)

1. Aim of the study

The aim of the research is to collect additional information on bycatch of protected sea birds, marine mammals, marine reptiles, elasmobranchs and microbenthic invertebrates through dedicated sampling activities on the key fishing gears, to assess the main areas for vulnerable species and perform a risk assessment of the impact of fishing gears on specific groups of PETS. This activity is complementary to scientific monitoring of commercial fisheries performed according to WP Sections 2.4, 2.5 and 4.2.

2. Duration of the study

01/01/2022 – 31/12/2024. Adjustments in planned activities from 2023 as specified below.

3. Methodology and expected outcomes of the study

Croatia conducted pilot studies for the assessment of incidental catches in the period 2018-2020 in accordance with the national program for data collection following regional agreement at the level of RCG Med&BS. In 2018 pilot study was conducted for bottom trawlers, in 2019 for longlines and in 2020 for set nets (gillnets). In

2021, sampling program for assessing incidental catches of vulnerable species was extended to cover all selected metiers: PS_SPF, PS_LPF, LLD_LPF, LHP_LPF, OTB, DRB, FPO, GNS, GTR, LLS, SB_SV.

Scientific monitoring of commercial fisheries from 2022 was significantly increased to ensure minimal coverage for all high risk metiers according to FAO methodology (0,5% of fishing effort). In 2022 gathering additional information on bycatch on key fishing gears was done by dedicated scientific PETS bycatch observers (1) on board fishing vessels (in total 54 additional trips), (2) at landing sites (in total 525 questionnaires) and (3) by experimental remote electronic monitoring (self-sampling by fisherman using cameras) on limited number of bottom trawlers (80 trips).

Starting from 2023 additional activity of monitoring on-board fishing vessels by dedicated PETS observers was added to the core sampling during regular monitoring as newly employed observers were educated in 2022 to perform all sampling activities. Following the recommendations of RCG Med&BS and STREAMLINE regional grant, the number of PSUs was significantly increased which allows optimal coverage of incidental catch of PET species, in accordance with GFCM and ICCAT requirements.

In 2023 and 2024 data collection on bycatch in commercial fishery will be done by:

- (1) IOF scientific observers on board fishing vessels (228 sampling trips per year) and at landing sites (in total 303 sampling trips per year) for all sampled metiers listed in Table 2.5,
- (2) Questionnaires collected by IOF scientific observers on 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 630 questionnaires. Following number of trips per year will be covered by questionnaires and interviews: for bottom trawls (40 trips), purse seine nets “srdelara” (60 trips), dredge “rampon” (20 trips), gillnets (220 trips), trammel nets (100 trips), bottom longlines (40 trips) and vessels using hand lines and pole lines and/or drifting longlines with quota for Bluefin tuna and/or swordfish (in total 15 trips). Questionnaires are modified forms according to GFCM FAO 2019 methodology.
- (3) Self-sampling by fisherman using experimental cameras on limited number of bottom trawlers (as experimental scientific project of remote electronic monitoring). It is planned to collect data by experimentally installing cameras on commercial fishing vessels to monitor incidental catch of vulnerable species, to be operated by fishermen with the aim to record the process of finishing fishing activities (beginning with the start of hauling operation on the fishing vessel). During the implementation, test sampling with camera will be conducted on demersal trawl vessels for the 40 trips per year. Records will be downloaded monthly by IOF observers. After the analysis of effectiveness of this type of data collection a methodological approach for other high-risk gears will be considered in the following implementation period.
- (4) Collecting and analysing data from scientific surveys (MEDITS, MEDIAS, SOLEMON).
- (5) Collecting and analysing data from other official data sources including Ministry of Agriculture, Directorate of Fisheries - MA-DoF (logbooks, fishing reports), Ministry of Economy and Sustainable Development - MINGOR (strandings and national alert system for injuries of marine mammals and marine turtles), as well as ICCAT observer reports from regional observers on PS BFT vessels (ROP) and national observers deployed on BFT towing vessels provided by MA-DoF.

Complete overview of PETS incidental catch observation effort carried out according to WP Section 2.5 and additional methodologies included in this study is provided in Section 4.2 (Table 2).

National estimation on the reliability of data sources used for estimation of incidental catch in commercial fisheries:

	Source of data	Fishing gears/group of vessels	Group of species	Coverage of fishing effort	Reliability	Used in bycatch rate estimation
MA-DoF	Logbook	Vessels >10 m LoA	All	100%	Medium	Yes
	Fishing report	Vessels <10 m LoA	All	100%	Low	Yes
	Regional ICCAT observer reports	Purse seine for BFT	All	100%	Very high	Yes
	Nacional ICCAT observer reports	BFT towing vessels	All	100%	Very high	Yes
IOF	National scientific observers	High risk gears	All	0,5% - 20%	Very high	Yes
		Low risk gears	All	0,2% - 0,5%	Very high	No
	Scientific survey	Fishery independent	All	Not applicable	Very high	No
	Experimental cameras	Bottom trawlers	All	0,30%	High	Yes
MINGOR	Stranding data and alert system	Fishery independent	Marine mammals, Marine turtles	Not applicable	Medium to low	No

In 2023 and 2024 data collection on bycatch in recreational fishery will be done by:

- (1) IOF scientific observers during big game fishing competitions in sports fishery
- (2) Analysis of information collected through the national survey on recreational fishery (HRV REC FISH, Section 2.4).

For the purpose of assessing bycatch rates and number of bycaught individuals IOF will establish a PETS bycatch database.

Expected outcomes

Study is aimed at increasing sampling coverage (observation effort of incidental catch of vulnerable species) by introducing additional methodologies - experimental remote electronic monitoring and questionnaires, and at collecting and analysing data which originates from all other official data sources (IOF, MA-DoF and MINGOR).

Results of this research will enable a more precise estimate of incidental catch of vulnerable species in commercial/recreational fisheries.

National estimation of vulnerable species incidental catch will be performed in line with FAO 2019 methodology for all high risk fishing gears taking into account Croatian fishing zones. Final report for each year will be published on the national data collection website.

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

During 2023, a total of 1,064 days of field sampling were carried out. Of these, 186 days at sea, 206 sampling at the landing site, 508 questionnaires on accidental catches of sensitive species were collected and recordings from 40 fishing trips were analyzed. During the research period, a total of 183 individuals of the species were recorded, Chondrichthyes 105, sea turtles 76, seabirds 2. Detailed results are not available at the time of the submission of AR 2023 on 31 May 2024. Expected data availability is June 2025 in line with planned activities (Table 1.1).

