

Johann Heinrich von Thünen Institute, Germany
and Federal Agency for Agriculture and Food, Germany

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

[DEU] Work Plan for data collection in the fisheries and aquaculture sectors

2025-2027

Version 3 – 2024

[Bremerhaven/Rostock, 30 Oct 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.

The German data collection programme for sampling of fisheries data refers to the DCF Regulation 2017/1004 on the Union framework for the collection, management and use of data in the fisheries sector and the COM Delegated Decision 2021/1167 and COM Implementing Decision 2021/1168 on the multiannual Union programme (EU-MAP) for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors from 2022. It describes the planned actions by sections of the abovementioned legal acts in accordance with the Guidelines for Work Plan (WP) submissions provided by the European Commission.

This national WP covers the forthcoming three years, 2025-2027.

Compared to previous years, the WP contains references to the relevant Regional Work Plans (RWPs), provides a number of additional test studies and other activities, as well as extended data collection efforts with regard to the incidental catches of sensitive species and fisheries impact on marine habitats (sections 4.2 and 4.3) in accordance with the Marine Action Plan (Document COM(2023)102 final of 21 February 2023). Several other parts have been updated and slightly modified to reflect recent changes in the sampling conditions and progress in sampling methodology.

The general rationale and methodology of the data collection, however, remains very similar to previous WPs and is based on past experience.

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The following two **institutions** contribute to the WP:

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38116 Braunschweig, Germany
Tel. +49 531 596-0
E-mail: info@thuenen.de
Website: <http://www.thuenen.de>

Bundesanstalt für Landwirtschaft und Ernährung (BLE) (Federal Agency for Agriculture and Food)
Deichmanns Aue 29
53179 Bonn, Germany
Tel. +49 228 6845-0
E-mail: info@ble.de
Website: <http://www.ble.de>

Within these institutions, the following four **institutes and units** are responsible for data collection and reporting:

TI:
Institute of Sea Fisheries (SF)
Herwigstr. 31
27572 Bremerhaven, Germany

Tel. +49 471 94460-100
E-mail: sf@thuenen.de
Website: <http://www.thuenen.de/sf/>

Institute of Baltic Sea Fisheries (OF)
Alter Hafen Süd 2
18069 Rostock, Germany
Tel. +49 381 66099-102
E-mail: of@thuenen.de
Website: <http://www.thuenen.de/of/>

Institute of Fisheries Ecology (FI)
Herwigstr. 31
27572 Bremerhaven, Germany
Tel. +49 471 94460-201
E-mail: fi@thuenen.de
Website: <http://www.thuenen.de/fi/>

The TI collects biological and economic data, by-catch and survey data as well as data from sampling of commercial fishing vessels under German flag. The TI-OF is responsible for the Baltic Sea and recreational fisheries sampling, while the TI-SF is responsible for the North Sea & Eastern Arctic, North Atlantic and other areas. The TI-FI is responsible for sampling diadromous species.

BLE:

Unit 531 (Fisheries Management)
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Unit 223 (Product Development)
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The BLE unit 531 holds the fishing vessel list including capacity, landings and effort data based on the relevant EU legislation. The BLE unit 223 is responsible for the central database of all national fisheries-related data and central IT services (e.g. national DCF website).

BLE and TI are institutions under the auspices of the Federal Ministry of Food and Agriculture (Bundesministerium für Ernährung und Landwirtschaft, BMEL). Within the institutions of BMEL, responsible persons are appointed in order to co-operate and implement the WP. The TI-SF is the national coordinator.

National co-ordination meetings with all persons involved in the German WP are held once a year (see Table 1.2). The main aim of these meetings is an exchange of experiences during the recent year of WP implementation and forward planning of data collection in the upcoming year(s).

A national portal website for dissemination of information has been established in 2009:
<http://www.dcf-germany.de>

Regional and international coordination, scientific advice:

Germany participates in the Regional Coordination Groups (RCGs) for the Baltic Sea, for the North Atlantic, North Sea and Eastern Arctic (NANSEA) and Long-Distance Fisheries (LDF), see Table 1.2, and their Inter-Sessional Sub-Groups (ISSGs).

In addition, Germany has members in various expert groups of the International Council for the Exploration of the Sea (ICES) and in the Scientific Council of the Northwest Atlantic Fisheries Organization (NAFO), supporting the scientific advice on fish stocks, on environmental impacts of fisheries and other relevant topics.

Text Box 1a: Test studies description

Region: BALTIC

Test study: Genetics

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

Name of the study: Genetics

Participation in **RWP Baltic 2025-2027** test study (Y/N): Y

Test study: Diadromous species data collection

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

Name of the study: Diadromous species data collection

Participation in **RWP Baltic 2025-2027** test study (Y/N): Y

Test study: Regionally coordinated stomach sampling program

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

Name of the study: Regionally coordinated stomach sampling program

Participation in **RWP Baltic 2025-2027** test study (Y/N): Y

In the Baltic Sea, sampling of stomachs of cod is already taking place during the internationally coordinated survey BITS and is coordinated through ICES WGBIFS. Currently, the stomach sampling program is part of the German national WP, i.e. a RWP is currently being discussed in RCG Baltic and Germany will adapt the current sampling once regional decisions are taken.

Test study: Genetic stock separation of herring collected during the German acoustic surveys in the Western Baltic Sea (ICES SD 21-24)

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

Name of the study: Genetic stock separation of herring collected during the German acoustic surveys in the Western Baltic Sea (ICES SD 21-24)

Aim of the test study

Fisheries-independent stock indices form the baseline for single stock assessment. The abundance and biomass of Baltic Sea herring has been monitored annually in October during the Baltic International Acoustic Survey (BIAS) since 1991 and is the most important index in the stock assessment of Western Baltic Spring spawning herring. Within the survey area covered by Germany, ICES subdivisions (SDs) 21-24, it is assumed that Central Baltic herring and Western Baltic herring mix in SD 24. To separate both stocks, a separation function based on growth parameters is applied (Gröhsler et al., 2016). In 2021 and 2022, abnormal spawning behaviour of herring in the Öresound between Sweden and Denmark has been observed during the BIAS. Individual fish were genetically assigned to North Sea herring which raises the question of the magnitude of mixing between different herring stocks in the western Baltic Sea. In the following year (2023), we genetically assigned all aged fish to get a holistic overview of stock mixing and found a mixture of five stocks (Fig 1). To avoid misestimations of the respective herring populations in a phase of great uncertainty on the future of the herring stocks, genetic samples of all aged herring should be collected in future cruises of the BIAS. As demonstrated in Bekkevold et al. (2023), DTU Aqua has developed and validated a genetic mixed-stock analysis which is specialized to the Baltic and North Sea. This tool enables an assignment of individuals to specific subpopulations and will improve our understanding of stock mixing and movements of herring in the Western Baltic Sea. In future approaches, the consideration of genetic assignments will help us to further improve the calculation of stock indices for commercially exploited herring stocks in the Baltic Sea. This pilot study also aims at assessing if annual genetic assignment could improve the stock assessment of herring stocks. The results from the genetic analyses will further be used to evaluate earlier established stock separation algorithms and to develop improved ones based on this validated set of learning data.

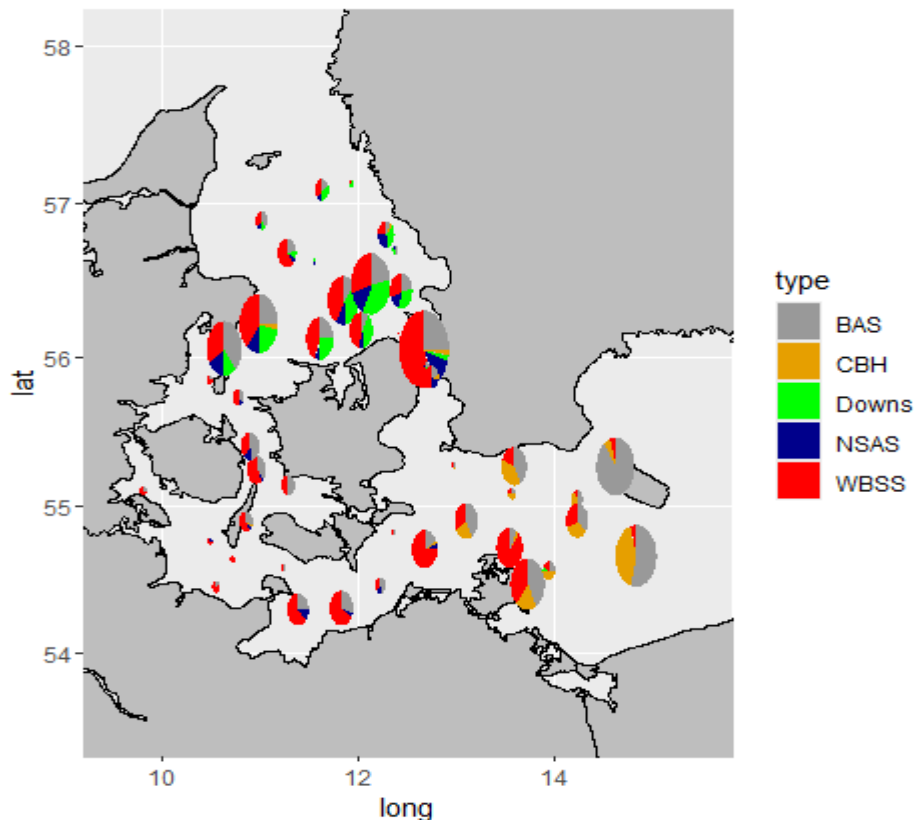


Figure 1: Genetic assignment of all aged fish (n=827) collected during the BIAS survey in 2023 (BAS=Baltic Autumn Spawner, CBH= Central Baltic herring, Down = Downs herring, NSAS = North Sea Autumn Spawner, WBSS = Western Baltic Spring Spawning herring).

Duration of the test study

The study will start in January 2025 and end in December 2027. By the end of 2026, an interim report will be prepared using the results of the sample analyses carried out to date. The findings from these analyses will be used to further optimize sampling, handling and logistics and adapt them accordingly for the remaining duration of the project. In 2027, sampling will be continued with adapted and optimized approaches to continue a time series with the new data. The project will be concluded in December 2027 with a comprehensive final report, which, in addition to the results on the spatial and temporal distribution of the stocks, will also contain clear recommendations for future sampling schemes and relevance for the stock index used for the stock assessment.

Methodology and expected outcomes of the test study

We will take extensive samples during the Baltic International Acoustic survey (BIAS) in the western Baltic Sea (SD 21-24). All herring sampled during this annual survey (biometrics, sex, maturity, age, etc.) will also be genetically characterized and allocated to the population of their origin (i.e. approximately 1,500 individuals per year). In recent years, the development of very precise markers has progressed, and the differentiation of genetic origin has even become possible down to the subpopulation level. Genetic classification is nowadays carried out using the single nucleotide polymorphism (SNP), which enables precise differentiation between different populations. Although it is generally not self-evident that the genetic “population” and the management unit “stock” represent the same group, in the case of herring in the western Baltic Sea this is at least the case to the extent that a genetic classification provides sufficient evidence of belonging to a specific managed stock (see Bekkevold et al., 2023). The genetic samples will be processed and analysed together with our Danish cooperation partners from the National Institute of Aquatic Resources at the Technical University of Denmark, as they are currently leading in the development of specific herring markers specialized for the Baltic Sea. The data obtained will be used to:

- Investigate annual differences in the spatial distribution of the different stocks and their contribution to the total abundance of herring in the area.
- Estimate the influence on the calculated stock indices and the estimated stock status if genetic allocation were to be considered (also important for the upcoming benchmark of the assessment of the Western Baltic Spring Spawning herring).
- Evaluate earlier established stock separation algorithms (based on growth and other biometrics) and develop new ones based on the genetically validated set of learning data (e.g. using machine learning approaches such as random forest)
- Use new stock separation algorithms to go back in time for years with no or little data regarding the catch composition regarding the distinct stocks

Along with evaluating the benefits of integrating genetic testing into standard monitoring, the study will develop clear recommendations on how this should best be implemented in the future in terms of best practice. In addition to summarizing the results and recommendations in interim and final reports, the results will also be presented at conferences and published in peer-reviewed journals.

Test study: Age validation of Baltic flatfish species

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

Name of the study: Age validation of Baltic flatfish species

Aim of the test study

In the Baltic Sea, flatfishes are the last remaining resource for the demersal fisheries since the collapse of the two Baltic cod stocks. The main commercially used flatfish species in the Baltic Sea are European plaice, European and Baltic flounder, common dab, turbot and brill.

In the ICES stock assessments information on age is used for plaice, flounder, and dab. Plaice is assessed using an analytical age-based stock assessment; age data from both commercial and survey data are used (the stocks is being benchmarked in 2024). The ICES stock assessments of flounder and dab use age information from the survey only; otoliths of flounder and dab from the commercial samplings in the Baltic Sea are only archived but not age-read (in Germany) because age data are not requested by ICES and the age determination is so uncertain that ageing is postponed to the time a clear guide is available based on age-validated otolith material. Turbot and brill are piscivorous flatfish species and are rare in the commercial catches; they are age-read but the uncertainty is high and presently the data are not used by ICES.

In the past, several ageing workshops of the different flatfish species have been conducted in the region, all showing substantial disagreement in age interpretation between the different national laboratories and age readers. And there has not been any major improvement, e.g. in plaice and flounder. Age has been validated in any of the Baltic flatfish stocks. The uncertainty struggling the age readers, comprises 1) the identification of the first increment and 2) the increment periodicity until the edge of the otolith (due to the cliff edge effect in older flatfish otoliths). Moreover, different methods are used in different countries (e.g. reading whole otoliths vs slicing, or instantaneous ageing under a stereo zoom microscope vs. ageing of photos with a reference scale on a monitor), making robust comparisons of age determinations between age readers and labs quite difficult.

Given the ongoing ageing uncertainties and lack of age validation results that could be transferred from the North Sea to the Baltic Sea, in 2017 the Thünen Institute of Baltic Sea Fisheries (Rostock, OF) started mark-recapture experiments using tetracycline-marked individuals. Since then, several dozens of recaptures were returned, some out for more than 1300 days. In addition, other otolith collections were compiled (see below). Major parts of these activities have already been financed by the DCF.

Due to time and staff constraints, this material and the connected data have not or only partially been analysed. Therefore, this test study aims at 1) analysing the available material and data and publish the results. The results will be 2) disseminated to other fisheries labs in the region in an attempt 3) to harmonise methodologies between national labs and ultimately, 4) improve the age data of flatfish stocks in the Baltic Sea – and maybe also in the North Sea.

Duration of the test study

The test study is scheduled from January 2025 to December 2027. The PhD candidate will use the three years to assess the available material, design and conduct own, complementary experiments and publish the results in internationally peer-reviewed journals.

Methodology and expected outcomes of the test study

The test study will benefit from the available material and expertise at the Thünen Institute of Baltic Sea Fisheries. There are nearly 50, 30, 20, and 5 recaptures of plaice, flounder, dab and turbot, respectively, in the OF, many of them with stored tetracycline-marked otoliths. In addition, dozens of tetracycline-marked juvenile plaice and flounder released in a small coastal lake have already been recaptured after months or years. Moreover, otoliths are available of tetracycline-marked juvenile plaice and flounder, kept in aquaria and killed in intervals for up to one year post-tagging. Finally, monthly samplings of length distributions, partly covering more than one complete year, of juvenile plaice, flounder and turbot from beaches near Rostock were collected since 2018. OF has a microscope (ZEISS Axiscope 7) which allows for high-resolution analysis of otoliths slices using UV light. Contacts to Deutsches Elektronen-Synchrotron (DESY) in Hamburg could allow for the analysis of trace element patterns in otolith slices. Moreover, there are contacts to SLU (Yvette Heimbrand) which can contribute with Laser Ablation-ICPMS.

Given the relatively slow growth, age validation studies of flatfishes may have to follow a separate methodological approach for the juveniles (to answer the question “where is the first increment?”) and

another approach for adults (“how many annual increments can be seen?”). This dichotomy was already applied in previous studies and important scientific contributions can already be expected from the available material and data: on age validation of juvenile and adult plaice, juvenile and adult flounder, juvenile turbot and adult dab.

Denmark, Sweden and Poland have been informed about the material and the data collected by OF a few years ago. There is a good level of trust from previous otolith exchanges which may facilitate the acceptance of age validation results, joint development of new ageing guides, and discussions on the possible implementation of modified methodologies in ageing Baltic flatfish species.

Test study: Bomb radiocarbon dating of Baltic cod otoliths

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

Name of the study: Bomb radiocarbon dating of Baltic cod otoliths

Aim of the test study

In this study, bomb radiocarbon (^{14}C) dating will be used to provide well-supported estimates of age, growth and longevity of historic and contemporary Eastern Baltic cod (EBC). A special area of this application is age validation in EBC, which has been pending for a long time, with consideration for Western Baltic cod otoliths.

The age determination of EBC has been pursued for decades and is difficult due to unclear patterns in ring formation. An age-based stock assessment had traditionally been used by ICES until 2015. To account for the uncertainty in ageing, ICES switched to a state-space mode (SS3) in 2019, which indirectly relies on age information. In 2024, the stock was further downgraded and yet age information is no longer used in the survey index. However, scientific and public interest in the EBC stock is remains high because the reasons for the stock decline are far from being understood.

Several workshops and scientific attempts were carried out in the past, but none could provide an unambiguous guide for ring interpretation of EBC otoliths. Even recently, dozens of tetracycline-marked recaptured of adult wild EBC collected during the international TABACOD project (2016-2020) suggested that the translucent band is mainly laid down during the spawning period in summer, but several factors made these results ambiguous: i) in some years in some specimens two rings per year were formed unlike only one in the other cod; ii) the time at liberty of the recaptures was often less than one year; iii) contemporary growth of EBC is slow so that the distances between otolith increments were small and differences in otolith measurements did not yield clear results; iv) the spawning time of EBC extends over several months so that a clear assignment of opaque or translucent zones to the period of spawning was uncertain; v) in addition to the problems related to understanding the periodicity of ring formation in adult EBC, there are also no chemically-marked recaptures of juveniles (i.e. age-0 cod) so that even the interpretation of the first increment is uncertain.

Consequently, bomb ^{14}C dating is an effective tool that has yet to be applied to this species. It is important to note that a solid bomb ^{14}C baseline is newly available based on a ^{14}C reference series going back to year 1938 that used archived Swedish cod otoliths from SD25 (personal communication, Allen H. Andrews).

Duration of the test study

Since an award procedure will be required before the project begins, the project duration is scheduled to run from January to December 2025. This study involves the awarding of a contract to Dr. Allen H. Andrews from the USA, world expert in bomb radiocarbon dating of otoliths (www.astrofish.me). The results will be published in internationally peer-reviewed journals.

Methodology and expected outcomes of the test study

Bomb ^{14}C dating is a technique that has evolved as a unique application in the age validation of marine and freshwater fishes and invertebrates. The approach relies on a conserved record of the rapid increase in ^{14}C that occurred in the aquatic environments (rivers, lakes, and oceans) of the world as a result of atmospheric testing of thermonuclear devices in the 1950's and 1960's. It has proven a useful method to validate the age, growth and longevity of many important fish species. Powder samples are micro-milled from the otoliths and analysed using mass spectrometry.

The otolith archive of the Thünen Institute of Baltic Sea Fisheries contains Baltic cod otoliths dating back to 1977 (i.e., after the peak bomb period and before and after the Chernobyl disaster in April 1986). The cod otoliths collected between 1977 and 1989 originate from the research cruises of the FFS "Eisbär" usually conducted twice per year and comprise cod otoliths from SD22, SD24 and SD25 (i.e., the same SD are the available ^{14}C baseline, see above).

The historic cod below 30 cm total length are of interest to fill in and reinforce the current ^{14}C reference curve for the years 1977 to 1989. From this period, also samples for an age validation study of historic EBC will be taken.

The earliest otoliths in 1977-79 are particularly interesting because they may date back to the bomb ^{14}C rise period as birth years, if they are slightly older than expected.

Moreover, some of the historic specimens were large (in terms of total lengths); these otoliths may be instrumental in establishing a revised lifespan.

Comparisons with contemporary EBC otoliths from SD25 and cross-comparisons with historic and contemporary WBC from SD22 may provide further insights into differences and changes in age, growth and longevity of the two Baltic cod stocks.

Region: NORTH SEA AND EASTERN ARCTIC

Test study: Genetics

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

Name of the study: 1 Genetics

Participation in **RWP NANSEA 2025-2027** test study (Y/N): Y

Test study: Regional Sampling Plan Pelagic Freezer trawler

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

Name of the study: 2 Regional Sampling Plan Pelagic Freezer trawler

Participation in **RWP NANSEA 2025-2027** test study (Y/N): Y

Test study: Bay of Biscay and Iberian waters common dolphin (*Delphinus delphis*) case study

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

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

Participation in **RWP NANSEA 2025-2027** test study (Y/N): N

Test study: Diadromous species data collection

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

Name of the study: 4 Diadromous species data collection

Participation in **RWP NANSEA 2025-2027** test study (Y/N): Y

Test study: North Sea bass (*Dicentrarchus labrax*) stock marine recreational fisheries sampling

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

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

Participation in **RWP NANSEA 2025-2027** test study (Y/N): N

Test study: Navigating New Waters: Economic Viability and Sustainability of Alternative North Sea Fisheries Resources

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

Name of the study: Navigating New Waters: Economic Viability and Sustainability of Alternative North Sea Fisheries Resources

Aim of the test study

German coastal fisheries are in a severe crisis. Diminishing fishing opportunities, difficult market conditions, and increasing competition for areas have forced many small businesses to close and left others without financing opportunities. Therefore, additional sources of income are urgently needed. Simultaneously, climate change and the recovery of significant stocks are driving remarkable changes in the North Sea ecosystem. Within this test study, we plan to investigate the potential economic viability of utilizing alternative fisheries resources in light of forecasted changes and historical fishing activities. The focus will be on pot fishing for lobster and brown crab, as well as the potential of seasonal fisheries for various squid species, bluefin tuna, and other increasingly prevalent species in the North Sea. In this process, we will involve active fishermen,

managers, and scientists in a participatory manner to derive recommendations from our studies that will benefit both scientific assessment strategies and fisheries management. Such investigations are crucial for advising policy and management, as they form the basis for recommendations, funding measures, and development strategies.

Duration of the test study

The test study is planned with one full-time position for seven months within the 2025-2027 period, with the potential for extension based on available funding. It will focus on analysing existing datasets, conducting literature reviews, and interviewing experts to assess the current state of fisheries and explore economic scenarios for alternative fisheries, along with providing strategic recommendations for data collection and management. If additional funding becomes available, a market demand analysis will be carried out to evaluate consumer demand and price elasticity for alternative fisheries products such as lobster, brown crab, bluefin tuna, and squid, identifying market opportunities and obstacles to inform targeted marketing strategies.

Methodology and expected outcomes of the test study

To rapidly and efficiently estimate the economic potential of alternative fisheries strategies, this study will focus on analyzing existing data sources, including historical catch data, market data, and relevant scientific studies. Expert interviews will be conducted to provide practical insights and assessments of current market developments, but on a reduced scale to fit the shortened study period.

The potential ecological footprint of pot fishing for lobster and brown crab compared to other types of fisheries in the North Sea will be evaluated, with particular attention to sustainability metrics such as bycatch rates, habitat disruption, and carbon emissions. The test study also investigates the potential of seasonal cutter fisheries targeting bluefin tuna and squid, incorporating biological data, historical sources, and expert insights. The experiences from pilot projects and existing fisheries in Norway, the United Kingdom, and other locations are also examined to determine their applicability to the German fleet.

Market analysis and scenario planning will be based on existing data, with a focus on providing short-term, actionable recommendations taking into account consumer demand and price elasticity for alternative fisheries products, such as lobster, brown crab, bluefin tuna, and squid. This will help in identifying potential market opportunities and obstacles, thereby facilitating the development of precise marketing strategies tailored to these products.

The study will also investigate how technological advancements can boost the efficiency and sustainability of alternative fisheries. Technological innovations and their effects on the efficiency and sustainability of fisheries will be evaluated through literature reviews and data analysis. Additionally, the current regulatory environment will be scrutinized to pinpoint any regulatory challenges or supports that might impact the economic viability of these fisheries. Based on this analysis, recommendations for necessary policy adjustments or new regulations to foster sustainable growth in this sector will be developed.

The project will culminate in a detailed final report that includes practical recommendations on how to integrate vessels catching alternative resources into the DCF data collection program. This will ensure that the findings are not only actionable but also significantly contribute to the advancement of Germany's fisheries sector, promoting a robust framework for sustainable fisheries management.

Test study: Tracing Origins, Ensuring Sustainability: A Comprehensive Study of Aquatic Biomass Management in Germany

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

Name of the study: Tracing Origins, Ensuring Sustainability: A Comprehensive Study of Aquatic Biomass Management in Germany

Aim of the test study

The test study addresses significant issues posed by a growing global population and the increasing consumption of fisheries and aquaculture products. Especially the challenge is faced to ensure sustainability of marine ecosystems and security of the food supply, while at the same time resources are limited. In Germany, a decline in catches and a stagnation of aquaculture production are observed, although the consumption of these products remains constant. These developments have led to an increasing shortage of raw materials and a significant drop in the self-sufficiency rate from over 40% in the 1980s to only 17% to 20% today. Despite extensive fish processing activities, particularly in Bremerhaven—one of the largest in Europe—Germany is increasingly dependent on imports. This dependency carries risks, especially if the availability of these raw materials could be impacted by geopolitical events such as wars or Brexit. Against this backdrop, the transparent tracing of the origin of fish and seafood and an accurate analysis of their production and processing processes are considered essential. The importance of efficient resource use, sustainable production and consumption patterns, and the reduction of food waste and byproducts are emphasized by the United Nations' sustainability goals (SDGs 2, 12, 9). Germany has committed to these goals with the German Sustainability Strategy, but open questions regarding the efficiency and sustainability of fish production are faced.

This test study seeks to analyze the flows of aquatic biomass in Germany to provide a comprehensive picture of the current situation and potential future paths, aiming to inform strategies and measures that ensure not only food security but also ecological sustainability and adaptability to climatic and geopolitical changes.

Duration of the test study

The test study is scheduled with one half-time position for 12 months and another for 21 months within the 2025-2027 period, with the possibility of extension based on available funding. During this time, a comprehensive review and analysis of current data will be conducted, methodologies will be refined, and origin and byproduct analyses will be completed. The study may further advance through the automation of analysis processes and the development of time series for major marine commodity systems, aimed at identifying key trends. Upon completion of the study, a detailed final report will be provided, summarizing the status quo, presenting sustainability analyses, and offering recommendations for future data collection and management strategies in the German aquatic bioeconomy.

Methodology and expected outcomes of the test study

The test study focuses on further developing a tracing method, previously used successfully to determine the origin of Atlantic salmon in the BMEL-supported project ([Monitoring System for the German Bioeconomy](#)). This method will be adapted to identify the origin countries of the most consumed fish types and product groups in Germany. If additional funding becomes available, the study will explore the potential of genetic traceability, using genetic markers to enhance the accuracy of origin tracing and verify species authenticity. This approach will significantly improve the ability to detect discrepancies or adulterations within the supply chain, enhancing transparency and reliability in product sourcing. The goal is to create a reliable method that not only facilitates origin tracing but also provides insights into production systems and clarifies the share of certain fish species within product groups. This method will also streamline time-series analyses and can be used for identifying production processes and analyzing specific species. Additionally, this method would support blockchain technology, offering transformative possibilities. Through seamless documentation of all production and processing steps on a blockchain, from production to retail, transparent and verifiable traceability can be achieved. Consumers would have access to real-time information on origin and production conditions by

scanning a Smart Label, while economic actors would benefit from improved auditability and more efficient communication within the supply chain, ultimately enabling better resource management.

A second focus of the test study is to assess the sustainability of specific fisheries and aquaculture products by integrating origin information into detailed sustainability analyses. Particular attention will be given to production conditions in the origin countries to understand their environmental and social impacts. Another key aspect is the investigation of byproducts from production in Germany. The study will analyze how these valuable resources are handled, identify areas for improvement, and highlight best practices. The goal is to precisely quantify the biomass produced and byproducts generated within the German aquatic bioeconomy for specific product groups. By recording the byproduct amounts of key fish species, the study will determine how much biomass is lost and how much is utilized in processing. This Rest Raw Material Flow Analysis, tracking trends over several years, will reveal opportunities to increase resource efficiency. Ultimately, the study will demonstrate which sustainability approaches are suitable and implementable for aquatic biomass, based on product origin knowledge. These findings will guide the integration of sustainability practices into the DCF fish processing framework.

Test study: Monitoring local and regional effects of offshore wind farms on fisheries resources to inform marine spatial planning

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

Name of the study: Monitoring local and regional effects of offshore wind farms on fisheries resources to inform marine spatial planning

Aim of the test study

The rapid expansion of offshore wind farms (OWFs), driven by the growing demand for renewable energy sources, intensifies competition for limited space among various stakeholders. In addition, the implementation of marine protected areas (MPAs) results in an increasing loss of fishing opportunities for mobile fisheries targeting demersal resources. The allocation of human activities in the North Sea region is governed by national maritime spatial planning processes or marine spatial planning (MSP). The intensification of human pressures, the reallocation of fishing activities together with climate change induced effects challenge the adaptive capacity of fisheries socio-ecological systems. Recent evidence suggests that multi-use options in MSP such as the co-location of OWF and fisheries could mitigate to some extent the direct socio-economic effects of fishing closures.

This study draws on existing data, knowledge and monitoring activities and aims at assessing fisheries benefits of OWF in the southern North Sea to guide decision-making for co-location fisheries and OWF. The focus is on brown crab (*Cancer pagurus*), a species which prefers rocky habitats but is known to be widely distributed in the southern North Sea in particular along the habitat boundaries of sand to coarse sand. As yet, stock boundaries for brown crab remain poorly understood. Both sexes are known to migrate widely at times, with females being able to travel large distances associated with spawning activity.

Further, brown crab is known to aggregate at OWF infrastructure such as monopiles with rocky scour protection, hence leading to density gradients from OWF to surrounding waters. This in turn suggests potential spill-over of biomass and potential long-term fisheries benefits. However, the development of co-location solutions is compromised by key knowledge gaps regarding the recruitment processes and migration pattern of brown crab, causing increased uncertainties in the predictions of the productivity of OWF areas and their long-time contribution to population developments.

The work plan will deliver on four specific objectives:

- 1) Fill data gaps with regard to abundance, recruitment, and migration of brown crab through targeted monitoring in and around OWFs
- 2) Aggregate and prepare catch and recruitment data to support the development of a stock assessment of brown crab in the central and southern North Sea
- 3) Contribute to the development of standardised monitoring strategies through collaboration with other institutions
- 4) Contribute to the development of sustainable co-location solutions for passive gear fisheries around OWF

Duration of the test study

The study is aimed to start January 2025 to December 2027 and entails three project phases. In the first phase the monitoring concepts for assessing brown crab recruitment success and migration patterns in and around OWFs will be developed and implemented. The second phase will require consolidation of methods, field work and data analysis, as well as the alignment with other OWF monitoring initiatives in the southern North Sea. The final year will comprise field work, synthesis of the results, an established workflow for the support of brown crab assessment as well as development of spatial and temporal explicit recommendations on sustainable co-location of passive gear fisheries around OWF.

Methodology and expected outcomes of the test study

Understanding stock structure requires long term data on where adults spawn and release larvae, the path of larval transport and settlement and the pathway of subsequent recruitment to the fishable stock. Further migration data from tagging helps strengthen this understanding population dynamics. In the first phase of the test study, the monitoring concepts to explore recruitment success will be defined. Catch data around distinct OWFs in the German EEZ of the North Sea indicate potential distinct aggregations of males and female during the summer months. With female crabs be rather found around 35- 40 depth in the north-eastern part of the EEZ and males in shallower water around 20-25 m in coastal waters. Building on existing larvae data and drift models, within the first-year additional larvae samples will be sampled in offshore waters in various distances to the OWFs Sandbank and Meerwind Süd/Ost and in coastal waters around the Borkum reef ground OWF. Sampling will take place in the summer months during the routine German small-scale bottom trawl survey (GSBTS). This will allow deriving key patterns of larval transport. The recruitment success will be further assessed with the help of larvae collectors which be placed within a 400m by 400m research zone inside the OWF Meerwind Süd/Ost. Those remain over summer and will be retrieved in autumn to count the number of settlers. By the end of 2025 new data on recruitment pathways and success will guide the field work to be carried out in the two subsequent years.

Migration patterns will be assessed during the second and third phase of the project. For this it is foreseen to install 3-5 "Open Protocol" receiver within the same research zone. Pot sampling is routinely carried out during the GSBTS, with sampling locations also close by the OWF Meerwind Süd/Ost. Here adult crab will be marked with acoustic tags. UK based acoustic studies have shown that stocks are regionally separated, revealing no migratory exchange between North Sea stocks and stocks of the Channel or Celtic Sea. Those tagging studies identified both local and distance migrations, whereby males and immature females were nomadic over relatively short distances. In contrast, recaptures of adult females identified more substantial distances travelled. In particular the second phase of the project data, aggregation and analysis will contribute to the development of stock assessment approaches carried out by the International Council for the Exploration of the Sea (ICES). The existing liaison with Wageningen Research, NL (Dr. Marcel Rozemeijer) will be intensified throughout the project and a scoping for standardized monitoring of adults and recruitment will be conducted. In the final phase of the project the data analysis will inform the development of sustainable and spatiotemporal explicit recommendation of co-locating passive gear fisheries around OWF.

Test study: Age determination of fish using DNA methylation

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

Name of the study: Age determination of fish using DNA methylation

Aim of the test study

The distribution of age classes is a crucial demographic parameter in populations, making accurate age estimation essential for effective fisheries management and conservation biology. Traditionally, age estimation in fish has relied on analyzing growth marks in hard structures such as otoliths. However, this method is not only lethal but also time-consuming, can be inaccurate for certain species, and is inapplicable to others. As a result, there is a need for the development of alternative methods. DNA methylation, an epigenetic modification, has emerged as a promising tool for determining the biological age of various organisms, including mammals and birds. This method aligns with the requirements of the Data Collection Framework (DCF) and the EU Multiannual Programme (EU-MAP) under Commission Delegated Decision (EU) 2021/1167, which emphasize the collection of accurate biological data to support effective fisheries management. The technique involves measuring the addition of methyl groups to specific DNA regions, a process that correlates with age. In vertebrates, DNA methylation typically occurs in a CpG context, where a cytosine is followed by a guanine. Age estimators derived from DNA methylation, known as epigenetic clocks, offer much higher accuracy compared to traditional age estimation methods. Recent advances in high-throughput sequencing and bioinformatics have made it feasible to apply this approach to non-model organisms such as fish. The development of DNA methylation-based age estimation methods directly supports the objectives of the DCF and EU-MAP, as outlined in Commission Implementing Decision (EU) 2021/1168, by potentially improving the accuracy and reliability of age data collected for key fish species.

This pilot study seeks to develop and validate a set of age-correlated loci for determining fish age based on DNA methylation patterns. By offering a more precise method for assessing fish populations, this approach has the potential to enhance the accuracy of fish population evaluations, thereby contributing to more effective management of fish stocks and more accurate age classification of endangered species. By providing a more precise method for assessing fish populations, this study also aims to enhance the quality of data collected under the DCF, thus contributing to the EU's broader efforts to ensure sustainable fisheries and informed management decisions in line with EU-MAP objectives.

Duration of the test study

The study will be conducted over a three-year period, from January 2025 to December 2027. The initial phase will involve sample collection and DNA extraction, followed by sequencing to identify age-correlated loci for constructing a species-specific epigenetic clock. In the second phase, the developed model will be validated using an independent set of samples, with DNA methylation-based age estimates compared against those obtained through traditional methods. Lastly, the findings will be prepared for publication in peer-reviewed journals. The timeline for this study is designed to ensure that the outcomes contribute to the ongoing data collection efforts under the DCF and EU-MAP, particularly as they relate to improving methodologies for biological data collection in fisheries management.

Methodology and expected outcomes of the test study

The project will begin by selecting one or more fish species, chosen based on their ecological significance, availability of genomic resources, and importance to fisheries management. Potential candidates include species like the European plaice (*Pleuronectes platessa*) and the European eel (*Anguilla anguilla*). This approach is in line with the DCF's mandate for Member States to collect and manage biological data that are

critical for the assessment and management of fish stocks, as established by Commission Delegated Decision (EU) 2021/1167.

Fish samples will be collected across a wide range of age classes, with DNA extracted from various tissue types. Parallel collection of otoliths will enable comparison with traditional age determination methods. High-throughput sequencing will be employed to identify CpG sites where methylation levels correlate with age, facilitating the construction of a species-specific epigenetic clock. This model will predict the chronological age of the fish based on methylation levels at these sites. The model will be trained on a subset of samples and validated with an independent sample set. Cross-validation techniques will ensure the model's robustness and prevent overfitting. The final phase will involve comparing DNA methylation-based age estimates with those obtained from traditional methods, such as otolith analysis, evaluating metrics like accuracy, precision, and potential biases. This comparison will shed light on the practical utility of DNA methylation as a tool for non-lethal age determination in fish, and its potential to replace or complement traditional techniques. Additionally, the study will offer valuable insights into fish aging and epigenetics, enhancing our understanding of how DNA methylation changes with age in fish and contributing to the broader field of epigenetics. This pilot study not only aims to advance scientific knowledge in fish aging and epigenetics but also ensures that the data collected and methodologies developed are fully aligned with the DCF and EU-MAP objectives, as mandated by Commission Delegated Decision (EU) 2021/1167 and Commission Implementing Decision (EU) 2021/1168. The project is thereby supporting the EU's broader goals for sustainable fisheries management by enhancing data quality and reliability in fisheries management aiming at the sustainable use of marine resources and ecosystem preservation.

Test study: PFAS Pattern - Contamination of Fish with Fluorinated Compounds from the River to the Sea

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

Name of the study: PFAS Pattern - Contamination of Fish with Fluorinated Compounds from the River to the Sea

Aim of the test study

This test study addresses the important topic of 'good environmental status' according to the Marine Strategy Framework Directive (MSFD) of fish from the German exclusive economic zone in the North Sea. This study also aligns with the Data Collection Framework (DCF) and the EU Multiannual Programme (EU-MAP), as established under Commission Delegated Decision (EU) 2021/1167 and Commission Implementing Decision (EU) 2021/1168, by addressing critical data gaps in biological and environmental data collection. Sustainable use of fish stocks is only possible if the ecosystem is healthy and the fish are not suffering from an increased burden of pollutants. The situation is particularly challenging with environmental chemicals that have recently gained mandatory status under the MSFD. Data on these chemicals are often unsatisfactory, especially concerning per- and polyfluoroalkyl substances (PFAS), which are widely used in various industrial and commercial applications due to their unique physicochemical properties. These substances are extremely persistent, bioaccumulative, and potentially toxic, leading to potential environmental and health problems. In the 2024 MSFD status report on German North Sea, the good environmental status for Chemical Contamination in Biota from the Exclusive Economic Zone (EEZ) is not assessed due to a lack of relevant data. In compliance with EU-MAP and DCF, this project focusses on the systematic collection and management of PFAS contamination data in aquatic ecosystems, thereby supporting the EU's broader objectives for sustainable fisheries and environmental protection. By helping to close existing data gaps and to improve analytical methods, this study aligns with the EU-MAP of the by addressing critical data gaps in the biological and environmental data collection requirements set forth in these frameworks. Investigating PFAS concentrations in marine and freshwater organisms is crucial to understanding the extent of environmental pollution and taking measures to protect ecosystems.

Duration of the test study

The test study is scheduled to run from January 2025 to December 2026. The project begins with enhancing the methodology for PFAS measurements using advanced analytical techniques, including liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS). By December 2025, the project aims to provide an overview of existing fish samples from the German river Weser, nearby coastal areas, and the German EEZ in the North Sea – available for the project. Initial analytical data from Weser fish samples using LC-MS/MS will also be available. Additionally, a review of existing PFAS data with relation to German waters and quality assurance programs will be conducted. Throughout 2026, the project will progress with the analysis of low-contaminated samples from the German EEZ and the validation of the expanded PFAS method through an international ring test. The data will be evaluated according to different PFAS patterns, and a scientific publication will be prepared. The project will conclude in December 2026 with a comprehensive final report detailing the new data and summarizing the current status of PFAS pollution in fish from German waters, in relation to MSFD assessment criteria. The report will also include recommendations for future data collection strategies to meet national MSFD obligations.