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

Activities were achieved as planned.

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

Continuation of activities is planned according to WP 2023/2024.

Results of the study will be published online, and communicated to the environmental authorities, relevant NGOs, and sector.

Results were presented by IOF at the national coordination meeting in February 2024.

Final study report of the three-year implementation of monitoring will be made available to end-users by June 2025 in line with planned activities (Table 1.1).

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)

1. Aim of the study

Atlantic Bluefin tuna (*Thunnus thynnus*) and swordfish (*Xiphias gladius*) are important targeted species for commercial and recreational fisheries as it is specified in EU MAP implementation decision 2021/1167. 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, three main objectives are pursued: (1) to develop a reliable DNA metabarcoding protocol for the analysis of tuna and swordfish stomach contents with recurrent traits, to quantify (2) relative diet composition and (3) prey selectivity based on presence-absence inventories and associated metrics, taking into account ontogenetic preferences of the fish.

2. Duration of the study

Study was planned to start in 2022 however the beginning of the study was postponed to 2023 due to prolonged procurement process. Twenty-six months are planned for the current study duration, beginning in 2023, in the framework of EMFAF. The study is divided into three phases/periods. The first phase of 12 months duration includes fish and stomach sampling, stomach preservation, and macroscopic and DNA-based dietary analysis. DNA isolation and optimization of the protocol for amplification of two barcoding gene regions will be performed, followed by Illumina MiSeq sequencing. In the second phase (12 months duration), together fish and stomach sampling, a bioinformatics pipeline will be established to enable robust analysis of datasets. This will allow further statistical analysis to provide a list of prey taxa, their biodiversity and relative abundance. In the third phase (2 months duration), a comparative analysis with morphological data will be performed and the final report will be presented.

3. Methodology and expected outcomes of the study

Fish sampling. It is planned to conduct at least 20 successful stomach content analyses per species during the test study, combining morphological and metabarcoding approaches. Fish stomachs will be sampled during the first two project phases (in 2023 and 2024) from commercial fishing trips (as specified in Table 2.5 for ICCAT), as ontogenetic diet variability will also be assessed. Samples will be collected in the eastern regions of the Adriatic Sea during monitoring of commercial fishing. After catching the fish, the stomach will be sampled and placed on ice to preserve the contents and maintain high DNA quality. Metadata on each

specimen, including year, sex, weight, and length, will be recorded in line with the protocol for sampling of commercial fishery.

Stomach content analysis. In the laboratory, morphological identification of prey to the lowest possible taxonomic rank will be conducted on dissected stomach contents, following the DNA extraction from a few grams of homogenised contents. In addition to mechanical maceration, extraction will be performed in a lysis step using proteinase K and a commercial kit for DNA extraction. PCR will be performed separately for the two barcoding gene regions COI (Metazoa) and 18S-V1V2 (Metazoa). All PCR products will be analysed for quality and quantity by gel electrophoresis and fluorometer. Sequencing and library preparation will be performed by a commercial service provider using the Illumina MiSeq instrument to obtain 300 bp paired-end sequences.

Bioinformatics. Bioinformatic pipeline will include FASTQ files trimming to remove all primers and leftover adapters. The total length of 250-350 base pairs (bp) for COI and 300-500 bp for 18S-V1V2 assembled fragments is expected. The output as the list of unique sequences referred to as amplicon sequence variants (ASVs), along with the number of reads will be encountered. Taxonomic assignment will be performed at the ASV level using reference databases. Statistics will include analysis of presence-absence of ASVs, including the assessment of the percentage of occurrence and the weighted percentage of occurrence of prey taxa, both with a minimum 1% occurrence threshold. Second, to test the accuracy of the semi-quantitative information that the number of reads could deliver, relative read abundance information will be estimated for each prey item.

The expected outcomes are divided into the twenty-six period of the project:

(1) First phase activities: fish and stomach sampling, morphological analysis of the prey, procurement of chemicals and equipment, DNA isolation and amplification of barcoding genes, test sequencing using an Illumina MiSeq platform. Expected outcomes: Stomach sampling protocol, composition of stomach content based on morphological characteristics, quality DNA checklist, amplification protocol for barcoding genes.

(2) Second phase activities: fish and stomach sampling Sample Quality Check, library preparation and amplicon sequencing using an Illumina MiSeq platform, bioinformatics and statistical analysis of sequences obtained per gene and per fish, statistics of morphologically identified prey. Expected outputs: Bioinformatics pipeline.

(3) Third phase activities: analysis of relative food composition and prey selectivity based on presence-absence inventory and associated metrics with ontogenetic diet fish preferences. Expected outcomes: Final report.

Additional information is provided in Table 4.1.

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

In the first phase of the project, 20 wild Atlantic bluefin tuna (*Thunnus thynnus*) and 20 wild swordfish (*Xiphias gladius*), encompassing both juveniles and adults, were obtained from commercial fisheries and subjected to sampling. All relevant biometric measurements (weight, length, sex, and age) were taken, along with the stomach contents. Upon capture, each fish (both bluefin tuna and swordfish) was brought aboard the vessel, whereupon the abdominal cavity was promptly opened, and the stomach carefully isolated from other organs. Subsequently, each stomach, securely sealed, was transported to the Institute of Oceanography and Fisheries (IOF) via a cold chain to undergo morphological sampling. This involved identifying prey items morphologically to the lowest possible taxonomic classification. Under sterile conditions, DNA extraction from homogenized stomach contents was performed using a commercial kit. The concentrations (measured using a Qubit fluorometer), purities (assessed using an Implen NanoPhotometer), and quality (confirmed via gel electrophoresis) of the resulting 40 DNA samples were subsequently evaluated. To ensure the validity of DNA and the efficiency of selected primers for two gene regions (COI and 18S), polymerase chain reaction (PCR) was conducted using Bioline MyTaq HS Mix and primers sourced from Sigma Aldrich. Specifically, mICOIntF (forward) and jgHCO2198 (reverse) primers were employed for amplifying the Cytochrome C Oxidase subunit I (COI) region, while SSUF04 (forward) and SSURmod (reverse) were utilized for amplifying the Ribosomal 18S-V1V2 (18S) region. Subsequently, test sequencing was successfully performed on an Illumina MiSeq platform by Novogene service, with subsequent identification of Operational Taxonomic Units (OUTs).