Methodology and expected outcomes of the test study

This research project focuses on the analysis of PFAS in fish from three distinct geographical regions: the Weser River, the German coastal areas of the North Sea, and the North Sea EEZ. The Weser River is a significant waterway flowing through heavily industrialized and agriculturally utilized areas, making it a potential source of PFAS contamination. The coastal areas are affected by a mix of fluvial inputs, maritime traffic, and atmospheric deposition, while the open sea is considered less directly impacted but can still be affected by pollutants. The selection of these regions allows for a comprehensive assessment of PFAS contamination across various marine environments and helps identify potential differences in contamination patterns and sources. The selection of these regions and the targeted analysis of PFAS align with the DCF's requirements for Member States to collect biological and environmental data, that can contribute to a comprehensive understanding and thus management of marine ecosystems as mandated by the EU-MAP. Fish are a particularly relevant sample matrix, as they play a crucial role in aquatic food webs and can accumulate PFAS both directly from water and through their diet. Special attention will be given to the patterns of various PFAS compounds to identify possible sources and transport pathways. It is expected that the PFAS profiles of fish from different regions will vary due to differing PFAS sources. The existing method, using liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS), will be employed for the identification and quantification of PFAS, including at least the following compounds: PFOS, PFOA, PFNA, PFDA, PFUnDA, PFTrDA, and PFTreA, with some still pending validation. A methodical expansion to include additional PFAS compounds, particularly those expected to be found in fish from the river Weser but possibly below detection limits in fish from the North Sea, is planned. The selection of additional PFAS will be based on the "PFAS-20 sum" according to the new Drinking Water Ordinance of 2024 (Appendix 2, Part I). This methodological approach not only enhances the accuracy of PFAS detection, but also fulfills the DCF and EU-MAP's criteria for data collection methods that support the evaluation of fish stock health and the broader marine environment. The final selection of the PFAS palette will be part of the project outcome.

The outcomes of this study are expected to contribute directly to the data collection mandates under the DCF, particularly in areas where PFAS contamination data is currently insufficient, thereby supporting the EU's efforts to maintain and restore marine environmental health and aquatic resources. This study contributes to closing knowledge gaps regarding the distribution and dynamics of PFAS in aquatic ecosystems and provides valuable data for the management and regulation of these persistent pollutants with regard to MSFD. For the investigation of PFAS, LC-MS/MS will be used, a method known for its high sensitivity and specificity, enabling reliable identification and quantification of PFAS in complex matrices. This analytical technique allows the detection and quantification of a wide range of PFAS compounds, including long-chain perfluorocarboxylic acids (PFCAs), perfluorosulfonic acids (PFSAs), and newer

substitutes like fluorinated ethers. By expanding the range of substances analyzed, this project ensures that the data collected are comprehensive and meet the high standards set by DCF and EU-MAP, ultimately aiding in the effective management and conservation of marine resources. The final report of this study will thus not only provide valuable insights into the PFAS contamination status of German aquatic systems, but also include recommendations for future data collection strategies, ensuring continued compliance with EU environmental and fisheries policies.

The overall goal of the project is to improve the data availability for assessing good environmental status under the MSFD through enhanced PFAS monitoring in fish including by:

- a) Methodological improvement in PFAS determination by expanding the range of PFAS substances analyzed.
- b) Quantification of PFAS concentrations in fish from the Weser River, German coastal areas, and the open sea.
- c) Assessment of differences in PFAS patterns and contamination levels across different fish species and habitats, compared to existing environmental and food regulations.

Text Box 1b: Other data collection activities

Region: Baltic Sea, North Sea and Eastern Arctic

Activity: RCGs Secretariat

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.

1 - RCGs Secretariat:

Participation in **RWP Baltic 2025-2027** other data collection activity (Y/N): Y

Activity: Regional data base and estimation System (RDBES)

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

2 - Regional data base and estimation System (RDBES)

Participation in **RWP Baltic 2025-2027** other data collection activity (Y/N): Y

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

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

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

Participation in **RWP Baltic 2025-2027** other data collection activity (Y/N): Y

Activity: Smart Dots

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

4 - Smart Dots

Participation in **RWP Baltic 2025-2027** other data collection activity (Y/N): Y

Activity: Catch, effort and sampling overviews for RCG Technical Meeting

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

5 - Catch, effort and sampling overviews for RCG Technical Meeting

Participation in **RWP Baltic 2025-2027** other data collection activity (Y/N): Y

Activity: WFD-DIADROMOUS

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

Name of the national activity: WFD-DIADROMOUS

1. Aim of the data collection activity

Data collected on biota in the EU Water Framework Directive (WFD) potentially contains valuable information on the European eel, salmon and sea trout. Building on the results of the previous workplan (i.e. review of German WFD fishing activities and related catch), the aim of this activity is to further elicit and facilitate it's use, both for the estimation of eel abundance (standing stock) and the collection of biological data from selected time series to extend or replace biological data collection under Eel_ComFish.

2. Duration of the data collection activity

The duration of the activity cannot be precisely estimated since progress depends on a variety of factors, such as the results of reviewing biological data, the availability and types of accompanying data or the existence and availability of a suitable digital river network.

3. Methodology and expected outcomes of the data collection activity

The tasks planned for the period 2025-2027 are based on the currently available information but fulfillment will depend e.g., on the result of data queries or developments in the international assessment of the stock (see e.g. DIASPARA, Nr. 101155914 - EMFAF-2023-PIA-FisheriesScientificAdvice). They may therefore include, but are not necessarily limited to:

- i. queries and review of collected biological data to extend or replace data collected under Eel_ComFish**
- ii. collection of additional information on individual samplings in order to normalize catches and facilitate modeling of abundance (e.g. single vs. multi-pass fishing, restocking influence)**
- iii. spatial allocation of samplings in a digital river network in order to facilitate modeling abundance of standing stock**

Activity: eDNA-DIADROMOUS

General comment: Describe either activities that are funded by the DCF without a direct link to the EU MAP specific requirements or WP template tables, like marine knowledge, or activities funded by other financial instruments and/or programmes that relate to EU MAP requirements, like actions under the marine action

plan. You can also include one-off specific studies for a particular end-user need that will not enter the regular data collection.

Name of the national activity: eDNA-DIADROMOUS

1. Aim of the data collection activity:

The proposed activities aim to create synergies with two other ongoing EMFAF-funded projects, in which water samples from German river systems are analyzed for pink salmon (*Oncorhynchus gorbuscha*) and other migratory fish species including lampreys, shads (*Alosa alosa*) and sturgeon (*Acipenser spp.*) but also DCF-relevant species such as eel (*Anguilla anguilla*), sea trout (*Salmo trutta*) and Atlantic salmon (*Salmo salar*). This approach will fulfill both national and regional needs, aligning with EU monitoring obligations under the Data Collection Framework (DCF). The results will be useful for national agencies, fisheries management bodies, and regional organizations but also international working group responsible for assessment, conservation and fisheries management.

Relation to EU MAP:

This activity links directly to the EU Multi-Annual Plan (EU MAP) by generating essential data on the presence, absence, and seasonal occurrences of key migratory species, contributing to the mandated data collection under the DCF. Moreover, the extended monitoring will help in addressing critical gaps in the current understanding of these species' population dynamics, particularly with regard to the European eel, Atlantic salmon, and trout populations. The project aims at investigating the feasibility of integrating eDNA methodologies into routine national monitoring as a long-term solution.

2. Duration of the Data collection activity

Jan 2025 – Dec 2027, depending on the sampling activities in the other related projects.

3. Methodology and expected outcomes of the data collection activity

Methodology and Risk Mitigation:

The project will utilize environmental DNA (eDNA) sampling to detect the target species in selected river basins, building on protocols developed in the PinkTrack project. The eDNA method is non-invasive, cost-effective, and provides a higher sensitivity for detecting rare or elusive species compared to traditional methods.

The sampling will occur in various management units, with an emphasis on both freshwater and estuarine environments. The resulting data will provide presence/absence information, as well as indications of species abundance where possible. These data will then be analyzed to establish correlations with other available monitoring data, including traditional capture data and environmental variables.

Risks and Mitigation:

1. **eDNA Degradation:** Environmental DNA can degrade quickly in certain conditions, which may affect detection accuracy. To mitigate this, sampling will be conducted under standardized protocols to ensure the preservation of DNA.
2. **False Positives or Negatives:** The specificity of eDNA markers will be critically evaluated to avoid false detections. To mitigate this, laboratory protocols will include the use of negative controls, replicates, and marker validation. The use of multiple markers for each target species will further reduce the risk of false positives or negatives.

3. **Limited Correlation with Traditional Data:** The ability to compare eDNA results with traditional capture methods may be limited due to differences in sampling methodologies.
4. **Weather and Environmental Conditions:** Variability in weather conditions and water quality may impact eDNA detection rates. The project will incorporate contingency plans, including flexible sampling efforts, schedules and alternative sampling locations, to ensure data integrity.

Expected outcomes:

The project will provide significant national benefits by enhancing the ability to monitor and manage key migratory species. Data on the presence and seasonal distribution of eels, salmon, trout, and other species will contribute to more effective management of fisheries and endangered species under national and EU frameworks. Furthermore, it will offer insights into the correlation between eDNA concentrations and species abundance, supporting efforts to develop quantitative estimates for species such as eel and salmon, as required under the DCF regulation.

In the long term, this project has the potential to significantly improve the capacity to monitor species that are difficult to track with traditional methods, providing a robust tool for conservation and fisheries management across the EU.

Activity: TELEMETRY-DIADROMOUS

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

Name of the national activity: TELEMETRY-DIADROMOUS

1. Aim of the data collection activity

This EMFAF-funded national project investigates the ecology, migration and threat of migratory fish species in German waters. The project aims to improve the data basis for diadromous fish species in Germany that are not assessed in the DCF and to work towards the development of effective population management and adapted protection for these species. Depending on the infrastructure provided within the project and the activities that will be realised, DCF data collection is planning to cooperate in the project in order to extend data collection to diadromous DCF species where possible (e.g. eel, salmon, sea trout).

In particular, tagging experiments planned as part of this project offer good opportunities to obtain additional information on diadromous DCF species. It is therefore planned to utilise the infrastructure (e.g. receiver network) and to collaborate during tagging campaigns to collect data on eel and if possible, also on salmon and sea trout (e.g. migration behaviour, mortality during migration). However, the planned data collection is only optional as it depends entirely on the activities that will be carried out within this project.

2. Duration of the data collection activity

June 2024 - December 2027

3. Methodology and expected outcomes of the data collection activity

The methodology and the study area have yet to be finalised as part of the project and therefore cannot be described in detail here. However, if possible, acoustic transmitters should be used on migrating silver eels to quantify mortality during migration. In addition, the installation of small detection devices (e.g. PIT tag antennas) can provide information on the movements of yellow eels and early life stages of salmonid species within river networks

Activity: Sampling and assessment of benthic species and seabed in the German EEZ

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

Name of the national activity: Sampling and assessment of benthic species and seabed in the German EEZ

1. Aim of the data collection activity

The spatial distribution of benthic biotopes is largely dependent on the sediment composition of the seabed. There is therefore an urgent need for detailed information on the sediment types occurring in the German EEZ as a basis for benthic biotope mapping, which is necessary for the national implementation of the European directives on the protection of flora, fauna and habitats (FFH) and for measures under the Marine Strategy Framework Directive (MSFD). The Thünen Institute of Sea Fisheries carries out regular monitoring programs in the German EEZ of the North Sea. As part of the project, synergies are to be created in cooperation with other federal authorities by expanding these monitoring programs to include sedimentological investigations for benthic biotope mapping.

Another focus of the project is the further development of non-invasive sampling strategies for benthic communities, which will be tested in practice in the German EEZ. The increasing need for exploitation and protection in the North Sea makes biological sampling using conventional, invasive methods more difficult. There is therefore an urgent need for alternative sampling methods in order to be able to fulfil official monitoring obligations in the entire EEZ in the future.

2. Duration of the data collection activity

June 2024 - December 2027

3. Methodology and expected outcomes of the data collection activity

Approach

- Sedimentological characterization by means of grab sampling and subsequent granulometric analysis supplemented by hydroacoustic investigations.

- Analysis of eDNA with qualitative and quantitative validation of the benthic fauna and implementation of the results in official monitoring programs.

Our Research Questions

- What is the sediment composition in the German EEZ of the North Sea and how does it influence the spatial distribution of benthic biotopes?
- To what extent are genetic methods suitable for the qualitative and quantitative assessment of benthic fauna?
- How can non-invasive sampling methods be implemented in official monitoring programs?

Activity: Ecosystem-friendly fishing gears in the North Sea and Baltic Sea

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

Name of the national activity: Ecosystem-friendly fishing gears in the North Sea and Baltic Sea

1. Aim of the data collection activity

The impact of fishing on the ecosystem and its components is largely dependent on the fishing gear used. However, this also means that the systematic further development or new development of fishing gear is a decisive key to the development of ecosystem-friendly fisheries in the North and Baltic Seas.

This national project, funded by EMFAF, is working on technical solutions to reduce the environmental impact of fishing in German waters and at the same time maintain or strengthen the economic power of fishery. Within the project alternative fishing gears for German fisheries will be developed and tested with primary focus on the brown shrimp fishery in the North Sea.

The North Sea brown shrimp fishery currently uses beam trawls, which are criticized for their bottom contact, high energy demand and relatively high bycatch. To begin with, the project investigates the possibility of passive brown shrimp fishery, which is assumed to tackle the most of the above-mentioned issues of this fishery.

2. Duration of the data collection activity

June 2024 - December 2027

3. Methodology and expected outcomes of the data collection activity

The methodology and the study area have yet to be finalised as part of the project and therefore cannot be described in detail here. The search for potential passive fishing gears to be used in this fishery, will include a worldwide review on gear alternatives to catch small crustacean species. From a current status, this might include stownet fisheries (the current brings the shrimp into the nets) and traps and pots (the shrimp move actively towards the fishing gear). The finally selected gears will be adapted to local requirements and tested on North Sea fishing grounds.

In any case, the work of this project will be linked to other international projects aiming to improve the North Sea brown shrimp fishery.

SECTION 2: BIOLOGICAL DATA

Text Box 2.3: Diadromous species data collection in freshwater

Region: Baltic Sea, North Sea and Eastern Arctic

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

Method used for collecting data

Eel (*Anguilla anguilla*)

As required by Decisions 2021/1167 and 2021/1168, the data collection in all German Eel Management Units (EMUs) will be organised as follows:

- Biological variables (individual length, age, sex, weight and maturity (stage))
 - Silver eels from commercial catches will be sampled twice in each EMU during this WP period.
 - Where feasible, samples from commercial fisheries will be substituted with samples from catches for Trap & Transport. Whether this will be possible depends on the approval of regional authorities.
 - Eels sacrificed for DCF sampling may be further utilized for analysis of eel quality (e.g. parasite infestation, contaminant load, diseases or fat content). In addition, stable isotope ratios in tissues of eels from different origins will be analysed. If necessary, additional eels may be sampled for these analyses.
- Annual catch quantities
 - As reported by fishers and obtained by national/regional catch statistics
- Recruitment
 - Natural recruitment: regional (non-DCF) glass eel monitoring/ICES time series
 - Stocking: number of glass eels and elvers, as reported in national/regional stocking statistics
 - Larval surveys in the spawning area of the European eel (Sargasso Sea).
- Abundance of standing stock and silver eel escapement
 - Calculated via German Eel Model III (Oeberst & Fladung 2012)

Salmon (*Salmo salar*) in the North and Baltic Sea

German populations of *S. salar* are extirpated and reintroduction measures have not yet led to stable populations in any river systems of the Baltic and North Sea. As a result, German salmon stocks currently do not contribute to the international stock assessments by WGNAS/WGBAST and active data collection within the DCF framework is considered not feasible due to the very low numbers. However, available data and information from regional authorities will be collected annually and provided to relevant end-users and data calls in order to ensure regular updates on the state of German salmon populations. The above-mentioned analysis of Water Framework Directive data also applies for *S. salar* (see textbox WFD-Diadromous).

Sea trout (*Salmo trutta*) in the North Sea

Currently, there is no international assessment for sea trout in the North Sea and Eastern Arctic region. German sea trout stocks in these regions are low and active data collection is considered not feasible due to low numbers. However, available data and information from regional authorities will be collected and provided to relevant end-users and data calls on request. The above-mentioned analysis of Water Framework Directive data also applies for *S. trutta* (see textbox WFD-Diadromous).

Sea trout (*Salmo trutta*) in the Baltic Sea

Trout_data: Monitoring of Baltic Sea trout parr densities lies de jure in the responsibility of the individual federal states in Germany (Schleswig-Holstein and Mecklenburg-Western Pomerania). Therefore, the data are collected by the federal state authorities. Available data on parr abundances from the federal authorities will be queried, compiled and transmitted annually to the relevant end users by the Thünen Institute. Densities of trout parr in German Baltic nursery streams are evaluated by electrofishing following the Trout Habitat Parr Index method as recommended by the corresponding assessment group ICES WGBAST. Parr densities (number of 0+ (3-15 cm TL) / 100m²) are monitored by means of one-pass electrofishing of sites in relevant Baltic tributaries. Electrofishing campaigns are usually scheduled in summer/autumn.

Trout_camera: Monitoring of ascending adult Baltic Sea trout lies de jure in the responsibility of the individual federal states in Germany (Schleswig-Holstein and Mecklenburg-Western Pomerania). Therefore, the data are collected by the federal state authorities. Available data on ascending adults/river from the federal authorities will be queried, compiled and transmitted annually to the relevant end users. Currently video camera systems have been installed in 12 reference rivers with relevant sea trout populations draining in the Baltic Sea. The video cameras automatically document ascending sea trout in the individual rivers. A special AI-based software was developed for the automatic evaluation of the recorded video sequences. The software has been trained annually since 2017 using the video data of each season. The accuracy of detections is currently 98%. Available data on ascending adult spawners from the federal authorities will be queried, compiled and transmitted annually to the relevant end users by the Thünen Institute.

Text Box 2.4: Recreational Fisheries

Region: Baltic Sea

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

RWP: So far, there exists no regional work plan for recreational fisheries data in the Baltic Sea.

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

1. Multispecies off-site survey: A nation-wide representative off-site survey (telephone or mail) followed by a diary study is planned for 2027/2028. The decision on the survey contact method (telephone or mail) will depend on results of a current project (<https://www.thuenen.de/en/institutes/baltic-sea-fisheries/projects/living-marine-ressources/mareechange>) that tests the response rates of mail surveys versus telephone surveys in Germany. The background to this is the general decline in response rates in telephone surveys in Germany (Weltersbach et al., 2024). Depending on the results of this project the sample size will be determined. The off-site survey will be designed to identify anglers in the German population (no register available), to collect their socio-demographic parameters, information on angler heterogeneity, and to estimate fishing effort for different platforms and water bodies (North Sea, Baltic Sea and inland waters) as well as to recruit participants for a subsequent diary study. It is planned to conduct the survey in 2-3 waves to decrease recall bias. Selection probabilities will be proportional to the number of households per municipality. Household size and number of persons in a household being recreational anglers will be determined. An angler will be defined as a person who had fished at least once in Germany during the last 12 months preceding the survey. All persons that had been fishing in Germany in the last 12 months, or who plan to go fishing there in the next 12 months will be asked to participate in a diary survey. All diary participants will be asked to report every single angling day in Germany over a certain observation period (depending on the number of survey waves). For every angling day, the date, time, fishing location, angling platform (boat, charter boat, shore), target species, and the number of fish caught (harvest and release component) per species has to be reported. In order to maintain the motivation to participate, to retrieve diary data, and to reduce panel attrition bias, the participants are contacted by telephone, email or mail regularly during the observation period. In order to obtain representative estimates of the size of the German angler population, the corresponding fishing effort and catches, harvests and releases for all species both the data of the off-site survey and the diary survey will be weighted and extrapolated in various ways following the data collection.

References:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

2. Multispecies on-site survey: The multispecies on-site survey aims to collect information on recreational fishing characteristics and catch rates for all species in the Baltic Sea. The on-site survey is carried out along the outer German Baltic coastline by survey agents and uses a stratified random sample of sampling days and access points selected without replacement (harbours, boat ramps, piers and beaches; Weltersbach et al., 2024). The coastline was divided into five spatial strata for sampling, with harbours and beaches as access points and days as primary sampling units. Each day is divided into three six hours shifts: 6:00-12:00; 12:00-18:00 and 18:00-00:00. Sampling at night (00:00-06:00) will not be conducted due to very low fishing effort during this time. Access points, days (7 days per month and stratum) and shifts are randomly selected within the spatial strata. However, sampling effort is increased for those days when anglers most frequently go fishing (weekends and public holidays). Observation time per access point is 6 hours. The fishing methods are grouped into shore fishing (surf angling and wading), boat fishing (including float tubes and kayaks), and charter vessel fishing. The following data are collected during the interviews: the number of caught and released fish per species, the sociodemographic factors gender, age, place of residence (postal code), avidity (measured as the reported number of fishing days in the German Baltic Sea in the past 12 months), weather conditions and the coastal state and specific location at which the interview took place.

References:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

3. Multispecies length sampling: Length frequency distributions of sea-based recreational catches (harvest and releases of all species, including western Baltic cod) are collected during onboard measurements by survey agents on charter vessel trips along the German Baltic coast. The sampling frame covers the German charter boat fleet in ICES subdivisions 22 and 24. Length measurements are conducted via random onboard sampling based on a recreational charter boat registry (for details see Weltersbach et al., 2024). This registry includes all recreational charter boats used for recreational fishing along the German Baltic coast. One assignment per month will be conducted. Information on the overall recreational catch composition and sociodemographic data of the individual anglers are also collected. The individual charter boat is randomly selected for each sampling day. However, random selection can be affected by weather conditions (i.e., weather-related cancellations) and the availability of the selected charter boat (e.g., level of bookings, dry dock phase, approval of the crew) and sometimes sampling dates or charter boats have to be changed (Weltersbach et al., 2024). During some trips, not all fish can be measured because of very high catch rates. In such cases, all fish are separately counted and representative subsamples are measured. This approach ensures that all fish caught on the charter boat fishing trip are registered by the survey agents, minimizing the risk of under- and non-reporting (Weltersbach et al., 2024).

References:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

4. Salmon camera survey: In Germany, recreational salmon fishing occurs only from specialized trolling boats in a relatively small area off the Baltic Island of Ruegen (ICES Subdivision 24). Remote cameras are installed at three marinas (Glowe, Lohme, Wiek) that collectively provide access to > 65% of all trolling boats participating in the German salmon trolling fishery, to quantify fishing effort from these marinas (Hartill et al., 2020; Weltersbach et al., 2024). Each system consists of a network camera connected to a wireless network router. Images are stored on a Solid-State Drive (SSD) connected to the router and data are manually retrieved every two months. Marina entrance choke points are monitored, providing coverage of all boats leaving the marinas. Recording is restricted to the salmon trolling season (December to May) and images are only taken between 5 am and 3 pm when trolling boats are known to leave the marinas to increase cost efficiency. Depending on mounting location, the cameras take 12-20 time-stamped images per minute aiming to reach a census of all boats leaving the marina. Image analysis and boat counting is conducted via manual visual inspection of the images in time-lapse (30 frames viewed per second). Salmon trolling effort from non-camera-monitored marinas is extrapolated using regular instantaneous trolling boat counts (every two weeks at night or on stormy days) covering all relevant marinas with salmon trolling boats, and the proportions of trolling boats that went out for fishing is derived from the marinas with camera monitoring (see Weltersbach et al., 2024).

References:

Hartill BW, Taylor SM, Keller K, Weltersbach MS (2020) Digital camera monitoring of recreational fishing effort: Applications and challenges. *Fish Fisheries* 21(1):204-215.

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

5. Salmon on-site survey: The salmon trolling boat camera monitoring is complemented by random on-site interviews of salmon trolling anglers in four relevant marinas (including the marinas where the camera monitoring is conducted) to determine catch, harvest and release rates (each per boat) and to collect biological catch data and socio-economic information (Weltersbach et al., 2024). The survey agents collect length and weight data from released and retained salmon and sea trout during the on-site access point survey. Sampling days and access points are randomly selected with replacement. Between 10 and 12 samplings days are planned per month during the salmon trolling season from December until May. Lengths and weights are usually reported by the anglers and not self-measured. Occasionally, additional data or samples such as individual weights, and scale and tissue samples are collected for certain end-user needs.

References:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000.

Region: North Sea and Eastern Arctic

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

RWP: So far, there exists no regional work plan for recreational fisheries data in the Baltic Sea.

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

1. Multispecies off-site survey: A nation-wide representative off-site survey (telephone or mail) followed by a diary study is planned for 2027/2028. The decision on the survey contact method (telephone or mail) will depend on results of a current project (<https://www.thuenen.de/en/institutes/baltic-sea-fisheries/projects/living-marine-ressources/mareechange>) that tests the response rates of mail surveys versus telephone surveys in Germany. The background to this is the general decline in response rates in telephone surveys in Germany (Weltersbach et al., 2024). Depending on the results of this project the sample size will be determined. The off-site survey will be designed to identify anglers in the German population (no register available), to collect their socio-demographic parameters, information on angler heterogeneity, and to estimate fishing effort for different platforms and water bodies (North Sea, Baltic Sea and inland waters) as well as to recruit participants for a subsequent diary study. It is planned to conducted the survey in 2-3 waves to decrease recall bias. Selection probabilities will be proportional to the number of households per municipality. Household size and number of persons in a household being recreational anglers will be determined. An angler will be defined as a person who had fished at least once in Germany during the last 12 months preceding the survey. All persons that had been fishing in Germany in the last 12 months, or who plan to go fishing there in the next 12 months will be asked to participate in a diary survey. All diary participants will be asked to report every single angling day in Germany over a certain observation period (depending on the number of survey waves). For every angling day, the date, time, fishing location, angling platform (boat, charter boat, shore), target species, and the number of fish caught (harvest and release component) per species has to be reported. In order to maintain the motivation to participate, to retrieve diary data, and to reduce panel attrition bias, the participants are contacted by telephone, email or mail regularly

during the observation period. In order to obtain representative estimates of the size of the German angler population, the corresponding fishing effort and catches, harvests and releases for all species both the data of the off-site survey and the diary survey will be weighted and extrapolated in various ways following the data collection.

References:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

Text Box 2.5: Sampling plan description for biological data

Region: Baltic Sea

Sampling scheme name: Baltic SPF regional

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

Sampling scheme name (or identifier): Baltic SPF regional

RWP Baltic SPF regional implementation years 2025-2027

Regional coordination for sampling Small Pelagic Fish in the Baltic

The regional coordination for sampling Small Pelagic Fish in the Baltic is under development in the RCG Baltic ISSG on Small Pelagics. Additional information on RWP agreed sampling schemes: Annex 1.1 on Baltic SPF regional.

Germany is sampling small pelagic stocks (herring and sprat) according to the agreed RWP sampling protocols. The collected data are provided to the ISSG and are uploaded to the RDBES. **However, the German sampling scheme for small pelagics in the Baltic samples on a higher spatial and temporal resolution than agreed upon in the RWP (see Text Box 2.5).**

Sampling scheme name: OF Observer/OF Self Sampling

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.

OF Observer/OF Self Sampling

The German fisheries in the Baltic Sea are separated into three fleet segments: 1) Demersal fish, 2) Sprat, 3) Herring.

The demersal fleet is further subdivided into 1a) passive SD2224, 1b) active SD2224, 1c) active SD2532. Each year, a list of vessels is produced using the landings data from the previous year (e.g. the lists for 2025 are compiled 2024 with data from 2023). The lists are sorted by total landings per vessel. The fleet segment lists of 1a, 1b and 1c include all vessels that contributed ~60%, ~90 and ~90% of the total landings, respectively. The list of vessels is then randomised by assigning a random number to each vessel on a list. The sequence of the random number determines the sequence of contacting the vessel. There is only one list for the entire year. If all vessels from a list have been contacted before the year ended, the same list is used again. Sampling is conducted all year-round and the effort is distributed according to fishing seasons. Each phone call with fishers is documented since 2010. This forms the basis for our recordings of success/non-response/rejection/refusal rates. In addition, we record if the sample is random or based on expert knowledge. Expert knowledge partly is used to ensure efficient sampling coverage of periods/strata with very low landings, e.g. demersal species in quarter 3. If a vessel is selected, any fishing trip is sampled, except for trips targeting freshwater species, herring or sprat (see below).

An at-sea observer catch sampling programme (including concurrent sampling of landings, discards and unwanted by-catches) is conducted for the demersal fleet segments. In addition, a self-sampling programme with fishers is used to collect biological and catch data; unsorted commercial catch samples of usually 150-200 kg from the last or last but one haul is purchased. Diagnostics show that sampled trips are representative of the overall national population of vessels and their spatio-temporal dynamics. In addition, opportunistic sampling of landed discards (BMS cod under the landing obligation) may take place.

The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

The sprat catches mainly originate from two pelagic trawlers. Since 2013, we have a self-sampling programme where each vessel provides one frozen catch sample (5 kg) from each trip. This covers the ICES subdivisions 25-29. In addition, the minor sprat catches in SD22 and SD24 are sampled opportunistically upon expert knowledge and notification from the few fishers that are temporarily targeting sprat.

The fleet targeting herring is subdivided into 3a) passive SD2224, 3b) active SD24. For 3a, five major ports around the Greifswald Bay - the major fishing ground - are sampled using 50 kg unsorted catch samples from a vessel per port. Samples from the ports are taken from a known group of fishers, which are considered representative for the respective fleet given that similar mesh sizes are used. For 3b, a 30 kg unsorted catch sample is provided by a vessel. During the herring season (Nov-Apr), each week either 3a or 3b is sampled.

The assessment input data for small pelagics are prepared by quarter, gear (for herring: gillnet, trapnet, pelagic trawl; for sprat: pelagic trawl) and ICES Subdivision (for herring: SD 22 and 24; for sprat: SD 22, 24, 25-29). The landings are raised by the corresponding total length/age-length distributions of the commercial samples.

Region: North Sea and Eastern Arctic

Sampling scheme name: SF Observer

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.

SF Observer

Overall, approx. 175 vessels are operating in the North Sea, the majority belonging to the brown shrimp fleet (144 boats in 2023). All other segments operating in the North Sea consist of only a few vessels (on average 2 to 5 vessels). The same vessels can belong to more than one sampling frame. For instance, the same pelagic trawlers are targeting North Sea herring or blue whiting in ICES Div. 6b depending on the season.

The sampling frames for biological data are described in Table 2.5. Vessels to be sampled are selected from a telephone list. However, the approach is an opportunistic randomised PSU selection and not fully probability-based due to the low number of vessels within one segment. The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

The only fleet segment with a greater number of vessels is the brown shrimp fishery, yet the target species is not assessed by ICES and there is no TAC. Some segments in the high-seas fisheries might consist only of one trip of a three-month duration by a huge vessel and high catch leading to a nearly exhaustive sampling of the segment.

Overall, the sampling frame is designed to fulfil the sampling obligations according to Table 2.1 and to understand the catch compositions of the important fisheries in these regions qualitatively and quantitatively as well as to enable and secure the data delivery to the assessment working groups. Adaptations to the selected fisheries will be carried out after regional work plans and/or agreements have been established.

For the North Sea, sampling is mainly undertaken by at-sea-sampling only. This is because in the harbours of the German North Sea coast, there are hardly any auctions and direct fish sales. Landings are directly transferred from the vessel to different processing plants in Germany, but also to processing plants in foreign countries. Overall, 76%, 83% and 86% of the landings occurred in foreign countries in 2021, 2022 and 2023, respectively. Therefore, it is virtually impossible to sample sufficiently at harbours. On occasions, co-sampling with the fishery is initiated in order to fulfil sampling obligations in cases the placement of an observer on a fishing trip is not possible.

Region: North East Atlantic

Sampling scheme name: SF Observer

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.

SF Observer

Overall, approx. 25 vessels are operating in the North Atlantic region. The segments operating in the North Atlantic consist of only a few vessels (on average 2 to 5 vessels). The same vessels can belong to more than one sampling frame. For instance, the same pelagic trawlers are targeting North Sea herring or blue whiting in ICES Div. 6b depending on the season.

The sampling frames for biological data are described in Table 2.5. Vessels to be sampled are selected from a telephone list. However, the approach is an opportunistic randomised PSU selection and not fully probability-based due to the low number of vessels within one segment. The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

Segments in the high-seas fisheries might consist only of one trip of a three-month duration by a huge vessel and high catch leading to a nearly exhaustive sampling of the segment.

Overall, the sampling frame is designed to fulfil the sampling obligations according to Table 2.1 and to understand the catch compositions of the important fisheries in these regions qualitatively and quantitatively as

well as to enable and secure the data delivery to the assessment working groups. Adaptations to the selected fisheries will be carried out after regional work plans and/or agreements have been established.

For the North Atlantic, sampling is mainly undertaken by at-sea-sampling only. This is because in the harbours of the German North Sea coast, there are hardly any auctions and direct fish sales. Landings are directly transferred from the vessel to different processing plants in Germany, but also to processing plants in foreign countries. Overall, 76%, 83% and 86% of the landings occurred in foreign countries in 2021, 2022 and 2023, respectively. Therefore, it is virtually impossible to sample sufficiently at harbours. On occasions, co-sampling with the fishery is initiated in order to fulfil sampling obligations in cases the placement of an observer on a fishing trip is not possible.

Region: Other regions NAFO areas

Sampling scheme name: SF Observer

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.

SF Observer

Only 2 vessels are operating in the NAFO region.

The sampling frames for biological data are described in Table 2.5. The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

Segments in the high-seas fisheries might consist only of one trip of a three-month duration by a huge vessel and high catch leading to a nearly exhaustive sampling of the segment.

Overall, the sampling frame is designed to fulfil the sampling obligations according to Table 2.1 and to understand the catch compositions of the fishery in this region qualitatively and quantitatively as well as to enable and secure the data delivery to the assessment working groups. Adaptations to the selected fisheries will be carried out after regional work plans and/or agreements have been established.

For the NAFO area, sampling is undertaken by at-sea-sampling only. This is because in the harbours of the German North Sea coast, there are hardly any auctions and direct fish sales. Landings are directly transferred from the vessel to different processing plants in Germany, but also to processing plants in foreign countries. Overall, 76%, 83% and 86% of the landings occurred in foreign countries in 2021, 2022 and 2023, respectively. Therefore, it is virtually impossible to sample sufficiently at harbours. On occasions, co-sampling with the fishery is initiated in order to fulfil sampling obligations in cases the placement of an observer on a fishing trip is not possible.

Region: Other regions (Eastern Central Atlantic (FAO area 34)) – CECAF

Sampling scheme name: CECAF at sea sampling

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.

CECAF at sea sampling

RWP LDF 2025-2027

The agreement in Long Distance Fisheries Regional Work Plan 2025-2027 is applicable to MS (Y/N): Y

Details can be found in text box 2.5 of NWP NLD 2025-2027.

Data collection and data provision to the end user is coordinated and executed by NLD under the joint sampling programme based on “Multi-lateral agreement for 2025-2027 between Germany, Latvia, Lithuania, The Netherlands and Poland for biological data collection of pelagic fisheries in CECAF waters”. The multi-lateral agreement is valid until the end of 2027 with an option for extension.

The sampling scheme is described in the Annex 1.1

Region: Other regions (South-Pacific (FAO area 81 and 87)) – SPRFMO

Sampling scheme name: SPRFMO at sea sampling

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.

SPRFMO at sea sampling

RWP LDF 2025-2027

The agreement in Long Distance Fisheries Regional Work Plan 2025-2027 is applicable to MS (Y/N): Y

Details can be found in text box 2.5 of NWP NLD 2025-2027.

Data collection and data provision to the end user is coordinated and executed by NLD under the joint sampling programme based on “Multi-lateral agreement for 2025-2027 between Germany, Latvia, Lithuania, The Netherlands and Poland for biological data collection of pelagic fisheries in SPRFMO waters”. The multi-lateral agreement is valid until the end of 2027 with an option for extension.

The sampling scheme is described in the Annex 1.1

Region: Other regions (North-Pacific (FAO area 61 and 67)) - NPFC

Sampling scheme name: NPFC at sea sampling

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

Sampling scheme name (or identifier): NPFC at sea sampling

RWP LDF 2025-2027

The agreement in Long Distance Fisheries Regional Work Plan 2025-2027 is applicable to MS (Y/N): Y

Details can be found in text box 2.5 of NWP NLD 2025-2027.

Data collection and data provision to the end user is coordinated and executed by NLD under the joint sampling programme based on “Multi-lateral agreement for 2025-2027 between Germany, Latvia, Lithuania, The Netherlands and Poland for biological data collection of pelagic fisheries in NPFC waters”. The multi-lateral agreement is valid until the end of 2027 with an option for extension.

The sampling scheme is described in the Annex 1.1

Text Box 2.6: Research surveys at sea

Region: Baltic

Research survey: Baltic International Trawl Surveys – BITS_Q1

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

Research survey: Baltic International Trawl Surveys – BITS_Q1

RWP Baltic 2025-2027

Research survey: Baltic International Trawl Surveys – BITS_Q4

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

Research survey: Baltic International Trawl Surveys – BITS_Q4

RWP Baltic 2025-2027

Research survey: Baltic International Acoustic Surveys – BIAS

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

Research survey: Baltic International Acoustic Surveys – BIAS

RWP Baltic 2025-2027

Research survey: Sprat Acoustic Surveys – SPRAS

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

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

Research survey: Sprat Acoustic Surveys – SPRAS

RWP Baltic 2025-2027

Research survey: Rügen Herring Larvae Survey (RHLS)

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

Research survey: Rügen Herring Larvae Survey (RHLS)

1. Objectives of the survey

Target species is the western Baltic spring-spawning herring. The main aim is to monitor spawning activity and reproductive success of the spring-spawning herring of the Western Baltic Sea in its main spawning area, the Greifswald Bay. Target data are high-resolution spatial and temporal records of the larval abundance during the entire spawning period as well as hydrographic data (temperature, salinity and oxygen). The collected data are stored nationally and in the ICES Fish Eggs and Larvae data base. The survey is conducted annually in February to June and November.

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.

Detailed descriptions of the survey design are provided in:

Polte P (2013) Ruegen herring larvae survey and N20 larval index. Working Document WKPELA. Benchmark Workshop on on Pelagic Stocks (WKPELA): 4-8 February 2013. Copenhagen: ICES, 10 p

Polte P, Kotterba P, Hammer C, Gröhsler T (2014) Survival bottlenecks in the early ontogenesis of Atlantic herring (*Clupea harengus*, L.) in coastal lagoon spawning areas of the western Baltic Sea. ICES J Mar Sci 71(4):982-990, doi:10.1093/icesjms/fst050

Oeberst R, Klenz B, Gröhsler T, Dickey-Collas M, Nash RDM, Zimmermann C (2009) When is year-class strength determined in western Baltic herring? ICES J Mar Sci 66(8):1667-1672, DOI:10.1093/icesjms/fsp143

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

not applicable

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

not applicable

Research survey: Fehmarn Juvenile Cod Survey (FEJUCS)

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

Research survey: Fehmarn Juvenile Cod Survey (FEJUCS)

1. Objectives of the survey

Target species is the western Baltic cod. The main aim is to monitor the cohort strengths of age-0 and age-1 cod during autumn in the Western Baltic Sea. Target data are length-frequency distributions of undersized cod caught in commercial pound nets located near Fehmarn (the centre of the main spawning area of western Baltic cod). The collected data are stored and processed nationally. The survey is conducted annually in September to December.

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 method is described in the Working Document Number 18, p. 293-310 of ICES 2019, Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>.

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

National survey only.

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

National survey only.

Region: North Sea and Eastern Arctic (ICES areas 1, 2, 3a, 4, 7d)

Research survey: International Ecosystem Survey in the Nordic Seas (ASH; ICES acronym: IESNS)

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

Research survey: International Ecosystem Survey in the Nordic Seas (ASH; ICES acronym: IESNS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: North Sea Beam Trawl Survey (BTS)

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

Research survey: North Sea Beam Trawl Survey (BTS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: Demersal Young Fish Survey (DYFS)

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

Research survey: Demersal Young Fish Survey (DYFS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: International Bottom Trawl Survey (IBTS_Q1)

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

Research survey: International Bottom Trawl Survey (IBTS_Q1)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: International Bottom Trawl Survey (IBTS_Q3)

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

Research survey: International Bottom Trawl Survey (IBTS_Q3)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: International Herring Larvae Surveys (IHLS)

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

Research survey: International Herring Larvae Surveys (IHLS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: North Sea Herring Acoustic Survey (NHAS)

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

Research survey: North Sea Herring Acoustic Survey (NHAS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Region: North East Atlantic (ICES areas 5-14 and NAFO areas)**Research survey: International Blue Whiting Spawning Survey (IBWSS)**

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

Research survey: International Blue Whiting Spawning Survey (IBWSS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

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

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

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

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Research survey: Greenland Groundfish Survey (GGS)

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

Research survey: Greenland Groundfish Survey (GGS)

1. Objectives of the survey

The objective is to obtain data for the assessment of cod, demersal redfish and other demersal species off Greenland.