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

All planned steps and outcomes for the first phase of the project were successfully completed. However, while

the initial target was to sample 20 fishes of each species over a 24-month period, this was achieved within the first project phase. The ongoing sampling during the second phase will expand the total number of fishes beyond the initial plan, thus ensuring a more robust analysis of fish diet composition. Protocols for stomach sampling and gene amplification have been documented, and stomach content composition based on morphological analysis has been compiled alongside a checklist ensuring the quality of extracted DNA.

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

The second phase of the project will involve the continuation of fish sampling, with subsequent analysis of stomach contents using both molecular and morphological approaches. Amplicon sequencing on an Illumina MiSeq platform is scheduled, followed by bioinformatics and statistical analysis of the obtained sequences per gene and per fish. The main aim of the second phase is to develop a user-friendly bioinformatics pipeline that can be adopted by less specialized laboratories.

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 sampling and analysis for demersal species

1. Aim of the study

Non-binding Regional Work Plan for data collection in the fisheries and aquaculture sectors in the Mediterranean and Black Sea (RWP Med&BS) on fish stomach contents collection and analysis in the Med&BS.

2. Duration of the study

2023

3. Methodology and expected outcomes of the study

In the Mediterranean, the stomach sampling shall be based on European hake, *Merluccius merluccius*, and on the MEDITS international trawl survey. However, in order to cover all the quarters (and a larger size range), it is suggested to sample other full stomachs of European hake from the biological sampling of commercial fisheries, in the quarters not covered by the MEDITS survey. The stomach sampling of European hake shall be done according to three size classes: Juveniles, sub-adults and adults.

In addition, it is proposed to sample the stomachs of monkfish and anglerfish, *Lophius piscatorius* and *L. budegassa*. It is suggested to sample full stomachs of monkfish and anglerfish during all the year, taking advantage of both the MEDITS survey and the biological sampling of commercial fisheries.

Stomach sampling protocol is in accordance with the MARE/2016/22 STREAM Task D4.1 (Updated protocols and guidelines for collection, processing and analysis of stomach contents).

Additional information is provided in Table 4.1.

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

In 2023 stomach sampling for demersal species has been conducted during the annual MEDITS survey.

For European hake, based on the sampling protocol established by Project MARE/2014/19 Med&BS and the conclusions of WKSTCON Workshop held in Palma de Mallorca in 2018. As proposed, a total of 60 stomachs were collected to cover three size classes - juveniles (<20 cm), - sub-adults (20-35 cm) and adults (>35 cm).

The stomachs of European hake, *Merluccius merluccius*, were carefully removed, placed in marked zip-lock bags and frozen on board for later laboratory processing. Prey was determined to the lowest taxonomic level possible, weighted and measured when possible. The digestion state of prey was determined according to

protocol, and hard parts like otoliths or beaks were noted if present.

Preliminary results show that, as expected, European hake is a highly piscivorous opportunistic predator in the sub-adult and adult phases, also showing significant cannibalistic behaviour.

In addition to European hake, stomach content analysis was carried out on monkfish, *Lophius budegassa*. In total 93 stomachs were collected and analysed following the same protocol as for European hake. Samples were collected mostly during scientific surveys, winter survey in the Jabuka pit area and MEDITS survey. In addition, few samples were collected from commercial fisheries. Whole specimens of monkfish were frozen on board and stomach sampling was conducted later in the laboratory. The sampling scheme was opportunistic in means that all available specimens were collected for further analysis.

As expected, it is evident that monkfish is a highly ravenous opportunistic predator, mainly piscivorous.

When the state of digestion is low, determination of whether the prey has fallen inside the stomach during the time in the trawl is difficult, and this may influence the results in a significant manner.

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

Activities were achieved as planned in terms of sample size and species analysed.

Unfortunately, for European hake, samples from commercial fisheries were not possible to obtain, since the juvenile part of the sample is below the minimum landing size, and the other two classes are gutted on board commercial vessels. A similar problem is in the case of the monkfish, however a few samples were obtained by on-board observers.

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

Continuation of activities is planned in 2024 according to WP 2023/2024.

SECTION 5: ECONOMIC AND SOCIAL DATA IN FISHERIES

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

General comment: This Text box fulfils Article 5(2)(d), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 5 of the EU MAP Delegated Decision annex. It is intended to specify data to be collected under Tables 7, 8 and 9 of the EU MAP Delegated Decision annex.

1. Description of clustering

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.

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%. Finally, stratification on the basis of representative sub-sample per coastal county is made which results 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.

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 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.

Information on clustered fleet segments (based on referent year 2020):

- *Demersal trawlers and/or demersal seiners 6-< 12 m** (142 vessels) is clustered with *Demersal trawlers and/or demersal seiners 0-< 6 m* (5 vessels);
- *Dredgers 12-< 18 m** (14 vessels) is clustered with *Dredgers 24-< 40 m* (1 vessel);
- *Vessel using other active gears 6-< 12 m** (55 vessels) is clustered with *Vessel using other active gears 12-< 18 m* (2 vessels);
- *Vessels using active and passive gears 6-< 12 m** (27 vessels) is clustered with *Vessels using active and passive gears 12-< 18 m* (3 vessels);
- *Vessels using hooks 6-< 12 m** (254 vessels) is clustered with *Vessels using hooks 6-< 12 m* (7 vessels); and
- *Vessels using Polyvalent “passive” gears only 6-< 12 m** (821 vessels) is clustered with *Vessels using Polyvalent “passive” gears only 12-< 18 m* (1 vessel).

Clustering is performed in cases where a fleet segment has less than 10 vessels and it is necessary in order to design the sampling plan and to report economic variables. Clustering is done entirely on the basis of 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).

2. Description of activity indicator

If the MS is using activity indicator for dividing the fleet segment into different activity levels, use “L” for the low activity vessels and “A” for the normal economic activity vessels please provide description of activity methodology used.

Not applicable.

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

Describe and justify any deviations from variable definitions as listed in ‘EU MAP Guidance Document’ in the JRC/DCF website. In case the PIM is not used, explain and justify the application of alternative methods.

Not applicable.

Deviations from the work plan

List the changes from the work plan (if any) and explain the reasons.

- No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

- Not applicable.