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.

Demersal trawling, plankton sampling and CTD casts for physical oceanographic measurements along standard transects are carried out. The survey started in 1982 and was primarily designed for the assessment of cod and redfish, but covers the entire groundfish fauna down to 400 m depth. It is carried out annually during the 4th quarter and provides the only fishery-independent information about the abundance & biomass of groundfish off Greenland (ICES Div. 14b and NAFO Div. 1B-1F). Designed as a stratified random survey, the hauls are allocated to 14 strata (7 geographic areas * 2 depth strata, 0-200m, 201-400m) off West and East Greenland. The fishing gear used is a standardised 140-foot bottom trawl. Biological data from the catches (length distributions for all species, individual weights, gonad and liver weights as well as age, sex and maturity for the commercial species) are collected, population data raised to the total surveyed area and submitted to the ICES North-Western Working Group (NWWG) and NAFO Scientific Council and used in the respective stock assessments. In addition, hydrographic (CTD) and weather data are collected. The survey was carried out every October/November on FRV "Walther Herwig III". In 2023, the survey

timing will be changed from autumn to summer. This decision was taken due to continuously poor weather conditions in autumn resulting in missing coverage. It is in agreement with the Greenland Institute of Natural Resources and was discussed in ICES NWWG.

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

The survey is regularly evaluated through ICES NWWG. DEU is the only EU Member State to undertake this survey. The current vessel used for the survey is FRV Walther Herwig III.

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

Greenland conducts a parallel summer survey with its own vessel. Data from the two surveys are combined in the assessment.

Research survey: International Redfish Trawl and Acoustic Survey (REDTAS)

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

Research survey: International Redfish Trawl and Acoustic Survey (REDTAS)

RWP North Atlantic, North Sea & Eastern Arctic 2025-2027

Reion: Other Regions

Research survey: Eel Larval Survey (EELS)

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

Research survey: Eel Larval Survey (EELS)

(Non-mandatory survey)

1. Objectives of the survey

A) Regular and standardized monitoring of larval eel (*Anguilla anguilla*) abundance in the Sargasso Sea as a basis for the establishment of a stock-recruitment relationship and stock assessment.

B) Larval abundance and distribution in the Sargasso Sea in relation to glass eel recruitment and hydrographic conditions in order to evaluate the effect of oceanic conditions on larval survival, retention and drift.

Data on larval abundance in the spawning area are poor and the existence of a stock-recruitment-relationship is unproven. Until today, European eel stock assessment is largely based on fluctuations in glass eel recruitment along European coasts. However, the age of arriving glass eels is scientifically disputed with estimations reaching between 1 and 3 years. In addition, oceanic factors influencing larval survival until metamorphosis into glass eel stages are still debated as potential drivers for the eel stock decline. The regular monitoring of larval abundance in the Sargasso Sea is aiming to provide information that is required to evaluate whether management measures (e.g. increase of spawner escapement) increase the reproduction success of *A. anguilla*. By comparing larval abundances with glass eel recruitment of the following years, the surveys also provide insights into the effect of oceanic factors on eel stock development. It is investigated how climatic changes affect the survival and distribution of eel larvae and to what extent the drift towards European waters might be impeded by hydrographic conditions. The survey is conducted triennially in February to April.

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 study area ranges from 31° - 22°N and 70° - 50°W. Inside this area, a core sampling area is defined in accordance with larval distribution. Sampling takes place with an Isaac-Kidd Midwater Trawl (net opening 6.3 m², mesh size 500 µm) at approximately 50 stations along north-south transects. Species identification and length measurements of all leptocephalus larvae are done on board. Hydrographic conditions are monitored by CTD throughout the sampling area.

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

National survey only.

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

National survey only.

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

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No logbooks are available for vessels <8m in the Baltic and <10m elsewhere.

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

For vessels without logbook obligation (<8m in the Baltic, <10m elsewhere), an additional survey on effort variables is planned.

The questionnaire on effort is combined with the questionnaire on economic variables. Thus, the sampling characteristics will be identical: probability sampling proportional to size. In that case “size” is the value of landings.

For time-related effort variables (days at sea etc.), the monthly sales declarations (which are available for the entire fleet without logbooks) will be used as additional information to raise the sample: i.e. the sampling results will be set in relation to the number of monthly declarations, then the average number of days fished per month is estimated, and that ratio will be applied to the entire segment. The information on gear (net size, number of hooks, traps etc.) will be raised using the same ratio.

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.

Inland fisheries in Germany are regulated under state law, meaning that all fisheries law affairs are within the range of authority of the German federal states. As a result, collection of latest capacity, effort and landings for each jurisdiction are directly derived from respective German federal states. Data sources are based on number of registered fishing licenses and self-reporting of number and type of used gears and effort data in terms of fishing days.

Following Council Regulation 1100/2007, federal states in Germany produce an implementation report on a 3-year cycle, in which the states document their efforts and results to fulfil their 40% silver eel escapement goals. The report compiles available data from the federal states including capacity, effort and landings.

MS will extract data from the implementation report and provide the requested data, described below.

Commercial eel fishing effort is collected based on fishing days as well as amount and type of used gear.

Eel commercial inland fisheries in Germany is generally dominated by the use of different types of fyke nets. However, besides small and large fyke nets, also longlining (in 100 hook – units), number of traps, stow nets, stationary eel traps and electrofishing may be used by commercial eel fisheries in Germany and are reported in number of units and number of days used per year and EMU.

Recreational eel fishing effort and landings is usually estimated based on number of licensed anglers per EMU. Only in some EMUs (DE_Elbe, DE_Wese), recreational landings data are directly collected.

Landings (fishing mortality) are reported in tonnes per EMU based on self-reporting of commercial fisheries and estimates of recreational landings.

SECTION 4: IMPACT OF FISHERIES ON MARINE BIOLOGICAL RESOURCES

Text Box 4.2: Incidental catches of sensitive species

Region: Baltic Sea

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

The Thünen Institutes of Sea Fisheries and Baltic Sea Fisheries routinely record on each at-sea-observer trip the absence or presence of incidental bycatches, details on the bycatch (If it occurs), and parameters on the gear such as the number of units, their heights and lengths and the amount of the observed hauling process are recorded (e.g. in case of gillnets) and the soaking time. These data are annually submitted for the WGBYC data call and will be included in the future submission of RDBES data when respective tables and parameters are in place.

A dedicated sampling program on incidental bycatch is neither planned nor is a specific monitoring program intended in the national WP for 2025-2027. However, the institute is conducting a project on harbour porpoise bycatch reduction in the western Baltic Sea. Baltic Sea fishers in the state of Schleswig-Holstein have been voluntarily attaching porpoise alert devices (PAL) to their gillnets since 2017 to avoid porpoise bycatch. Environmentalists argue that there could be habituation effects and the project investigates whether or not the effect of the PAL persists over longer periods of time. For details see <https://www.thuenen.de/en/institutes/baltic-sea-fisheries/projects/fisheries-environment-baltic-sea/does-the-efficiency-of-pal-to-reduce-harbor-porpoise-bycatch-persist>

- 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?

Gillnets

- What methods are used to calculate the observation effort?

Percentage of observed fishing trips vs. total number of fishing trips

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

The sampling covers all bird and marine mammal species (no reptiles occur in our fishing areas). In case of a bycatch detected by an observer, the species is identified to the lowest possible taxon (species level). Birds are

usually dead; they are collected and forwarded to the Institute for Terrestrial and Aquatic Wildlife Research of the University of Veterinary Medicine Hannover (ITAW) in Büsum, Germany. Cormorants are not collected. Carcasses are provided to the ITAW or to the Ocean Museum in Stralsund, Germany.

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?

The observer is advised to check the cod-end.

- 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?

For the Baltic: yes.

- In large catches: does the protocol instruct the observer to check for rare specimens during sorting of the catch (i.e. at the conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

In general, the observer is advised to give an indication to which amount he/she was able to check the fishing activities for accidental by-catch.

Region: North Sea and Eastern Arctic

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.

General remark:

The Thünen Institute of Sea Fisheries routinely records the absence or presence of incidental bycatches on each at-sea-observer trip. If bycatch occurs, details on the bycatch and parameters on the gear such as the number of units, their heights and lengths and the amount of the observed hauling process are recorded (e.g. in case of gillnets). These data are annually submitted for the WGBYC data call and will be included in the future submission of RDBES data when respective tables and parameters are in place. A dedicated sampling program on incidental bycatch is neither planned nor is a specific monitoring program intended in the national WP for 2025-2027.

- 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?

For fish species: demersal trawlers, for marine mammals: pelagic freezer trawlers

- What methods are used to calculate the observation effort?

Percentage of observed fishing trips vs. total number of fishing trips

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

The sampling covers all bird and marine mammal species (no reptiles occur in our fishing areas). In case of a bycatch detected by an observer, the species is identified to the lowest possible taxon (species level). Birds are usually dead; they are collected and forwarded to the Institute for Terrestrial and Aquatic Wildlife Research of the University of Veterinary Medicine Hannover (ITAW) in Büsum, Germany. Cormorants are not collected. Carcasses are provided to the ITAW or to the Ocean Museum in Stralsund, Germany.

Additional information on observer protocols (if already filled in in Annex 1.1, indicate where it can be found): <https://www.dcf-germany.de/>

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

The observer is advised to check the cod-end.

- 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?

Due to the negligible effort, these vessels are not included in the observer program.

- In large catches: does the protocol instruct the observer to check for rare specimens during sorting of the catch (i.e. at the conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

In general, the observer is advised to give an indication to which amount he/she was able to check the fishing activities for accidental by-catch.

Additional information on sampling schemes and sampling frames

SF Observer – North Sea 2: A joint report of the Dutch and German onboard sampling programme of the freezer trawler fleet is available listing all by-catch in this fishery (Overzee HMJ van, Ulleweit J, Panten K, Bangma T (2024) Catch sampling of the pelagic freezer trawler fishery operating in European waters in 2021-2022 : Joint report of the Dutch and German national on-board sampling programme. IJmuiden: Centre for Fisheries Research (CVO), 50 p, CVO Rep 24.001, DOI:10.18174/645872).

Region: North East Atlantic

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.

General remark:

The Thünen Institutes of Sea Fisheries routinely records the absence or presence of incidental bycatches on each at-sea-observer trip. If bycatch occurs, details on the bycatch and parameters on the gear such as the number of units, their heights and lengths and the amount of the observed hauling process are recorded (e.g. in case of gillnets). These data are annually submitted for the WGBYC data call and will be included in the future submission of RDBES data when respective tables and parameters are in place. A dedicated sampling program on incidental bycatch is neither planned nor is a specific monitoring program intended in the national WP for 2025-2027.

- 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?

See North Sea and Eastern Arctic region.

- What methods are used to calculate the observation effort?

Percentage of observed fishing trips vs. total number of fishing trips

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

The sampling covers all bird and marine mammal species (no reptiles occur in our fishing areas). In case of a bycatch detected by an observer, the species is identified to the lowest possible taxon (species level). Birds are

usually dead; they are collected and forwarded to the Institute for Terrestrial and Aquatic Wildlife Research of the University of Veterinary Medicine Hannover (ITAW) in Büsum, Germany. Cormorants are not collected. Carcasses are provided to the ITAW or to the Ocean Museum in Stralsund, Germany.

Additional information on observer protocols (if already filled in in Annex 1.1, indicate where it can be found): <https://www.dcf-germany.de/>

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

The observer is advised to check the cod-end.

- 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?

Gill nets are only used by very few vessels in north-western waters. Due to the negligible effort, these vessels are not included in the observer program.

- In large catches: does the protocol instruct the observer to check for rare specimens during sorting of the catch (i.e. at the conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

In general, the observer is advised to give an indication to which amount he/she was able to check the fishing activities for accidental by-catch.

Additional information on sampling schemes and sampling frames

SF Observer – North Atlantic 1: In co-operation with the fishery, an observation programme in order to quantify the by-catch and survival rates of Greenland sharks was initiated.

SF Observer – North Atlantic 1/North Atlantic 4: In co-operation with the fishery, a monitoring programme on the by-catch of deep sea fauna was initiated (SeaPen, see Text Box 1b).

SF Observer – North Atlantic 2: A joint report of the Dutch and German onboard sampling programme of the freezer trawler fleet is available listing all by-catch in this fishery (Overzee HMJ van, Ulleweit J, Panten K, Bangma T (2024) Catch sampling of the pelagic freezer trawler fishery operating in European waters in 2021-2022 : Joint report of the Dutch and German national on-board sampling programme. IJmuiden: Centre for Fisheries Research (CVO), 50 p, CVO Rep 24.001, DOI:10.18174/645872).

Region: Other regions

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.

The fishery in other regions is subject of multilateral agreements of EU MS fishing in these areas. A pool of international observers from the MSs are obliged to sample and observe the EU fisheries in other regions. Observers are trained and advised to check the whole catch for rare species and the by-catch of mammals, birds and reptiles.

For the SPRFMO area, the first training workshop for the period 2025-2027 is scheduled for November 2024, which is compulsory for observers. The training will cover the background of the sampling program, the catch advice for the SPRFMO area with special emphasis on Chilean jack mackerel. Information on the fishing fleet will be given, the sampling methodology will be trained and an overview on SPRFMO Conservation and Management Measures (CMMs) will be given. Germany will send two observers to this workshop.

Text Box 4.3: Fisheries impact on marine habitats

Region: Baltic

Study: MGF project Baltic Sea

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: MGF Project Baltic Sea

There is no RWP on fisheries impact on marine habitats, and also no study from a RWP and no specific program is intended in the national WP for 2025-2027. However, the Thünen institute is involved in a multidisciplinary project on short- and medium-term impacts of a commercial bottom trawl on the seafloor community in the western Baltic Sea (mobile ground-contacting fisheries – MGF). For details, see <https://www.thuenen.de/en/institutes/baltic-sea-fisheries/projects/fisheries-environment-baltic-sea/what-are-the-effects-of-a-bottom-trawl-fisheries-mgf-ostsee-fisch>.

Region: North Sea and Eastern Arctic

Study: MGF Project North Sea

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: MGF Project North Sea

Thünen institute is involved in a multidisciplinary project on short- and medium-term impacts of the exclusion of mobile bottom-fishing in the German Natura 2000 areas (MGF). For details, see <https://www.thuenen.de/en/institutes/sea-fisheries/projects/exclusion-of-mobile-bottom-fishing-in-the-german-natura-2000-areas-mgf-nordsee>.

Region: North East Atlantic

Study: SeaPen

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: SeaPen

In co-operation with the fishery, a monitoring programme on the by-catch of deep-sea fauna in the Arctic and Greenlandic demersal fishery (SF Observer – Artic 1/North Atlantic 1/North Atlantic 4) was initiated (SeaPen). Target of the study is to report all by-catch of vulnerable deep-sea fauna and to map their occurrence in the fishing areas in order to avoid the by-catch of such species in future fishing operations.

Study: VME on the East Greenland shelf

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: VME on the East Greenland shelf

1. Aim of the study

Improved identification of sensitive epibenthic organisms and habitat observations for monitoring the impact of fisheries on vulnerable marine ecosystem (VME) on the East Greenland shelf.

2. Duration of the study

January 2025 - December 2027

3. Methodology and expected outcomes of the study

On the mandatory annual Greenland Groundfish Survey (GGS), sensitive epibenthic organisms have been observed in the bottom trawl hauls occasionally, but taxonomic expertise was lacking and systematic recording of species (or higher-order taxa) has not taken place so far. Based on the ICES VME data call, opportunities for determination, recording and observations of VME organisms have been considered. Given available expertise and equipment, VME organisms caught in the GGS hauls will be determined to the lowest taxonomic level possible and direct observations of the seafloor by cameras will be attempted.

In a second step, it is attempted to compare the taxonomic composition and habitat structure of East Greenland shelf VMEs in areas with high and low fishing pressure, based on direct observations of the seafloor. This study was already planned in the WP 2022-2024, but had to be deferred due to technical problems and related cruise cancellations of the research vessel foreseen for the survey (GGS).

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.

RWP ECON 2025-2027

National specific aspects

1. Description of clustering

In the German fleet, clustering is performed for confidentiality reasons only.

The introduction of an 8m threshold for segments in the Baltic implies some mismatch with the length classes to be applied for the North Sea. In fact, there are six vessels with PG gear in the North Sea which would fall under the 0-10m length class. These are clustered with the PG0-8m segment. For the same reason, the PG10-12m segment (at current state no vessels identified, though, in 2024) is clustered with the PG08-12m segment. All clustered PG segments are very similar.

The segments TBB0010 (5 vessels) and TBB1012 (2 vessels) are clustered as the vessels are very similar.

The same applies to the segments TBB2440 (3 vessels) and TBB40XX (2 vessels). The original cluster DFN2440* (2 DFN2440 vessels, together with one FPO2440 vessel) has to be clustered with DFN1218 (4 vessels) and 3 FPO1824 vessels for confidentiality reasons. Even though these vessels are not necessarily

similar, there is no other reasonable option of clustering as there are no other segments which would have more similarities.

In cases where a fleet segment has less than 10 vessels:

- (a) *Clustering may be necessary in order to design the sampling plan and to report economic variables;*
- (b) *Member States shall report which fleet segments have been grouped at the national level and shall justify the clustering on the basis of statistical analysis;*
- (c) *In their annual report, Member States shall report the number of sampled vessels for each fleet segment regardless of any clustering made to collect or provide the data."*

Clustering should be described, and information should be given on the segments that are clustered.

The Member State should distinguish between segments considered for clustering as follows:

- (a) *Important segments with distinct characteristics;*
- (b) *Segments similar to other segments;*
- (c) *Non-important segments with distinct characteristics.*

Importance of fleet segments should be assessed in terms of landings (value and volume) and/or effort. Similarity should be demonstrated using expert knowledge on fishing patterns or on available data on landings and/or effort.

For each of the cases described, the Member State should apply the following approaches for clustering according to the different characteristics of fleet segments:

- (a) *Important segments with distinct characteristics*
- (b) *Such segments should not be clustered unless strictly necessary in data reporting for confidentiality reasons. Data should be separately collected for these segments and included in national totals (unless separate identification is then made possible as a consequence).*
- (c) *Segments similar to other segments*
- (d) *Such segments can be clustered for sampling purposes, as well as for confidentiality reasons. The segments merged should be selected according to criteria that should be fully explained and justified by the Member State. In particular, the approach to determine similarity should be clearly described by the Member State.*
- (e) *Non-important segments with distinct characteristics*
- (f) *Such segments can be clustered for sampling purposes, as well as for confidentiality reasons. These segments can be merged with other non-important segments. Clustering of these segments with other important segments should be avoided. The Member State should explain how the lower importance had been determined and for which reasons the clustered segments have been selected. Clusters should be named after the biggest segment in terms of number of vessels or economic significance.*

2. Description of activity indicator

For the fleet segments <12m using passive gear (PG0008, PG0812), a threshold of €10.000 of annual value of landings is applied to distinguish between low activity and normal activity vessels. The threshold has been selected as pragmatic compromise, taking into account tax offset and poverty line in Germany. It is assumed that fishing activities do not contribute to a sensible extent to the household income if the annual earnings are below €10.000. This threshold is below the minimum wage (~€17.000), which was regarded the preferred parameter at the 2017 WS on thresholds (The Hague), but with that parameter most vessels in the segment would have been regarded low active.

If the Member State is using an activity indicator to divide the fleet segment into different activity levels, use 'L' for the low activity vessels and 'A' for the normal economic activity vessels. Please provide a description of the activity methodology used.

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

Concerning methodology, Germany will, like for unpaid labour, derive figures for “paid labour” from other surveyed variables, i.e. crew size information from the fleet register, effort and earnings, in combination with totals from the Employer's Liability Insurance Association.

German employment data (both paid and unpaid labour) follow the approach of minimum requirements of activity, i.e., a person that goes fishing for twenty days or less during the year is not accounted for one employed person. Fulltime equivalents are estimated with reference to the days-at-sea and the crew size. The total number of jobs is then derived by the ratio of total number vs. FTE as observed in panel data. Due to this approach the data correspond to official employment statistics. If one day at sea would qualify for counting a “person employed” figures would exceed official statistics by about 30-50%.

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.

RWP ECON 2025-2027

National specific aspects

1. Description of the threshold application

2,150 German aquaculture farms produced more than 26,498 tons of fish, crustaceans, molluscs and other aquatic organisms in 2022 (Destatis, 2023). The main species produced are rainbow trout, common carp and blue mussels. According to the last estimated EUROSTAT aquaculture production data, the German production represents a share of 2.44% of the total EU-27 production. Taking into account the defined thresholds of the EU MAP (Implementing Decision 2021/1168 Annex chapter II.7), social and economic data on aquaculture will be collected under the pre-condition that simplified methodologies to estimate such data may be used.

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

No deviation.

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.

RWP ECON 2025-2027

National specific aspects

1. The Member State should provide justification for complementary data collection for fish processing in addition to Eurostat data.

The data delivered by Eurostat are based on the Federal Statistical Office in Germany (Destatis). It holds a database with data on enterprises and employees. In addition to this, Destatis conducts a probability sample survey on several cost items with a threshold of companies with 20 and more employees.

The Thünen Institute enhances the database by gathering information of different official data sources and adjusting them to the DCF defined variables. For example, the Federal Employment Agency is asked for all registered persons employed belonging to the social security scheme in Germany together with certain additional characteristics. In addition, the Thünen Institute uses own standardised surveys for variables that are not included in any of the above-mentioned available national statistics and cannot be obtained by any other administrative bodies (as it is the case for *Financial income*, *Gross debt*, *Subsidies on investments*, *Total assets*, *Weight of raw material by country of origin*, *Weight of raw material by production environment*, *Weight of raw material by species* and *Weight of raw material by type of processed material*) or where data on employment figures are not sufficiently covered by the Employment Agency (as it is the case for *Employment by level of education* and *Employment by age*).

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

No deviation.

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: Eel_ComFish

MS : DEU
Region: North Sea and Eastern Arctic, Baltic Sea
Sampling scheme identifier: Eel_ComFish
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): The sampling of commercial eel fisheries is carried out in all German Eel Management Units (EMUs), with sampling design and implementation as well as data capture, storage and processing being largely identical. Therefore, a single sampling scheme is reported referring to biological data from all relevant EMUs (namely DE_Ems, De_Eider, DE_Elbe, DE_Wese, DE_Rhe and DE_Schl). DE_Maas has no commercial fishery, for DE_Warnow data is reported from a scientific monitoring and DE_Oder is reported as entire EMU Oder by Poland, based on a bilateral agreement. Sampling aims at collecting biological variables (i.e. individual biometric data).
Description of the population
Population targeted: Biological data from silver eels from commercial eel fisheries from every German EMU.
Population sampled: Biological data from silver eels from commercial eel fisheries from every German EMU. Recruitment and yellow eels are not directly sampled. Information on arriving recruits are obtained by regional (non-DCF) glass eel monitoring/ICES time series and yellow eel standing stock is calculated via German Eel Model III.
Stratification: Eel Management Units (EMUs) as defined by the German Eel Management Plans. Sampling takes place during silver eel migration in autumn.

Sampling design and protocols
Sampling design description: Silver eel fishery in each German EMU (as defined in the German Eel Management Plans) is sampled during silver eel migration in autumn. Entire silver eel catches or subsamples are sampled twice during the WP-period. Is the sampling design compliant with the 4S principle?: NA Regional coordination: No Link to sampling design documentation: Sampling design is described in the “Data Quality document for eel sampling & analysis within the German DCF programme” and available from the German DCF website (https://www.dcf-germany.de/fileadmin/sites/default/downloads/DataQuality_DCF_eel_Germany.pdf) Design follows international recommendations: Starting in 2018, given that there was no longer a distinct end-user need for age data, eels were no longer killed but biological data were collected on-site and eels were retained by fishers, thus drastically reducing the number of sacrificed fishes. With the collection of individual biometric data, including age, through the ICES WGEEL data call there is now a distinct end-user need for age data and the sampling is adjusted accordingly for the period 2025-2027 (see Table 2.3). Since sufficient spatial coverage to derive meaningful information from silver eel catches is hardly achievable, sampling was focused on silver eels in downstream locations, since this life stage is considered to provide the best possible profile of the overall population in an EMU. However, the availability of catches is still a limiting factor, and due to the potentially insufficient temporal coverage, samples often reflect periods of peak migration. The objective of the current data collection is to provide biometric time series for ICES WGEEL and further provide data towards the application and validation of the currently used national stock assessment model. In some cases, non-representative data are collected, e.g. because a specific size class is required for a growth function, which is indicated in the data. Also, often additional data relevant to the stock assessment, e.g. on eel spawner quality (fat content, contamination) is collected, which is stored alongside the base data. Link to sampling protocol documentation: The sampling protocol follows the EU-MAP requirements and contains the following information: Individual ID, Location, Catch date, Catch gear, Time (UTC), Total length (cm), Weight (g), Age (y), Eye diameter (mm), Pectoral fin length (mm), Sex. In cases spawner quality is assessed, analysis on age, fat content, <i>Anguillicola crassus</i> infestation and contaminant load may be performed and documented in the sampling protocol. In addition, stable isotope ratios in tissues of eels from different origins will be analysed. Protocol follows international recommendations: Y
Sampling implementation
Recording of refusal rate: Y. Fishers are contacted via phone calls. Refusal rate is documented and available on request. Monitoring of sampling progress within the sampling year: If silver eel fisheries cannot be sampled in certain EMUs due to refusal or low/no catches, additional fishers in the respective EMU are contacted in order to fulfil sampling requirements.
Data capture

Means of data capture: Scale, measuring board, calliper, Photos, ImageJ-Software. Data capture documentation: Data capture is described in the “Data Quality document for eel sampling & analysis within the German DCF programme” and available from the German DCF website (https://www.dcf-germany.de/fileadmin/sites/default/downloads/DataQuality_DCF_eel_Germany.pdf) Quality checks documentation: Quality checks are described in the “Data Quality document for eel sampling & analysis within the German DCF programme” and available from the German DCF website (https://www.dcf-germany.de/fileadmin/sites/default/downloads/DataQuality_DCF_eel_Germany.pdf).
Data storage
National database: NA International database: NA Quality checks and data validation documentation: Data storage is described in the “Data Quality document for eel sampling & analysis within the German DCF programme” and available from the German DCF website (https://www.dcf-germany.de/fileadmin/sites/default/downloads/DataQuality_DCF_eel_Germany.pdf)
Sample storage
Storage description: In case tissues or whole individuals are sampled, they are stored at the Thünen-Institute of Fisheries Ecology until the analysis is completed. Otoliths are stored on long-term, to allow for further analyses, if required. Sample analysis: Age reading is conducted according to the guidelines provided by ICES WKAREA2 (ICES 2011, Report of the Workshop on Age Reading of European and American Eel (WKAREA2), 22-24 March 2011, Bordeaux, France. ICES CM 2011/ACOM:43. 35 pp.+ Annex 5: Manual for the Ageing of Atlantic eel: Otolith preparation methodologies, age interpretation and image storage, produced by the participants of the ICES Workshop on Age Reading for European and American Eel)
Data processing
Evaluation of data accuracy (bias and precision): Data are captured in a written protocol and double-checked when digitalized in an Excel table. Checks are performed by data visualization, e.g. length-mass relationship or length-age relationship and testing whether single datapoints are within a reasonable range (e.g. size of males <50cm). In case of discrepancies, data are reviewed and discarded if they cannot be evaluated. Additional quality checks are applied for age reading, which is conducted according to the guidelines provided by WKAREA2. Otoliths are prepared using the cut-and-burn method and blind age readings (i.e. without knowledge of other biological data) are performed by two independent readers to ensure precision of readings. In case of discrepancies, age readings are being reviewed. The accuracy of age readings cannot be confirmed without dedicated studies, but readers were trained and did comparative readings during WKAREA2 Editing and imputation methods: Data processing is described in the “Data Quality document for eel sampling & analysis within the German DCF programme” and available from the German DCF website (https://www.dcf-germany.de/fileadmin/sites/default/downloads/DataQuality_DCF_eel_Germany.pdf) Quality document associated to a dataset: No Validation of the final dataset: See above (Evaluation of data accuracy)

Sampling scheme identifier: Eel_GEM

MS : DEU
Region: North Sea and Eastern Arctic, Baltic Sea
Sampling scheme identifier: Eel_GEM
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): Data on the abundance of recruits (glass eel/elver), standing stock (yellow eel) and escaping eels (silver eels) is available as an input or output from the demographic German Eel Model (GEM). Recruitment is used as an input of the GEM and estimated based on a combination national monitoring of glass eel arrival and relevant time series from the ICES recruitment index. Standing stock and escapement are both output parameters from the GEM.
Description of the population
Population targeted: Abundance estimates of recruitment (glass eel/elver), standing stock (yellow eel) and escapement (silver eels). Population sampled: National glass eel time series, otherwise modeled data Stratification: Eel Management Units (EMUs) as defined by the German Eel Management Plans. Values are calculated for every calendar year but are reported every three years (in line with eel management plan progress reports).
Sampling design and protocols
Sampling design description: NA, modeled values. A detailed description of the process is provided in German eel management plan and progress reports. Input parameters are amount of eels fished per EMU based on self-reporting of fishermen and recruitment. Is the sampling design compliant with the 4S principle?: NA Regional coordination: No Link to sampling design documentation: https://www.portal-fischerei.de/bund/bestandsmanagement/aalbewirtschaftungsplaene Design follows international recommendations: Y, German eel management plans were implemented and accepted following council regulation (EC) 1100/2007. Link to sampling protocol documentation: https://www.portal-fischerei.de/bund/bestandsmanagement/aalbewirtschaftungsplaene Protocol follows international recommendations: Y, German eel management plans were implemented and accepted following council regulation (EC) 1100/2007.
Sampling implementation

Recording of refusal rate: NA
Monitoring of sampling progress within the sampling year: NA
Data capture
Means of data capture: NA, modeled values. A detailed description is provided in German eel management plan and progress reports.
Data capture documentation: NA, modeled values. A detailed description is provided in German eel management plan and progress reports.
Quality checks documentation: NA, modeled values. A detailed description is provided in German eel management plan and progress reports.
Data storage
National database: NA, modeled values. A detailed description is provided in German eel management plan and progress reports.
International database: NA, modeled values. A detailed description is provided in German eel management plan and progress reports.
Quality checks and data validation documentation: NA, modeled values. A detailed description is provided in German eel management plan and progress reports.
Sample storage
Storage description: NA, modeled values.
Sample analysis: NA, modeled values.
Data processing
Evaluation of data accuracy (bias and precision): Validation studies of the model have been carried out on a national level. For details see German eel management plan and progress reports.
Also see Hoehne et al. (2023): https://doi.org/10.1093/icesjms/fsad122 and Hoehne et al. (2024): https://doi.org/10.1093/icesjms/fsae069
Editing and imputation methods: NA, modeled values.
Quality document associated to a dataset: NA, modeled values.
Validation of the final dataset: Validation studies of the model have been carried out on a national level. A detailed description of the process is provided in German eel management plan and progress reports.
Also see Hoehne et al. (2023): https://doi.org/10.1093/icesjms/fsad122 and Hoehne et al. (2024): https://doi.org/10.1093/icesjms/fsae069

Sampling scheme identifier: Diad_eDNA

MS : DEU

Region: North Sea
Sampling scheme identifier: Diad_eDNA
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity: 2025-2026
Short description (max 100 words): Main goal is to enhance monitoring of eel, salmon, and trout in German inland waters. By extending water sampling from the EMFAF -funded PINKTrack project, eDNA will be used to detect species presence, absence, and seasonal patterns. This non-invasive method allows for more precise data collection, supporting national and EU data requirements under the Data Collection Framework (DCF).
Description of the population
Population targeted: The targeted species are European eel (<i>Anguilla anguilla</i>), Atlantic salmon (<i>Salmo salar</i>) and trout (<i>Salmo trutta</i>) Population sampled: Inland waters (North-Sea draining river basins and tributaries). Stratification: Samples will be taken during summer and fall of the year at different sampling stations of the targeted river basin in order to register changes in occurrence during critical migration months (ascending individuals / descending individuals)
Sampling design and protocols
Sampling design description: Water samples will be taken at different points in the river systems (including tributaries) at different times of the year and DNA of targeted species will be extracted, amplified and then quantified from the used water filters via q-PCR. The best types of filters and the needed amount of river water will be derived from the outcomes of the PINKTrack project. Is the sampling design compliant with the 4S principle?: NA Regional coordination: N Link to sampling design documentation: NA Design follows international recommendations:

Y. Sampling design will build up on the expected protocols and assays from the outcomes and recommendations following proceedings in the PINKTrack project. Link to sampling protocol documentation: NA Protocol follows international recommendations: Y
Sampling implementation
Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: Registered increase in eDNA of targeted species in critical months will indicate abundance and migratory activity. In such cases increased sampling efforts could be conducted
Data capture
Means of data capture: Water filter, filtration device, tubes & buckets, different sampling protocols. Q-PCR, computers. Data capture documentation: NA Quality checks documentation: Y. Quality of sampling and DNA amplification will be documented following in-house QA/QC protocols.
Data storage
National database: NA International database: NA Quality checks and data validation documentation: Quality assurance and quality control will be documented and stored on institute's servers and will be available on request.

Sample storage
Storage description: Filters will be dissolved, extracted and then analyzed following standard procedure. Only data of the outcomes will be stored as tables and files on institute's servers. Sample analysis: Protocols will be established throughout the project and are available later on request.
Data processing
Evaluation of data accuracy (bias and precision): Protocols will be established throughout the project and are available later on request. Editing and imputation methods: Protocols will be established throughout the project and are available later on request. Quality document associated to a dataset: Protocols will be established throughout the project and are available later on request. Validation of the final dataset: Yes. Quality assurance and control will be provided by scientists and data and documentation will be provided to enduser upon request.

Sampling scheme identifier: Salm_Data

MS : DEU
Region: North Sea
Sampling scheme identifier: Salm_Data
Sampling scheme type: Diadromous (scientific)
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): German salmon stocks are extirpated and rely on reintroduction measures in all relevant river basin districts. German salmon data is thus currently not relevant for international stock assessment by WGNAS

for NASCO. Data on abundance of different life stages, but also number of returnees or occasional recreational catch numbers, are – if at all - collected by local authorities and state agencies. The Thünen Institute of Fisheries Ecology conducts data queries and forwards data calls to these local authorities and state agencies in order to cumulate and provide relevant data to international end users such as ICES EGs. Active, directed data collection for salmon in German rivers or tributaries is currently deemed not feasible under DCF due to low numbers / poor stocks.

Description of the population

Population targeted:

Salmon stocks in German North Sea – draining River Basin districts.

Population sampled:

Inland waters (North-Sea draining river basins and tributaries).

Stratification:

Currently, there are four major German North-Sea draining rivers listed in WGNAS ‘Database on Effectiveness of Recovery Actions for Atlantic Salmon’ (DBERAAS):

- Rhine
- Ems
- Weser
- Elbe

State Agencies and regional managers responsible for re-introduction and monitoring measures of these RBDs are included in data queries in order to obtain valid and relevant information in order to provide valid information for enduser datacalls.

Sampling design and protocols

Sampling design description:

No harmonized sampling design or protocols exist as no targeted DCF monitoring is feasible.

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

NA

Regional coordination:

No

Link to sampling design documentation:

NA

Design follows international recommendations:

As targeted monitoring of the DCF is not possible, there is neither a harmonized sampling concept nor protocols.

However, data queries and data deliveries are carried out with the knowledge and agreement of the responsible ICES EG WGNAS. Link to sampling protocol documentation: NA Protocol follows international recommendations: NA
Sampling implementation
Recording of refusal rate: Y Monitoring of sampling progress within the sampling year: Monitoring of salmon returnees but also recruitment data (smolts / parr) are collected – where feasible – by state agencies and local authorities and made available upon request by the state agency.
Data capture
Means of data capture: Monitoring of salmon returnees but also recruitment data (smolts / parr) are collected – where feasible – by state agencies and local authorities and made available upon request by the state agency. Possible Methods: electrofishing, Vaki counters, smolt traps, tagging, Angler questionnaires Data capture documentation: Monitoring of salmon returnees but also recruitment data (smolts / parr) are collected – where feasible – by state agencies and local authorities and made available upon request by the state agency. Quality checks documentation: No
Data storage
National database: NA International database: All above mentioned data so far has been provided to WGNAS, who host a specific salmon database. Quality checks and data validation documentation: NA

Sample storage
Storage description: NA Sample analysis: NA
Data processing
Evaluation of data accuracy (bias and precision): Monitoring of salmon returnees but also recruitment data (smolts / parr) are collected – where feasible – by state agencies and local authorities and made available upon request by the state agency. Editing and imputation methods: NA Quality document associated to a dataset: NA Validation of the final dataset: All collected data is internally checked by the responsible state agencies and local authorities, then cumulated and finally quality controlled by the Federal agency (Thünen) before submission.

Sampling scheme identifier: Trout_data

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: Trout_data
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs water body
Time period of validity: 2025-2027
Short description (max 100 words): The Trout_data provides data on densities of trout (<i>Salmo trutta</i>) parr in Baltic nursery streams collected by electrofishing following the Trout Habitat Parr Index method (THS) as recommended by the corresponding assessment group ICES WGBAST. Parr densities (number of 0+ (3-15 cm TL) / 100m ²) are monitored by means of one-pass electrofishing of sites in relevant Baltic tributaries. The data are collected by the federal state authorities and will be queried, compiled and transmitted annually to the relevant end users by the Thünen Institute.
Description of the population
Population targeted: Primary sampling units (PSUs) are the individual Baltic tributaries used by sea trout for spawning, the secondary sampling unit is the electro fishing site and the tertiary sampling unit the fish (parr).

Population sampled: Baltic Sea tributaries with occurrence of sea trout
Stratification: Stratification by federal state and river
Sampling design and protocols
Sampling design description: Monitoring of Baltic Sea trout parr densities lies de jure in the responsibility of the individual federal states in Germany (Schleswig-Holstein and Mecklenburg-Western Pomerania). Therefore, the data are collected by the federal state authorities. Available data on parr abundances from the federal authorities will be queried, compiled and transmitted annually to the relevant end users. Densities of trout parr in German Baltic nursery streams are evaluated by electrofishing following the Trout Habitat Parr Index method (THS; Pedersen et al., 2017) as recommended by the corresponding assessment group ICES WGBAST. Parr densities (number of 0+ (3-15 cm TL) / 100m²) are monitored by means of one-pass electrofishing of sites in relevant Baltic tributaries. Electrofishing campaigns are usually scheduled in summer/autumn. Reference: Pedersen, S., Degerman, E., Debowski, P., Petereit, C. 2017. Assessment and recruitment status of Baltic Sea Trout populations. In Harris, G. (Ed): Sea Trout Science and Management. Proceedings of the 2nd International Sea Trout Symposium. Trobadour Publishing p. 423-441. Is the sampling design compliant with the 4S principle?: Y Regional coordination: N Link to sampling design documentation: ICES. 2020. Baltic Salmon and Trout Assessment Working Group (WGBAST). ICES Scientific Reports. 2:22. 261 pp. http://doi.org/10.17895/ices.pub.5974 Pedersen, S., Degerman, E., Debowski, P., Petereit, C. 2017. Assessment and recruitment status of Baltic Sea Trout populations. In Harris, G. (Ed): Sea Trout Science and Management. Proceedings of the 2nd International Sea Trout Symposium. Trobadour Publishing p. 423-441. Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. ICES WGBAST and SGBALANST, ICES WGTRUTTA) Link to sampling protocol documentation: NA – Sampling is conducted by the federal state authorities. Compliance with international recommendations: NA
Sampling implementation
Recording of refusal rate: NA
Monitoring of sampling progress within the sampling year: NA
Data capture
Means of data capture: Data collected during electrofishing are transferred to Excel spreadsheet templates. Available data on parr abundances from the federal authorities are queried, compiled and transmitted annually to the relevant end users. Data capture documentation: NA – Sampling is conducted by the federal state authorities.