SECTION 6: ECONOMIC AND SOCIAL DATA IN AQUACULTURE

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

General comment: This text box fulfils Article 5(2)(e), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 6 of the EU MAP Delegated Decision annex. It is intended to specify data to be collected under Tables 10 and 11 of the EU MAP Delegated Decision annex.

1. Description of the threshold application

Please provide % of the MS production from the latest EU aquaculture production reported to the EUROSTAT. Describe and justify the applied threshold(s).

According to available Eurostat aquaculture production data, Croatian aquaculture production, with 20,4 thousand tonnes in 2019 represents a share of 1,83% of the total EU-28 production from aquaculture (excluding hatcheries and nurseries). According to the latest Eurostat aquaculture production data, Croatian aquaculture production with 21,77 thousand tonnes in 2020 represents a share of 2,03% of the total EU-28 production from aquaculture (excluding hatcheries and nurseries), which is an increase of 0,1% compared to 2019.

Croatia is not applying a threshold on data collection. Data collection is planned in the period 2022-2024.

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

Describe and justify any deviations from variable definitions as listed in 'EU MAP Guidance Document' in the DCF website.

Not applicable.

Deviations from the work plan

List the changes from the work plan (if any) and explain the reasons.

- No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

Not relevant.

- Not applicable.

SECTION 7: ECONOMIC AND SOCIAL DATA IN FISH PROCESSING

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

General comment: This text box fulfils Article 5(2)(f), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 7 of the EU MAP Delegated Decision annex.

This text box is optional, since all information on the sampling schemes is available in Annex 1.2 document template. MS is invited to highlight additional information here on sampling schemes and sampling frames deemed necessary to understand the actual sampling design planned for the region and the implementation year(s).

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 RCG ECON (ex. PGECON) definitions

Describe and justify any deviations from variable definitions as listed in the 'EU MAP Guidance Document' on the DCF website.

Not applicable.

Deviations from the work plan

List the changes from work plan (if any) and explain the reasons.

- No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.

- 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.

Use this document to state whether documentation in the data collection process (design, sampling implementation, data capture, data storage, sample storage and data processing) exists and identify where this documentation can be found. Provide short descriptions where indicated, even if the documentation can be found in English. Names of sampling schemes and strata shall be identical to those in Tables 2.2, 2.3, 2.4, 2.5, 2.6 and 4.1 of the WP/AR. For quality information on scientific surveys, use the survey acronym as a sampling scheme identifier. For mandatory surveys, refer to Table 1 of the EU MAP Implementing Decision annex, see also MasterCodeList 'Mandatory survey at sea'.

(Sampling scheme identifier: Scientific monitoring of European eel in freshwater)

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: Scientific monitoring of European eel in freshwater
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity: 2023-2025
Short description: Scientific monitoring of European eel (<i>Anguilla anguilla</i>) in inland waters (Table 2.3, Text Box 2.3), conducted by independent research institutes contracted by MA-DoF. All biological data (length, weight, age, sex etc.) for eels will be collected from sampling in inland water bodies annually. Sampling will be performed by electrofishing, fyke nets, and other appropriate methods.
Description of the population
Population targeted: Sampling will be carried out annually at random locations in each area.
Population sampled: Glass, yellow and silver eel.
Stratification: Fishing area under jurisdiction of the Republic of Croatia is divided into several zones. Each zone has its own specific geomorphological characteristics and environmental conditions differ from one zone to another: river areas Drava-Dunav, Sava, Kupa, Lika and Jadran. Seasonal sampling will be carried out only in area Jadran (Adriatic) including six rivers (Mirna, Raša, Cetina, Krka, Zrmanja and Neretva).
Sampling design and protocols
Sampling design description: Sampling design will be provided after first year of implementation.
Is the sampling design compliant with the 4S principle?: NA.
Regional coordination: ISSG Diadromous, RCG MED & BS; GFCM WGs, ICES
Link to sampling design documentation: Sampling design will be provided after first year of implementation.
Compliance with international recommendations: Y
Link to sampling protocol documentation:

https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf
Compliance with international recommendations: Yes.
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 MA-DoF and research institutes conducting the monitoring.
Data capture
Means of data capture: Information will be provided after first year of implementation.
Data capture documentation: Documentation will be provided after first year of implementation.
Quality checks documentation: NA
Data storage
National database: MA-DoF database (FIS)
International database: JRC&GFCM
Quality checks and data validation documentation: NA
Sample storage
Storage description: Information will be provided after first year of implementation.
Sample analysis: Information will be provided after first year of implementation.
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: Datasets are validated by scientific consilium on the national and international level (STECF EWGs&GFCM WG, SCRS).
AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i> Scientific monitoring of European eel in inland water has been established in the second half of 2023, and is planned for three years. Biological sampling is under way, however, there has not yet been established an evaluation of data accuracy (bias and precision), editing and imputation methods, validation of the final dataset. It is expected that these elements of data processing will be established in 2025. In relation to stratification, in addition to six rivers, another water body was included to the study area, according to management needs, namely, Prokljan Lake. In addition, research is conducted in previously defined localities with the use of GPS, for standardization, and sampling is carried out in the same localities during three years of sampling. Concerning the sampling protocols, monitoring is carried out seasonally (for times a year: June, September, December, March) on seven rivers/water bodies (minimum two locations per river/water body, excluding River Neretva, which will be sampled on three locations). Rivers are sampled in the part near the mouth with the sea or in contact brackish area, and in the middle part of the river course. Field sampling is carried out using two types of gears: electro fishing in freshwater systems and fyke nets in brackish/marine ecosystems. Electrofishing is conducted with electric generators Susan 835MP (~1.5 kW), Susan 1030SMP (~2.4 kW), Lj 4085 NP (~6 kW). The minimum length of the transect, if the conditions on the ground allow it, is 100 m by walking from the shore or in the riverbed, or by boat. Fyke nets are placed in suitable locations for a minimum of two to maximum of seven days, with daily catch controls.

Eels are caught by electrofishing and by fyke nets, while the measurements of the lengths and weight are conducted with ichthyometer (precision of 1 mm) and digital scale (precision of 0,1 g). Protective equipment include: rubber fishing boots (thickness of 5 mm), neoprene diving gloves (thickness of 2 mm), protective polarized sunglasses and a visor cap. Additional equipment includes plastic buckets (10-20 L), fishing bag, aquarium net and aeration pump. The obtained data will be processed by statistical and fishery statistical programs (Statistica, Excel).

Following the catch, all caught eel are cooled to 4 °C in order to reduce mobility, and processed within 48 hours (length, weight, eye diameter, pectoral fin length, age, sex). Gonads will be analysed macroscopically according to the protocol from the recent Sudoang project (<https://sudoang.eu>), and by microscopic examination of fresh/chilled gonads. Methodology for otoliths dissection and age determination follows ICES recommendations (ICES: Manual for the Ageing of Atlantic Eel, 2009) as well as the protocol of the Sudoang project (<https://sudoang.eu/wp-content/uploads/2021/10/E613-workshop-lectura-otolitos-WKAREA3-Report.pdf>).

(Sampling scheme identifier: Scientific monitoring of recreational fisheries / HRV REC FISH Survey)

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: HRV REC FISH Survey
Sampling scheme type: Recreational fisheries
Observation type: EMAtSea; SelfAtSea
Time period of validity: 2022-2024
Short description: HRV REC FISH Survey is a national annual survey concerning recreational and sports fisheries in Croatia for species listed in Table 2.4. Data collection is based on self-sampling (log-book/questionnaires).
Description of the population
<p>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.</p> <p>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 (400 fishers). Non-respondents will be recorded.</p> <p>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.</p>
Sampling design and protocols
<p>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).</p> <p>Is the sampling design compliant with the 4S principle?: NA.</p> <p>Regional coordination: RCG MED & BS; RCG LP, GFCM WGs; FAO AdriaMed WGs</p> <p>Link to sampling design documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-</p>

<p>ribolova verzija-1 HR-1.pdf https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf</p> <p>Compliance with international recommendations: Yes. Agreed sampling protocol according to RCG Med&BS 2021 Recommendation 7 (Agreement on methodologies for data collection in recreational fisheries):</p> <p>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/</p> <p>Link to sampling protocol documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf</p> <p>Compliance with international recommendations: Yes.</p>
<p>Sampling implementation</p> <p>Recording of refusal rate: Y</p> <p>Monitoring of sampling progress within the sampling year: The progress will be monitored by means of expert consilium from IOF, MA-DoF and CSSFA.</p>
<p>Data capture</p> <p>Means of data capture: Log books, questionnaires, scales, measuring board, etc.</p> <p>Data capture documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf</p> <p>Quality checks documentation: https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/</p>
<p>Data storage</p> <p>National database: IOF database https://vrtlac.izor.hr/ords/riba</p> <p>International database: JRC&GFCM</p> <p>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.</p>
<p>Sample storage</p> <p>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.</p> <p>Sample analysis: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/Medits_Handbook_2017_version_9.pdf</p>
<p>Data processing</p> <p>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.</p> <p>Editing and imputation methods: 'Y'</p>

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).

AR comment: *Indicate any deviations. Do not change the text already adopted in the work plan.*

There are no deviations from planned methodology.

Realized sample size was more than 100% higher than initially planned, due to higher than expected response rate.

(Sampling scheme identifier: Scientific monitoring of recreational fisheries / BFT BGF REC)

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: BFT BGF REC
Sampling scheme type: Recreational fisheries
Observation type: SciObsOnShore
Time period of validity: 2022-2024
Short description: BFT BGF REC is sampling scheme code for Bluefin tuna quota competitions (BFT BGF REC) competitions (Table 2.4).
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/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf
Compliance with international recommendations: Yes. 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:

<p>https://www.fao.org/gfcm/publications/series/technical-paper/669/en/</p> <p>Link to sampling protocol documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf</p> <p>Compliance with international recommendations: Yes.</p>
<p>Sampling implementation</p> <p>Recording of refusal rate: Y</p>
<p>Monitoring of sampling progress within the sampling year: The progress will be monitored by means of expert consilium from IOF, MA-DoF and CSSFA.</p>
<p>Data capture</p> <p>Means of data capture: Log books, questionnaires, scales, measuring board, etc.</p> <p>Data capture documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf</p> <p>Quality checks documentation: https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/</p>
<p>Data storage</p> <p>National database: IOF database https://vrtlac.izor.hr/ords/riba</p> <p>International database: JRC&GFCM</p> <p>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.</p>
<p>Sample storage</p> <p>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.</p> <p>Sample analysis: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/Medits_Handbook_2017_version_9.pdf</p>
<p>Data processing</p> <p>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.</p> <p>Editing and imputation methods: 'Y' Web based application</p> <p>Quality document associated to a dataset: N</p> <p>Validation of the final dataset: Datasets are validated by scientific consilium on the national and international level (STECF EWGs & GFCM WG, SCRS).</p>
<p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

**(Sampling scheme identifier: Scientific monitoring of commercial fisheries / Sci Obs
Shore Commerc Sel Stock)**

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: Sci Obs Shore Commerc Sel Stock
Sampling scheme type: Commercial fishing
Observation type: SciObsOnShore
Time period of validity: 2022-2024
Short description: Sci Obs Shore Commerc Sel Stock is sampling scheme code for all of the sampling frames (metiers) specified in Table 2.5 that relate on data sampling by scientific observers on shore.
Description of the population
<p>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.</p> <p>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.</p> <p>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).</p>
Sampling design and protocols
<p>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</p>

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.

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/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf

Compliance with international recommendations: Yes.

Link to sampling protocol documentation:

https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf

Compliance with international recommendations: Yes.

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/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.

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/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/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 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: Datasets are validated by scientific consilium on the national and international level (STECF EWGs & GFCM WG, SCRS).
AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i>
There are no deviations from planned methodology.

**(Sampling scheme identifier: Scientific monitoring of commercial fisheries / Sci Obs Sea
Commerc Sel Stock)**

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: Sci Obs Sea Commerc Sel Stock
Sampling scheme type: Commercial fishing
Observation type: SciObsAtSea
Time period of validity: 2022-2024
Short description: Sci Obs Sea Commerc Sel Stock is a sampling scheme code for all of the sampling frames (metiers) specified in Table 2.5 that relate on data sampling by scientific observers at sea.
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 code, 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. 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 to record any interaction with vulnerable species.

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/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf

Compliance with international recommendations: Yes.

Link to sampling protocol documentation:

https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf

https://podaci.ribarstvo.hr/files/Protokoli-za-prikupljanje-podataka-i-postupanje-s-osjetljivim-vrstama_verzija-1_2021-1.pdf

Compliance with international recommendations: Yes.