Quality checks documentation: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks before data transfer to end users.
Data storage
National database: Data are stored at internal servers of the federal state authorities and the Thünen Institute of Baltic Sea Fisheries
International database: NA
Quality checks and data validation documentation: NA
Sample storage
NA – only parr abundance data collected
Data processing
Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally.
Editing and imputation methods: No editing and imputation occurs.
Quality document associated to a dataset: NA
Validation of the final dataset: The data sets are checked by the federal state authorities and the scientists working at the Thünen Institute who transfer the data to relevant end users.

Sampling scheme identifier: Trout_camera

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: Trout_camera
Sampling scheme type: Diadromous (scientific)
Observation type: EMA water body
Time period of validity: 2025-2027
Short description (max 100 words): The Trout_camera sampling provides data on the number of ascending adult sea trout (<i>Salmo trutta</i>) in Baltic nursery streams collected by electronic monitoring via remote underwater cameras. The data are collected by the federal state authorities and will be queried, compiled and transmitted annually to the relevant end users by the Thünen Institute.
Description of the population
Population targeted: Primary sampling units (PSUs) are the individual Baltic tributaries used by sea trout for spawning, the secondary sampling unit is the ascending fish (spawner).
Population sampled: Reference set of Baltic Sea tributaries with occurrence of sea trout
Stratification: Stratification by federal state and river
Sampling design and protocols
Sampling design description: Monitoring of ascending adult Baltic Sea trout lies de jure in the responsibility of the individual federal states in Germany (Schleswig-Holstein and Mecklenburg-Western Pomerania). Therefore, the data are collected by the federal state authorities. Available data on ascending adults/river from the federal authorities will be queried, compiled and transmitted annually to the relevant end users. Currently video camera systems have been installed in 12 reference rivers with relevant sea trout populations draining in the Baltic Sea. The video cameras

automatically document ascending sea trout in the individual rivers. A special AI-based software was developed for the automatic evaluation of the recorded video sequences. The software has been trained annually since 2017 using the video data of each season. The accuracy of detections is currently 98%.

Is the sampling design compliant with the 4S principle?: NA – fish are only counted.

Regional coordination: N

Link to sampling design documentation: Hantke, H., Lorenz, T., Krüger, O.W., Blume, W., Gentzen, B. (2013): Entwicklung einer Methode zur Bestandsschätzung der Meerforelle (*Salmo trutta trutta* L.) auf Grundlage videooptischer Zählungen in ausgewählten Fließgewässern unter Einbeziehung von Gewässerstrukturdaten. Jahresbericht Verein Fisch und Umwelt Mecklenburg-Vorpommern e.V., (in German) http://www.fium.de/fileadmin/Medienpool/PDFs/Jahresheft_2011_2012.pdf

Compliance with international recommendations: NA – There are no international recommendations regarding the monitoring of ascending sea trout

Link to sampling protocol documentation: NA – Sampling is conducted by the federal state authorities.

Compliance with international recommendations: NA

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: Video sequences are stored on local servers at the federal state authorities. A AI-based software evaluates the video sequences and transfers the count data to Excel spreadsheet templates. Available data on ascending adult sea trout per river from the federal authorities are queried, compiled and transmitted annually to the relevant end users by the Thünen Institute.

Data capture documentation: NA – Sampling is conducted by the federal state authorities.

Quality checks documentation: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks before data transfer to end users.

Data storage

National database: Data are stored at internal servers of the federal state authorities and the Thünen Institute of Baltic Sea Fisheries

International database: NA

Quality checks and data validation documentation: NA

Sample storage

NA – only numbers of ascending adults are collected

Data processing

Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally.

Editing and imputation methods: No editing and imputation occurs.

Quality document associated to a dataset: NA

Validation of the final dataset: The data sets are checked by the federal state authorities and the scientists working at the Thünen Institute who transfer the data to relevant end users.

Sampling scheme identifier: Multispecies off-site survey

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: Multispecies off-site survey
Sampling scheme type: recreational (off site survey)
Observation type: SelfOnShore
Time period of validity: 2025-2027
Short description (max 100 words): The multispecies off-site survey is a nation-wide representative off-site screening survey (telephone or mail) followed by a diary survey targeting German households. The off-site survey is designed to identify anglers in the German population, to collect their socio-demographic parameters and information on angler heterogeneity, and to estimate fishing effort as well as to recruit participants for a subsequent diary survey. No biological data is collected in this survey. These nation-wide off-site surveys are conducted every 5 years.
Description of the population
Population targeted: Primary sampling units (PSUs) are German households the secondary sampling unit is the individual.
Population sampled: German population
Stratification: The Population is stratified by municipality.
Sampling design and protocols
Sampling design description: A nation-wide representative off-site survey (telephone or mail) followed by a diary study is planned for 2027/2028. The decision on the survey contact method (telephone or mail) will depend on results of a current project (https://www.thuenen.de/en/institutes/baltic-sea-fisheries/projects/living-marine-ressources/mareechange) that tests the response rates of mail surveys versus telephone surveys in Germany. The background to this is the general decline in response rates in telephone surveys in Germany (Weltersbach et al., 2024). Depending on the results of this project the sample size will be determined. The off-site survey will be designed to identify anglers in the German population (no register available), to collect their socio-demographic parameters and information on angler heterogeneity, and to estimate fishing effort for different platforms and water bodies (North Sea, Baltic Sea and inland waters) as well as to recruit participants for a subsequent diary study. It is planned to conducted the survey in 2-3 waves to decrease recall bias. Selection probabilities will be proportional to the number of households per municipality. Household size and number of persons in a household being recreational anglers will be determined. An angler will be defined as a person who had fished at least once in Germany during the last 12 months preceding the survey. All persons that had been fishing in Germany in the last 12 months, or who plan to go fishing there in the next 12 months will be asked to participate in a diary survey. All diary participants will be asked to report every single angling day in Germany over a certain observation period (depending on the number of survey waves) starting from the day they received the diary. For every angling day, the date, time, fishing location, angling platform (boat, charter boat, shore), target species, and the number of fish caught, harvested and released per species has to be reported. In order to maintain the motivation to participate, to retrieve diary data, and to reduce panel attrition bias, the participants are contacted by telephone, email or mail regularly during the entire observation period. In order to obtain representative estimates of the size

of the German angler population, the corresponding fishing effort and catches, harvests and releases for all species both the data of the off-site survey and the diary survey will be weighted and extrapolated in various ways following the data collection.

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

Regional coordination: N

Link to sampling design documentation:

A similar approach has been documented in:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. ICES WGRFS)

Link to sampling protocol documentation: NA

Compliance with international recommendations: NA

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling is continuously planned and continuously monitored.

Data capture

Means of data capture: Data is collected by contracted market research company within their data systems. Final data tables are transmitted as Excel spreadsheets or R files and imported to the Thünen institutes recreational fisheries database.

Data capture documentation: protocols are stored on an internal server of the Thünen institute.

Quality checks documentation: Y, data quality is checked externally at a market research company for consistency and validity. Data quality is checked internally at different levels of the processing chain (e.g. completeness, consistency and validity checks of the Excel spreadsheets during data import to database / range and cross checks of the final database entry.

Data storage

National database: Thünen Baltic Sea Fisheries php myAdmin SQL and PostgreSQL data base.

International database: Y – catch data submitted to assessment working group

Quality checks and data validation documentation: NA – only catch data is submitted to other databases

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally.

Editing and imputation methods: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. completeness, consistency and validity checks of the Excel spreadsheets during data import to database / range and cross checks of the final database entry.

Quality document associated to a dataset:

Y, the data quality is checked internally and externally. A similar approach has been documented in:

Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

Validation of the final dataset: Before using the data to compile German recreational catch data, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: Multispecies on site survey

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: Multispecies on-site survey
Sampling scheme type: recreational (on site survey)
Observation type: SciObsOnShore
Time period of validity: 2025-2027
Short description (max 100 words): The multispecies on-site survey includes random intercepts of marine anglers (shore, boat and charter boat anglers) at access points (harbours, beaches) along the German Baltic Sea coast. It aims to collect catch rates and fishing characteristics of marine anglers for both sea-based and land-based catches for both the harvest and release component. The sampling frame covers access point along the entire German coast in SD22 & SD24. Data is used for extrapolation of German recreational catch data using effort data from the multispecies off-site survey.
Description of the population
Population targeted: Primary sampling units (PSUs) are access points and days the secondary sampling unit is the fishing trip. Population sampled: Baltic marine anglers Stratification: The Population is stratified by area.
Sampling design and protocols
Sampling design description: The on-site survey is carried out along the outer German Baltic coastline by survey agents and uses a stratified random sample of sampling days and access points selected without replacement (harbours, boat ramps, piers and beaches. The coastline was divided into five spatial strata for sampling, with harbours and beaches as access points and days as primary sampling units. Each day is divided into three six hours shifts: 6:00-12:00; 12:00-18:00 and 18:00-00:00 (secondary sampling units). Sampling at night (00:00-06:00) will not be conducted due to very low fishing effort during this time. Access points, days (7 days per month and stratum) and shifts are randomly selected within the spatial strata. However, sampling effort is increased for those days when anglers most frequently go fishing (weekends and public holidays). Observation time per access point is 6 hours. The fishing methods are grouped into shore fishing (surf angling and wading), boat fishing (including float tubes and kayaks), and charter vessel fishing. The following data are collected during the interviews: the number of caught

and released fish per species, the sociodemographic factors gender, age, place of residence (postal code), avidity (measured as the reported number of fishing days in the German Baltic Sea in the past 12 months), weather conditions and the coastal state and specific location at which the interview took place.

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

Regional coordination: N

Link to sampling design documentation:

1. Lewin, W.-C., Weltersbach, M. S., Haase, K., Riepe, C., Skov, C., Gundelund, C., & Strehlow, H. V. (2021). Comparing on-site and off-site survey data to investigate survey biases in recreational fisheries data. ICES Journal of Marine Science. <http://doi:10.1093/icesjms/fsab131>
2. Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000.

Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. ICES WGRFS)

Link to sampling protocol documentation: NA

Compliance with international recommendations: NA

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling is continuously planned and continuously monitored for the year

Data capture

Means of data capture: Observers are equipped with sampling protocols for documentation. Field notes are transferred to Excel spreadsheet templates provided. Excel spreadsheets are imported monthly to the Thünen institutes recreational fisheries database.

Data capture documentation: protocols are stored on an internal server of the Thünen institute.

Quality checks documentation: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks during data import to database / range and cross checks of the final database entry).

Data storage

National database: Thünen Baltic Sea Fisheries php myAdmin SQL and PostgreSQL data base.

International database: Y – catch data submitted to assessment working group

Quality checks and data validation documentation: NA – only catch data is submitted to other databases

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally.

Editing and imputation methods: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks during data import to database / range and cross checks of the final database entry.

Quality document associated to a dataset: *Has a publication digital object identifier (DOI) been created? Is there a document summarising the estimation process that has been followed?*

1. Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000
2. Haase K, Weltersbach MS, Lewin W-C, Zimmermann C, Strehlow HV (2022) Potential effects of management options on marine recreational fisheries - the example of the western Baltic cod fishery. ICES J Mar Sci 79(3):661-676, DOI:10.1093/icesjms/fsac012

Validation of the final dataset: Before using the data to compile German recreational catch data, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: Multispecies length sampling

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: Multispecies length sampling
Sampling scheme type: recreational (on site survey)
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): The multispecies length sampling includes onboard sampling of recreational charter boats in the German Baltic Sea. It aims to collect recreational length distributions for sea-based catches for both the harvest and release component of all species including cod (<i>Gadus morhua</i>). The sampling frame covers the German charter boat fleet in SD22 & SD24. Data is used for extrapolation of German recreational cod catch data, as well as for scaling Danish recreational cod catches in SD22 & SD24 for the ICES stock assessment. Recreational length data is used together with commercial length-weight data to determine cod catch in numbers at age (CANUM). Per month 1 assignment is carried out where a scientific observer carries out onboard length measurements. The individual charter vessel is randomly selected for each sampling day. Information on the overall recreational catch composition and sociodemographic data of the individual angler are also collected by the scientific observers.
Description of the population
Population targeted: Primary sampling units (PSUs) are recreational charter vessel fishing trips the secondary sampling unit is the fish. Population sampled: Charter vessel fishing trips Stratification: The Population is stratified by ICES SD.
Sampling design and protocols
Sampling design description: Biological data collection is conducted via random onboard sampling based on a recreational charter vessel registry (for details see Weltersbach et al., 2024). The individual charter vessel is randomly selected for each

sampling day. However, random selection can be affected by weather conditions (i.e., weather-related cancellations) and the availability of the selected charter vessel (e.g., level of bookings, dry dock phase, approval of the crew) and sometimes sampling dates or charter vessels have to be changed. During some trips, not all fish can be measured because of very high catch rates. In such cases, all fish are separately counted and representative subsamples are measured. This approach ensures that all fish caught on the charter vessel fishing trip are registered by the observers minimizing the risk of under- and non-reporting. Commercial/BITS length-weight relationships and age-length keys are then used for conversion of recreational cod catch numbers to biomass and length at age if needed by end users.

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

Regional coordination: Marginal regional coordination as German length distributions are used to age Danish recreational catch data (only weight) and determine CANUM data.

Link to sampling design documentation:

1. ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>.
2. Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000

Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. ICES WGRFS)

Link to sampling protocol documentation: NA – simple length distributions mostly census data

Compliance with international recommendations: NA

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Recreational charter boat activities are continuously monitored and sampling is adjusted accordingly.

Data capture

Means of data capture: Observers are equipped with measuring boards. Measurements are transferred to Excel spreadsheet templates provided. Excel spreadsheets are imported annually to the Thünen institutes recreational fisheries database.

Data capture documentation: protocols are stored on an internal server of the Thünen institute.

Quality checks documentation: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks during data import to database / range and cross checks of the final database entry).

Data storage

National database: Thünen Baltic Sea Fisheries php myAdmin SQL and PostgreSQL data base.

International database: NA – only catch data is submitted to other databases

Quality checks and data validation documentation: NA – only catch data is submitted to other databases

Sample storage

NA – only length data collected
Data processing
Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally. Editing and imputation methods: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks during data import to database / range and cross checks of the final database entry). Quality document associated to a dataset: <i>Has a publication digital object identifier (DOI) been created? Is there a document summarising the estimation process that has been followed?</i> Y, see: 1. Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000. 2. Haase K, Weltersbach MS, Lewin W-C, Zimmermann C, Strehlow HV (2022) Potential effects of management options on marine recreational fisheries - the example of the western Baltic cod fishery. ICES J Mar Sci 79(3):661-676, DOI:10.1093/icesjms/fsac012 Validation of the final dataset: Before using the data to compile German recreational catch data, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: Salmon survey

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: Salmon on-site survey
Sampling scheme type: recreational (on site survey)
Observation type: SciObsOnShore
Time period of validity: 2025-2027
Short description (max 100 words): The on-site salmon survey includes on-site access point intercepts of salmon trolling boat anglers in the German Baltic Sea (SD 24). Random on-site interviews (10 assignments per month with replacement) of trolling anglers in four relevant marinas are conducted (including the marinas where the remote cameras from the salmon camera survey are installed) to determine catch, harvest, and release rates (each per boat) in order to estimate catches (using effort data from the salmon camera survey) for stock assessment purposes and collect biological catch data and socio-economic information.
Description of the population
Population targeted: Primary sampling units (PSUs) are recreational trolling boat trips, secondary sampling units are salmon trolling anglers. Population sampled: Salmon trolling boats in four marinas (Glowe, Lohme, Wiek, Schaprode) Stratification: No stratification
Sampling design and protocols
Sampling design description: Data collection is conducted via random intercept sampling of trolling boats/anglers in four relevant salmon trolling boat harbors (Glowe, Lohme, Wiek, Schaprode) responsible for 85% of the German recreational salmon trolling effort during the salmon trolling season (December-May) (see Hartill et al., 2020). The survey consists of

10 assignments per month with replacement. Sampling date and the individual harbor are randomly selected for each sampling day. However, random selection can be affected by weather conditions (i.e., strong winds > 6bft) and sometimes sampling dates have to be changed. The survey agents interview the crew of each salmon trolling boat regarding catches, harvest, and releases of salmon (each per boat) in order to estimate catches for stock assessment purposes. In addition, biological catch data and socio-economic information are collected.

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

Regional coordination: N

Link to sampling design documentation:

1. Weltersbach MS, Lewin W-C, Haase K, Eckardt J, Strehlow HV (2024). 20 Years of Work on Marine Recreational Fisheries at the Thünen Institute of Baltic Sea Fisheries. Braunschweig: Johann Heinrich von Thünen-Institut, 87 p, Thünen Working Paper 234, DOI:10.3220/WP1710484687000.
2. ICES. 2020. Baltic Salmon and Trout Assessment Working Group (WGBAST). ICES Scientific Reports. 2:22. 261 pp. <http://doi.org/10.17895/ices.pub.5974>

Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. WGRFS)

Link to sampling protocol documentation: NA

Compliance with international recommendations: NA

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling is continuously planned and continuously monitored for each recreational salmon trolling season

Data capture

Means of data capture: Observers are equipped with sampling protocols for documentation. Field notes are transferred to Excel spreadsheet templates provided. Excel spreadsheets are imported monthly to the Thünen institutes recreational fisheries database.

Data capture documentation: protocols are stored on an internal server of the Thünen Institute.

Quality checks documentation: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks during data import to database / range and cross checks of the final database entry.

Data storage

National database: Thünen Baltic Sea Fisheries php myAdmin SQL and PostgreSQL data base.

International database: Y – catch data submitted to assessment working group

Quality checks and data validation documentation: NA – only catch data is submitted to other databases

Sample storage

NA

Data processing

Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally.

Editing and imputation methods: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. daily/monthly completeness and validity checks of the Excel spreadsheets during the data input / completeness, consistency and validity checks during data import to database / range and cross checks of the final database entry).

Quality document associated to a dataset: N, the data quality is regularly checked internally but not documented.

Validation of the final dataset: Before using the data to compile German recreational catch data, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: OF Observer

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: OF_Observer
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): The German sampling scheme for the Baltic Sea comprises 6 sampling frames: 1) Baltic active 2224, 2) Baltic passive 2224, 3) Baltic active 2532, 4) Baltic herring passive 2224, 5) Baltic herring active 2224, 6) Baltic sprat active SD2232. Only the demersal fleets are currently sampled by observers at sea. The sampling schemes aim at collecting biological data from target species of the German fisheries in the Baltic Sea to fulfil the national sampling obligations and secure the data delivery for the ICES stock assessments. Furthermore, information on the overall catch composition and incidental catches of sensitive species are collected by scientific observers. RWP 2025-2027
Description of the population
Population targeted: Primary sampling units (PSUs) are fishing trips in the different sampling frames. Population sampled: 1) Baltic active 2224: Trawlers targeting demersal species with active gear types. Peak season: 1st and 4th quarter. Area: Western Baltic Sea. Duration of trips: 1 to 5 days. Number of vessels operating: 49 (2023). 2) Baltic passive 2224: Small-scale vessels targeting demersal species with passive gear types. Peak season: yearround. Area: Western Baltic Sea. Duration of trips: 1-2 days. Number of vessels operating: 341 (2023). 3) Baltic active 2532: Trawlers targeting demersal species with demersal gears. Peak season: 1st and 2nd quarter. Area: Eastern Baltic Sea. Duration of trips: 5-8 days. Number of vessels operating: 3 (2023). The following pelagic populations are currently covered by a self-sampling program, conducted at sea or at shore and is covered by the respective Text Box. At-sea sampling might take place if necessary. 4) Baltic herring passive 2224: Small-scale vessels targeting herring with passive gear types. Peak season: 1st and 2nd quarter. Area: Western Baltic Sea. Duration of trips: 1 day. Number of vessels operating: 255 (2023). 5) Baltic herring active 2224: Trawlers targeting herring with pelagic trawl gears. Peak season: 1st and 2nd quarter. Area: Western Baltic Sea. Duration of trips: 1 day. Number of vessels operating: 6 (2023).

6) Baltic sprat: Trawlers targeting sprat with pelagic trawl gears. Peak season: 1st and 2nd quarter. Area: Baltic Sea. Duration of trips: 1-2 weeks. Number of vessels operating: 19 (2023).

Stratification:

Populations are stratified by target species group (demersal, pelagic), area and gear type (active, passive)

Sampling design and protocols

Sampling design description: The designs differ between the populations sampled.