Sampling implementation

<p>Recording of refusal rate: Y</p> <p>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.</p>
<p>Data capture</p> <p>Means of data capture: Fishing gear, scales, measuring board, etc.</p> <p>Data capture documentation: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf</p> <p>Quality checks documentation: https://podaci.ribarstvo.hr/prikupljanje-podataka/bioloski/</p>
<p>Data storage</p> <p>National database: IOF database https://vrtlac.izor.hr/ords/riba</p> <p>International database: JRC&GFCM</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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”.</p>
<p>Sample storage</p> <p>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.</p> <p>Sample analysis: https://podaci.ribarstvo.hr/files/Metodologija-za-znanstveni-monitoring-gospodarskog-i-rekreativnog-ribolova_verzija-1_HR-1.pdf https://podaci.ribarstvo.hr/files/Medits_Handbook_2017_version_9.pdf</p>
<p>Data processing</p> <p>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.</p> <p>Editing and imputation methods: 'Y' Web based application</p> <p>Quality document associated to a dataset: N</p> <p>Validation of the final dataset: Datasets are validated by scientific consilium on the national and international</p>

level (STECF EWGs & GFCM WG, SCRS).

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.

There are no deviations from planned methodology.

(Sampling scheme identifier: Research surveys at sea - MEDIAS)

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: MEDIAS
Sampling scheme type: Mandatory research survey
Observation type: Hydroacoustic survey
Time period of validity: 2022-2024
Short description: Sampling scheme aiming at collecting geo-referenced hydroacoustic data during annual research surveys at sea performed by research vessel equipped with calibrated scientific equipment. The scheme covers eastern part of GSA 17 (Adriatic Sea).
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
Link to sampling design documentation: https://podaci.ribarstvo.hr/files/MEDIASHandbookApril2021.pdf
Compliance with international recommendations: Y
Link to sampling protocol documentation: https://podaci.ribarstvo.hr/files/MEDIASHandbookApril2021.pdf
Compliance with 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

<p>equipment (GPS), mid-water trawl, calibrated on-board balances, calibrated CTD probe, ichtiometer, plankton net.</p> <p>Data capture documentation: https://podaci.ribarstvo.hr/files/MEDIASHandbookApril2021.pdf</p> <p>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.</p>
<p>Data storage</p> <p>National database: IOF database: https://vrtlac.izor.hr/ords/riba/m_tereni_prikaz.</p> <p>International database: final results from the survey are stored in JRC database</p> <p>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.</p>
<p>Sample storage</p> <p>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) 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.</p> <p>Sample analysis: See descriptions at https://podaci.ribarstvo.hr/files/MEDIASHandbookApril2021.pdf</p>
<p>Data processing</p> <p>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/files/MEDIASHandbookApril2021.pdf</p> <p>Editing and imputation methods: N</p> <p>Quality document associated to a dataset: Y - calibration report for scientific echosounder before survey (as requested in MEDIAS Handbook).</p> <p>Validation of the final dataset: Data validation tool is used: https://datacollection.jrc.ec.europa.eu/dvt/medbs#_48_INSTANCE_JaOp6V2u1Iyk_%3Dindex.xhtml</p> <p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

(Sampling scheme identifier: Research surveys at sea - MEDITS)

MS: Croatia
Region: Mediterranean Sea and Black Sea
Sampling scheme identifier: MEDITS
Sampling scheme type: Mandatory research survey
Observation type: Bottom trawl survey
Time period of validity: 2022-2024
Short description: The MEDITS survey programme intends to produce basic information on benthic and demersal species in term 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.
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 550.000 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/files/Medits_Handbook_2017_version_9.pdf

Compliance with international recommendations: Y

Link to sampling protocol documentation:

https://podaci.ribarstvo.hr/files/Medits_Handbook_2017_version_9.pdf

Compliance with 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/files/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

<p>Quality checks and data validation documentation: https://www.sibm.it/MEDITS%202011/new/RoME_April_2019/RoME%201.4%20User%20Manual%20-%202019.pdf https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf</p>
<p>Sample storage</p>
<p>Storage description: Age structures (otoliths) 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.</p> <p>Sample analysis: See descriptions at https://podaci.ribarstvo.hr/files/Medits_Handbook_2017_version_9.pdf</p>
<p>Data processing</p>
<p>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.</p> <p>Editing and imputation methods: Y https://www.faoadriamed.org/pdf/User_manual_ATrIS.pdf</p> <p>Quality document associated to a dataset: N</p> <p>Validation of the final dataset: Datasets are validated by scientific consilium on the national level.</p>
<p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

(Sampling scheme identifier: Research surveys at sea - SOLEMON)

<p>MS: Croatia</p>
<p>Region: Mediterranean Sea and Black Sea</p>
<p>Sampling scheme identifier: SOLEMON</p>
<p>Sampling scheme type: Mandatory research survey</p>
<p>Observation type: Adriatic Rapido Trawl Survey</p>
<p>Time period of validity: 2022-2024</p>
<p>Short description: The main survey objectives are: a) Assessing abundance, 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) Contribution 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 MSFD (Directive 2008/56/EC).</p>
<p>Description of the population</p>
<p>Population targeted: The SOLEMON is a scientific fishery independent rapido (beam trawl) survey. The main target species is <i>Solea solea</i>. The survey area covers the northern part of the Adriatic Sea (GSA17).</p> <p>Population sampled: A part of the target populations of <i>Solea solea</i> 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.</p> <p>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).</p>
<p>Sampling design and protocols</p>
<p>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</p>

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/files/SOLEMON-Handbook_2019_Ver_4.pdf

Compliance with international recommendations: Y

Link to sampling protocol documentation:

https://podaci.ribarstvo.hr/files/SOLEMON-Handbook_2019_Ver_4.pdf

Compliance with 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/files/SOLEMON-Handbook_2019_Ver_4.pdf

Quality checks documentation: Y

https://podaci.ribarstvo.hr/files/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) 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: See descriptions at

https://podaci.ribarstvo.hr/files/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: Datasets are validated by scientific consilium on the national level.

AR comment: *Indicate any deviations. Do not change the text already adopted in the work plan.*

There are no deviations from planned methodology.

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. Do not delete any text from the template.

(Sampling scheme identifier: Fishing activity and economic data for fisheries / Census)

Survey Specifications
<p><i>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.</i></p> <p><i>Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.</i></p> <p><i>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'.</i></p>
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 MA-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 1 st for the previous year.
Survey design and strategy
<p>Data sources: fishing fleet register, log books, 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 MA-DoF and financial accounts obtained from FINA.</p> <p>Collection of the fishing activity and economic variables of the fleet is based on two major data sources:</p> <p>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</p> <p>b) Questionnaires for economic data collection.</p> <p>The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.</p>
Determination of sample size:
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.

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.

Survey methods and distribution: 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.

Estimation design

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>).

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:

$$r_j = \frac{n}{N} * 100\%$$

r_j – 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.

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.

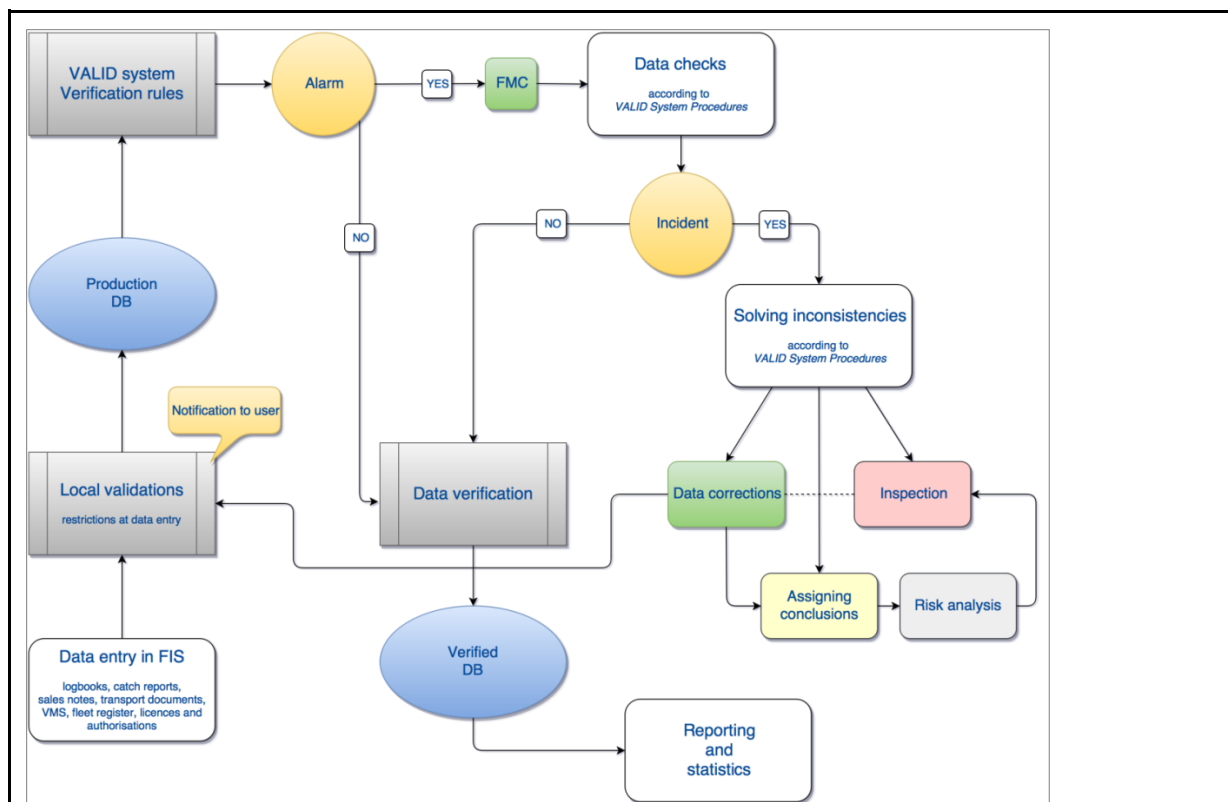


Chart 1. Flow chart of the data validation and verification system for fisheries

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 MA-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 log-books, fishing reports and sales notes
- cross-checking of data between e-log-books and VMS
- cross-checking of data between log-books, 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

<p>reports, m-catch reports), and</p> <ul style="list-style-type: none"> – collecting all relevant metadata necessary for reporting.
<p>Data storage and documentation</p>
<p>Describe how the data is stored. Provide link to webpage where additional methodological documentation can be found, if any.</p> <p>Additional methodological information on fishing activity data: https://podaci.ribarstvo.hr/metodologija/transverzalni/</p> <p>Additional methodological information on socio-economic data: https://podaci.ribarstvo.hr/metodologija/socioekonomski/</p>
<p>Revision</p>
<p><i>Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.</i></p> <p>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 MA-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.</p>
<p>Confidentiality</p>
<p><i>Are procedures for confidential data handling in place and documented?</i> Yes</p> <p><i>Are protocols to enforce confidentiality between DCF partners in place and documented?</i> NA.</p> <p><i>Are protocols to enforce confidentiality with external users in place and documented?</i> Yes</p> <p><i>Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.</i> No.</p>
<p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

(Sampling scheme identifier: Socio-economic data for fisheries / Probability Sample Survey)

<p>Survey Specifications</p>
<p><i>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.</i></p> <p><i>Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.</i></p> <p><i>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'.</i></p>
<p>Sector name(s): Fisheries</p>

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 MA-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 1 st for the previous year.
Survey design and strategy
<p>Data sources: questionnaires, financial accounts.</p> <p>Collection of the economic variables of the fleet is based on two major data sources:</p> <ul style="list-style-type: none"> 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). <p>The consistency of information coming from questionnaires and administrative sources is assured by cross-checking information from the different data sources.</p> <p>Determination of sample size:</p> <p>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.</p> <p>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.</p> <p>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%.</p> <p>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.</p> <p>For fleet segments under strict management measures all licence holders are contacted, due to the importance of a higher response rate.</p> <p>Survey methods and distribution: 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.</p> <p>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.</p>

Estimation design

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.

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:

$$r_j = \frac{n}{N} * 100\%$$

r_j – 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.

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

Describe how the data is stored.

Provide link to webpage where additional methodological documentation can be found, if any.

Additional methodological information on fishing activity data:

<https://podaci.ribarstvo.hr/metodologija/transverzalni/>

Additional methodological information on socio-economic data:

<https://podaci.ribarstvo.hr/metodologija/socioekonomski/>

Revision

<p><i>Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.</i></p> <p>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.</p>
<p>Confidentiality</p>
<p><i>Are procedures for confidential data handling in place and documented?</i></p> <p>Yes</p> <p><i>Are protocols to enforce confidentiality between DCF partners in place and documented?</i></p> <p>NA.</p> <p><i>Are protocols to enforce confidentiality with external users in place and documented?</i></p> <p>Yes</p> <p><i>Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.</i></p> <p>No.</p>
<p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

(Sampling scheme identifier: Socio-economic data for aquaculture / Census)

<p>Survey Specifications</p>
<p><i>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.</i></p> <p><i>Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.</i></p> <p><i>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'.</i></p>
<p>Sector name(s): Aquaculture</p>
<p>Sampling scheme: Census</p>
<p>Variables: Economic variables for marine and freshwater aquaculture (Energy costs, Number of enterprises by size category, Operating subsidies, Subsidies on investments, Weight of sales per species)</p>
<p>Supra region(s): Mediterranean Sea and Black Sea</p>
<p>Survey planning</p>
<p>The survey is performed by MA-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.</p> <ul style="list-style-type: none"> – Number of enterprises by size category: DoF registry of licences. – Weight of sales per species: logbook in aquaculture (DoF records on breeding and hatching), – Energy costs: DoF calculation based on records on blue diesel consumption and average prices, cross-checked with data form the questionnaires, and – Operating subsidies, Subsidies on investments: DoF records on paid subsidies.

Survey design and strategy

Data sources: aquaculture logbooks, blue diesel/fuel records, records of paid subsidies, registry of licences. Administrative sources of data available to MA-DoF:

Data is collected from administrative sources of data available to MA-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),
- Energy costs: DoF calculation based on records on blue diesel consumption and average prices, cross-checked with data from the questionnaires, and
- Operating subsidies, Subsidies on investments: DoF records on paid subsidies.

Determination of sample size:

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.

Survey methods and distribution:

Fishery Information System administered by MA-DoF (aquaculture farm registry and log-books, volume and value of blue diesel consumed per aquaculture farm; information on paid subsidies etc.).

Estimation design

No estimation on census data is planned, administrative sources are complete for all enterprises in the population.

Since a large number of shellfish enterprises are producing more than one species with significantly different market value (with an increasing volume and value of oysters and decreasing quantities of mussels), in order to make the segmentation more precise, to the additional segmentation, based on the value of production attributed to one species, the third criteria shall be applied - the total area of production per species.

Estimation of direct subsidies: DoF records on direct subsidies are used.

Estimation of energy costs: For the estimation of energy consumption and energy cost blue diesel records are used. The register of blue diesel is updated annually on the amount of fuel consumed per aquaculture farm. 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:

$$r_j = \frac{n}{N} * 100\%$$

r_j – 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.

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'

<p>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.</p>
<p>Data storage and documentation</p>
<p><i>Describe how the data is stored.</i> <i>Provide link to webpage where additional methodological documentation can be found, if any.</i></p>
<p>Additional methodological information on socio-economic data: https://podaci.ribarstvo.hr/metodologija/socioekonomski/</p>
<p>Revision</p>
<p><i>Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.</i> So far data has not been revised.</p>
<p>Confidentiality</p>
<p><i>Are procedures for confidential data handling in place and documented?</i> Yes <i>Are protocols to enforce confidentiality between DCF partners in place and documented?</i> NA. <i>Are protocols to enforce confidentiality with external users in place and documented?</i> Yes <i>Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.</i> No.</p>
<p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

(Sampling scheme identifier: Socio-economic data for aquaculture / Probability Sample Survey)

<p>Survey Specifications</p>
<p><i>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.</i> <i>Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.</i> <i>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'.</i></p>
<p>Sector name(s): Aquaculture</p>
<p>Sampling scheme: Probability Sample Survey</p>
<p>Variables: Economic and social variables for marine and freshwater aquaculture (Consumption of fixed capital,</p>

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 value of assets, Unpaid labour, Value of unpaid labour)

Supra region(s): Mediterranean Sea and Black Sea

Survey planning

The survey is performed by MA-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

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.

Determination of sample size:

Data collection for all techniques and species groups shall be sampled on the basis of a Probability Sample Survey.

Survey methods and distribution: 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 fleet is based on two major data sources:

- a) Fishery Information System administered by DoF (aquaculture farm registry and log-books, 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.

Estimation design

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.

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.

Since a large number of shellfish enterprises are producing more than one species with significantly different market value (with an increasing volume and value of oysters and decreasing quantities of mussels), in order to make the segmentation more precise, to the additional segmentation, based on the value of production attributed to one species, the third criteria shall be applied - the total area of production per species.

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:

$$r_j = \frac{n}{N} * 100\%$$

r_j – 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.

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

Describe how the data is stored.

Provide link to webpage where additional methodological documentation can be found, if any.

Additional methodological information on socio-economic data:

<https://podaci.ribarstvo.hr/metodologija/socioekonomski/>

Revision

Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.

So far data has not been revised.
Confidentiality
<p><i>Are procedures for confidential data handling in place and documented?</i> Yes</p> <p><i>Are protocols to enforce confidentiality between DCF partners in place and documented?</i> NA.</p> <p><i>Are protocols to enforce confidentiality with external users in place and documented?</i> Yes</p> <p><i>Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.</i> No.</p>
<p>AR comment: <i>Indicate any deviations. Do not change the text already adopted in the work plan.</i></p> <p>There are no deviations from planned methodology.</p>

(Sampling scheme identifier: Socio-economic data for processing / Probability Sample Survey)

Survey Specifications
<p><i>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.</i></p> <p><i>Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.</i></p> <p><i>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'.</i></p>
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
<p>Survey is performed by MA-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.</p> <p>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 2022-2024.</p> <p>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.</p>
Survey design and strategy
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.

Determination of sample size:

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 2022-2024.

Survey methods and distribution: 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.

Estimation design

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.

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.

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 correspond 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

Describe how the data is stored.

Provide link to webpage where additional methodological documentation can be found, if any.

Additional methodological information on socio-economic data:

<https://podaci.ribarstvo.hr/metodologija/socioekonomski/>

Revision

Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc.

So far data has not been revised.

Confidentiality

Are procedures for confidential data handling in place and documented?

Yes

Are protocols to enforce confidentiality between DCF partners in place and documented?

NA.

Are protocols to enforce confidentiality with external users in place and documented?

Yes

Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.

No.

AR comment: *Indicate any deviations. Do not change the text already adopted in the work plan.*

There are no deviations from planned methodology.