Demersal populations: Each year, for each sampled population a list of vessels is produced using the landings data from the previous year (e.g., the lists for 2025 are compiled at the end of 2024 with data from 2023). The lists are sorted by total landings per vessel. The vessel lists of the sampled populations Baltic active 2224, Baltic passive 2224 and Baltic active 2532 include all vessels that contributed ~60%, ~90 and ~90% of the total landings, respectively. The list of vessels is then randomised by assigning a random number to each vessel on a list. The sequence of the random number determines the sequence of contacting the vessel. If a vessel is selected, any fishing trip is sampled, except for trips targeting freshwater species, herring or sprat (see below).

There is only one list for the entire year. If all vessels from a list have been contacted before the year ends, the same list is used again. Sampling is conducted all year-round and the effort is distributed according to fishing seasons. Each phone call with fishers is documented since 2010. This document is used to calculate the success/non-response/rejection/refusal rates. In addition, we record if the sample is selected randomly or based on expert judgement. Expert knowledge partly is used to ensure efficient sampling coverage of periods/strata with very low landings, e.g. demersal species in quarter 3.

An at-sea observer catch sampling programme (including concurrent sampling of landings, discards and unwanted by-catches) is conducted for the demersal fleet segments. In addition, a self-sampling programme with fishers is used to collect biological and catch data; unsorted commercial catch samples of usually 150-200 kg from the last or last but one haul is purchased (see following textbox on OF Self-Sampling). Diagnostics show that sampled trips are representative of the overall national population of vessels and their spatio-temporal dynamics. In addition, opportunistic sampling of landed discards (BMS cod under the landing obligation) may take place.

Herring: For the sampled population Herring passive SD2224, five major ports around the Greifswald Bay - the major fishing ground - are sampled using unsorted catch samples from a vessel per port. For the sampled population Herring active SD2224, unsorted catch samples are provided by the trawlers.

Sprat SD2232: The German sprat catches in the Baltic Sea mainly originate from two pelagic trawlers. Since 2013, a self-sampling programme is conducted (see next textbox for sampling details).

The métier of a sample is assigned *ex-post*. Each sample is raised from the haul to trip level. Replicate samples from the same métier are averaged and raised to all trips of the métier within a stratum (e.g., all landings of quarter 1-SD22-gillnets).

The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

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

Regional coordination: Thünen-OF is involved in the regional sampling plan (RSP) on pelagic trawlers in 2025-2027. The RSP was developed by the RCG Baltic (RCG NA NS&EA RCG Baltic 2021) and incorporated into the Regional and National work plan. Data are collected using standardized sampling protocols and sampling methods that were developed and agreed on in the respective RCG Baltic subgroup and adopted by the member states. Refusal and rejection rates are collected. Data are submitted to the RDBES as a case study (Design “Baltic SPF Regional”).

Link to sampling design documentation: https://www.dcf-germany.de/sampling/ Design follows international recommendations: Y, the sampling design complies with ICES standards (e.g., WGCATCH) Link to sampling protocol documentation: https://www.dcf-germany.de/sampling/ and RCG NA NS&EA RCG Baltic 2024. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2024. Part I, Report, 78 p. Part II, Decisions and Recommendations, 16 p. Part III, Intersessional Subgroup (ISSG) 2023-2024 Reports, 331 p. (https://datacollection.jrc.ec.europa.eu/docs/rcg/), Report of the Intersessional Study Group (ISSG): case study on RSP of small pelagic fishery trawler in the Baltic, Report Part III, page 126pp. Protocol follows international recommendations: Y, the sampling design complies with ICES standards (e.g. WGCATCH) The sampling program was externally evaluated (Christman, M. 2020: Evaluation and Optimization of the National German Catch Sampling Programme for the Baltic Sea Fisheries of cod, plaice and herring)
Sampling implementation
Recording of refusal rate: Y, refusal rates are available at the end of the sampling year Monitoring of sampling progress within the sampling year: There is a constant flow of information between us and the fisheries on different channels. Thus, the fishing activities are continuously monitored and sampling is adjusted accordingly.
Data capture
Means of data capture: Observers are equipped with measuring boards, scales plus additional equipment, e.g., boxes, knives, forceps etc. Measurements are written on paper before the data are typed into a special input programme. Self-samples are processed in our laboratory according to standard procedure in fisheries biology. Data capture documentation: https://www.dcf-germany.de/sampling/, protocols are stored on an internal server of the Thünen institute. Quality checks documentation: Y, data quality is permanently checked internally at different levels of the processing chain (e.g. cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data.
Data storage
National database: Thünen Baltic Sea Fisheries php myAdmin SQL and PostgreSQL data base. International database: Data are submitted to the RDBES and InterCatch which are all hosted by ICES and provided to ICES working groups with internal data bases (e.g. WGBYC) as well as to EU institutions (e.g. JRC). See for details: https://rdbes.ices.dk/ https://intercatch.ices.dk/ https://datacollection.jrc.ec.europa.eu/data-calls Quality checks and data validation documentation: No link for national data base. Data quality is permanently checked internally at different levels of the processing chain (e.g., cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data. After upload to the international data bases ICES / EU institutions are responsible for further quality checks. See for details:
Sample storage

Storage description: With regard to sampling of the commercial fishery, mostly only otoliths are stored dark and dry in the Thünen Institute of Baltic Sea Fisheries. Sample storage is perpetual. The internal server of the Thünen institute contains the single fish data that can be linked to the stored otoliths.
Sample analysis: The Thünen Institute of Baltic Sea Fisheries is participating in all relevant methodology workshops and following the international agreed methods and manuals.
Data processing
Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally.
Editing and imputation methods: Y, data quality is permanently checked internally at different levels of the processing chain (e.g., cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data. Data checks and processes are stepwise adapted to the new PostgreSQL database and uploaded to a Thünen github and later to an ICES repository (https://github.com/ices-eg/Thuenen).
Quality document associated to a dataset: Y, the estimation process is documented internally and the data quality is regularly checked internally.
Validation of the final dataset: Before upload, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: OF Self-Sampling

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: OF_Self-sampling
Sampling scheme type: DEU
Observation type: SelfAtSea, SelfAtShore
Time period of validity: 2025-2027
The German self-sampling scheme for the Baltic Sea comprises of the same 6 sampling frames covered by the OF Observer scheme (previous textbox). It provides the essential biological data (length/weight/age/sex/maturity) from all commercially used fish species of the German fisheries in the Baltic Sea. The self-sampling are a major contribution to fulfil the national sampling obligations and secure the data delivery for the ICES stock assessments. Self-Samples comprise of unsorted catch samples; additional information on landings and sales as well as incidental catches of sensitive species are asked from the fishers directly and taken from official data.
RWP 2025 - 2027
Description of the population
Population targeted: Primary sampling units (PSUs) are fishing trips in the different sampling frames.
Population sampled: 1) Baltic active 2224: Trawlers targeting demersal species with active gear types. Peak season: 1 st and 4 th quarter. Area: Western Baltic Sea. Duration of trips: 1 to 5 days. Number of vessels operating: 49 (2023).
2) Baltic passive 2224: Small-scale vessels targeting demersal species with passive gear types. Peak season: yearround. Area: Western Baltic Sea. Duration of trips: 1-2 days. Number of vessels operating: 341 (2023).
3) Baltic active 2532: Trawlers targeting demersal species with demersal gears. Peak season: 1 st and 2 nd quarter. Area: Eastern Baltic Sea. Duration of trips: 5-8 days. Number of vessels operating: 3 (2023).
The following pelagic populations are currently covered by a self-sampling program, conducted at sea or at shore and is covered by the respective Text Box. At-sea sampling might take place if necessary.

4) Baltic herring passive 2224: Small-scale vessels targeting herring with passive gear types. Peak season: 1st and 2nd quarter. Area: Western Baltic Sea. Duration of trips: 1 day. Number of vessels operating: 255 (2023).

5) Baltic herring active 2224: Trawlers targeting herring with pelagic trawl gears. Peak season: 1st and 2nd quarter. Area: Western Baltic Sea. Duration of trips: 1 day. Number of vessels operating: 6 (2023).

6) Baltic sprat: Trawlers targeting sprat with pelagic trawl gears. Peak season: 1st and 2nd quarter. Area: Baltic Sea. Duration of trips: 1-2 weeks. Number of vessels operating: 19 (2023).

Stratification:

Populations are stratified by target species group (demersal, pelagic), area and gear type (active, passive)

Sampling design and protocols

Sampling design description: The designs differ between the populations sampled.

Demersal populations: Each year, for each sampled population a list of vessels is produced using the landings data from the previous year (e.g., the lists for 2025 are compiled at the end of 2024 with data from 2023). The lists are sorted by total landings per vessel. The vessel lists of the sampled populations Baltic active 2224, Baltic passive 2224 and Baltic active 2532 include all vessels that contributed ~60%, ~90 and ~90% of the total landings, respectively. The list of vessels is then randomised by assigning a random number to each vessel on a list. The sequence of the random number determines the sequence of contacting the vessel. If a vessel is selected, any fishing trip is sampled, except for trips targeting freshwater species, herring or sprat (see below).

There is only one list for the entire year. If all vessels from a list have been contacted before the year ends, the same list is used again. Sampling is conducted all year-round and the effort is distributed according to fishing seasons. Each phone call with fishers is documented since 2010. This document is used to calculate the success/non-response/rejection/refusal rates. In addition, we record if the sample is selected randomly or based on expert judgement. Expert knowledge partly is used to ensure efficient sampling coverage of periods/strata with very low landings, e.g. demersal species in quarter 3.

An at-sea observer catch sampling programme (including concurrent sampling of landings, discards and unwanted by-catches) is conducted for the demersal fleet segments. In addition, a self-sampling programme with fishers is used to collect biological and catch data; unsorted commercial catch samples of usually 150-200 kg from the last or last but one haul is purchased. Diagnostics show that sampled trips are representative of the overall national population of vessels and their spatio-temporal dynamics. In addition, opportunistic sampling of landed discards (BMS cod under the landing obligation) may take place.

Herring: For the sampled population Herring passive SD2224, five major ports around the Greifswald Bay - the major fishing ground - are sampled using unsorted catch samples from a vessel per port. For the sampled population Herring active SD2224, unsorted catch samples are provided by the trawlers.

Sprat SD2232: The German sprat catches in the Baltic Sea mainly originate from two pelagic trawlers. Since 2013, a self-sampling programme is conducted where each vessel provides one frozen catch sample (5 kg) per trip. This covers the ICES subdivisions 25-29. In addition, minor sprat catches in SD22 and SD24 are sampled opportunistically upon expert judgement and notification from the few fishers that are temporarily targeting sprat.

The métier of a sample is assigned *ex-post*. Each sample is raised from the haul to trip level. Replicate samples from the same métier are averaged and raised to all trips of the métier within a stratum (e.g., all landings of quarter 1-SD22-gillnets).

The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

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

Regional coordination: Thünen-OF is involved in the regional sampling plan (RSP) on pelagic trawlers in 2025-2027. The RSP was developed by the RCG Baltic (RCG NA NS&EA RCG Baltic 2021) is incorporated into the Regional and National work plan. Data are collected using standardized sampling protocols and sampling methods that were developed and agreed on in the respective RCG Baltic subgroup and adopted by the member states. Refusal and rejection rates are additionally collected. Data are submitted to the RDBES as a case study (Design “Baltic SPF Regional”).

Link to sampling design documentation: <https://www.dcf-germany.de/sampling/>

Design follows international recommendations: Y, the sampling design complies with ICES standards (e.g., WGCATCH)

Link to sampling protocol documentation: <https://www.dcf-germany.de/sampling/> and RCG NA NS&EA RCG Baltic 2024. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2024. Part I, Report, 78 p. Part II, Decisions and Recommendations, 16 p. **Part III, Intersessional Subgroup (ISSG) 2023-2024 Reports**, 331 p. (<https://datacollection.jrc.ec.europa.eu/docs/rcg/>), Report of the Intersessional Study Group (ISSG): case study on RSP of small pelagic fishery trawler in the Baltic, Report Part III, page 126pp.

Protocol follows international recommendations: Y, the sampling design complies with ICES standards (e.g. WGCATCH)

The sampling program was externally evaluated (Christman, M. 2020: Evaluation and Optimization of the National German Catch Sampling Programme for the Baltic Sea Fisheries of cod, plaice and herring)

Sampling implementation

Recording of refusal rate: Y, refusal rates are available at the end of the sampling year

Monitoring of sampling progress within the sampling year: There is a constant flow of information between us and the fisheries on different channels. Thus, the fishing activities are continuously monitored and sampling is adjusted accordingly.

Data capture

Means of data capture:

Self-samples are processed in our laboratory according to standard procedure in fisheries biology.

Data capture documentation: <https://www.dcf-germany.de/sampling/>, protocols are stored on an internal server of the Thünen institute.

Quality checks documentation:

Y, data quality is permanently checked internally at different levels of the processing chain (e.g. cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data.

Data storage

National database: Thünen Baltic Sea Fisheries php myAdmin SQL and PostgreSQL data base.

International database: Data are submitted to the RDBES and InterCatch which are all hosted by ICES and provided to ICES working groups with internal data bases (e.g. WGBYC) as well as to EU institutions (e.g. JRC). See for details:
<https://rdbes.ices.dk/>
<https://intercatch.ices.dk/>
<https://datacollection.jrc.ec.europa.eu/data-calls>

Quality checks and data validation documentation: No link for national data base. Data quality is permanently checked internally at different levels of the processing chain (e.g., cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data. After upload to the international data bases ICES / EU institutions are responsible for further quality checks.
Sample storage
Storage description: With regard to sampling of the commercial fishery, only otoliths are stored dark and dry in the Thünen Institute of Baltic Sea Fisheries. Sample storage is perpetual. The internal server of the Thünen institute contains the single fish data that can be linked to the stored otoliths. Sample analysis: The Thünen Institute of Baltic Sea Fisheries is participating in all relevant methodology workshops and following the international agreed methods and manuals.
Data processing
Evaluation of data accuracy (bias and precision): Y, data quality is regularly checked internally. Editing and imputation methods: Y, data quality is permanently checked internally at different levels of the processing chain (e.g., cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data. Data checks and processes are stepwise adapted to the new PostgreSQL database and uploaded to a Thünen github and later to an ICES repository (https://github.com/ices-eg/Thuenen). Quality document associated to a dataset: Y, the estimation process is documented internally and the data quality is regularly checked internally. Validation of the final dataset: Before upload, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: Baltic SPF regional

MS: DNK, DEU, EST, FIN, LVA, LTU, POL, SWE
Region: Baltic Sea
Sampling scheme identifier: Baltic SPF regional
Sampling scheme type: Commercial fishing trip
Observation type: Not coordinated
Time period of validity: 2025 fully implemented
Short description (max 100 words): This is a regional sampling program to collect length and age samples from the mixed sprat and herring fishery conducted by commercial trawlers operating in the Baltic Sea (ICES subdivisions 27.3.d.22 to 27.3.d.29 and 27.3.d.32) using self-sampling, or sampling on shore. The aim is to estimate length-and age composition of catches and mean weight of fish by length and age, caught by commercial trawlers by quarter and subdivision. The sampling program was introduced as a trial in 2022 to test what and how much it is possible to standardize regional sampling. In 2025 the sampling will be fully implemented as a RWP. In most countries the program has been conducted in parallel to national sampling programs covering other parts of the stocks (ex. Gillnets). The program is still under development and at the moment some aspects of the sampling (e.g., observation type, sample selection method, sampling frequency) vary between countries, mainly due to practicalities; but the

countries have agreed on standardized protocols for the sub-sampling of biological parameters and a substantial number of other aspects (e.g., coordinated estimation, upload to RDBES, etc).

Description of the population

Population targeted:

Pelagic trawlers participating in the herring and sprat fisheries of Subareas 27.3 – the sampling area is the Baltic Sea from ICES subdivision 22 to subdivisions 29 and 32.

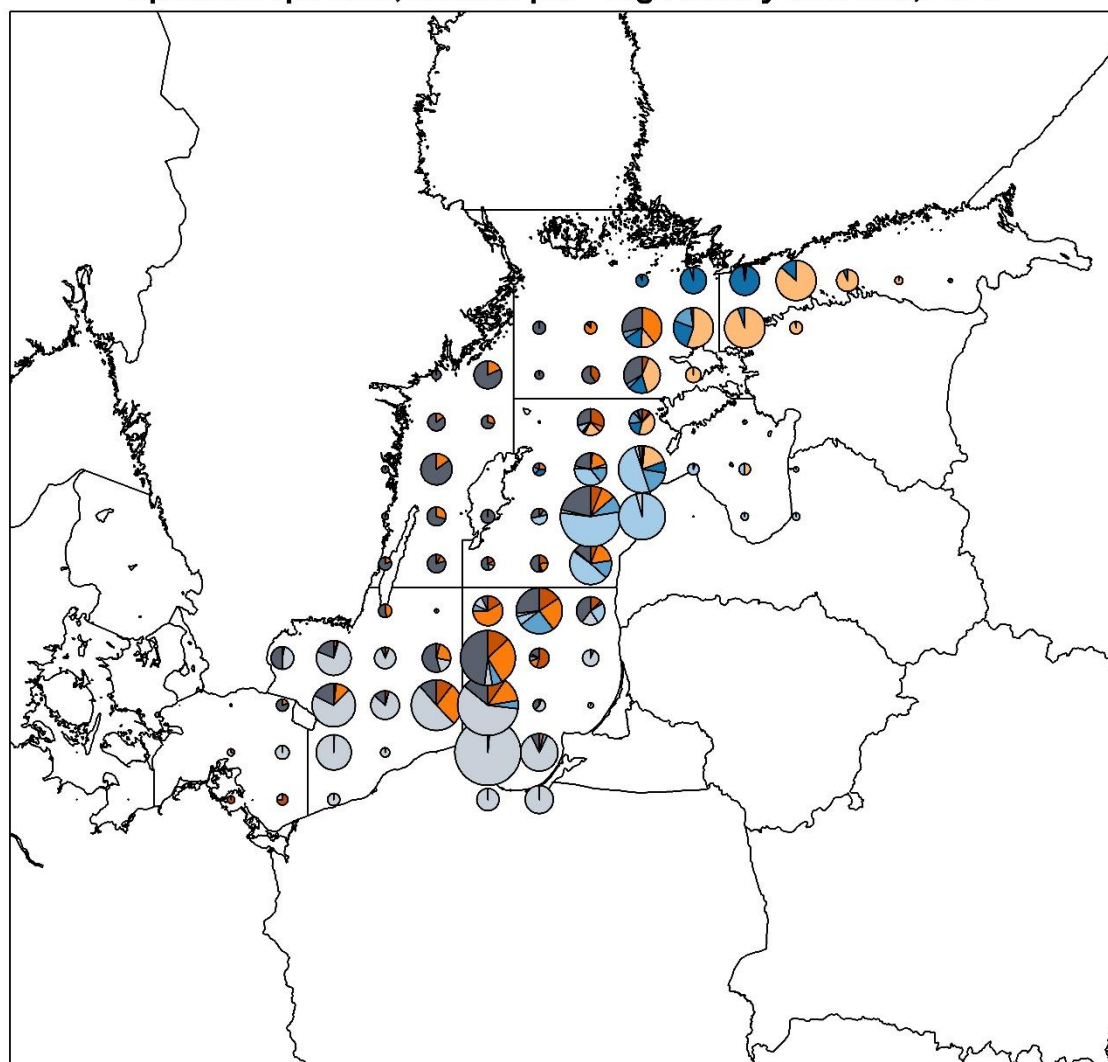
All herring and sprat commercially caught in the Baltic Sea for which estimates of length or age composition are required

Population sampled:

The scheme samples fishing trips from the most important trawlers participating in the small-pelagic fisheries for herring and sprat in the Baltic.

In principle several herring stocks and the one sprat stock in the Baltic can be sampled in this sampling program. However, in reality not all MS fleets are covering all the areas, as is indicated in figure 1 and 2.

Sprattus sprattus, landWt per FlagCountry and rect, 2023



DE FI PL
DK LT SE
EE LV

Only including rect's accounting for 100 pct. of total landWt, 0.1% of total landWt missing info about position and therefore not shown

Fig. 1. Catch of sprat in the Baltic in 2023 by MS. Data uploaded in RDB in 2024

Clupea harengus, landWt per FlagCountry and rect, 2023

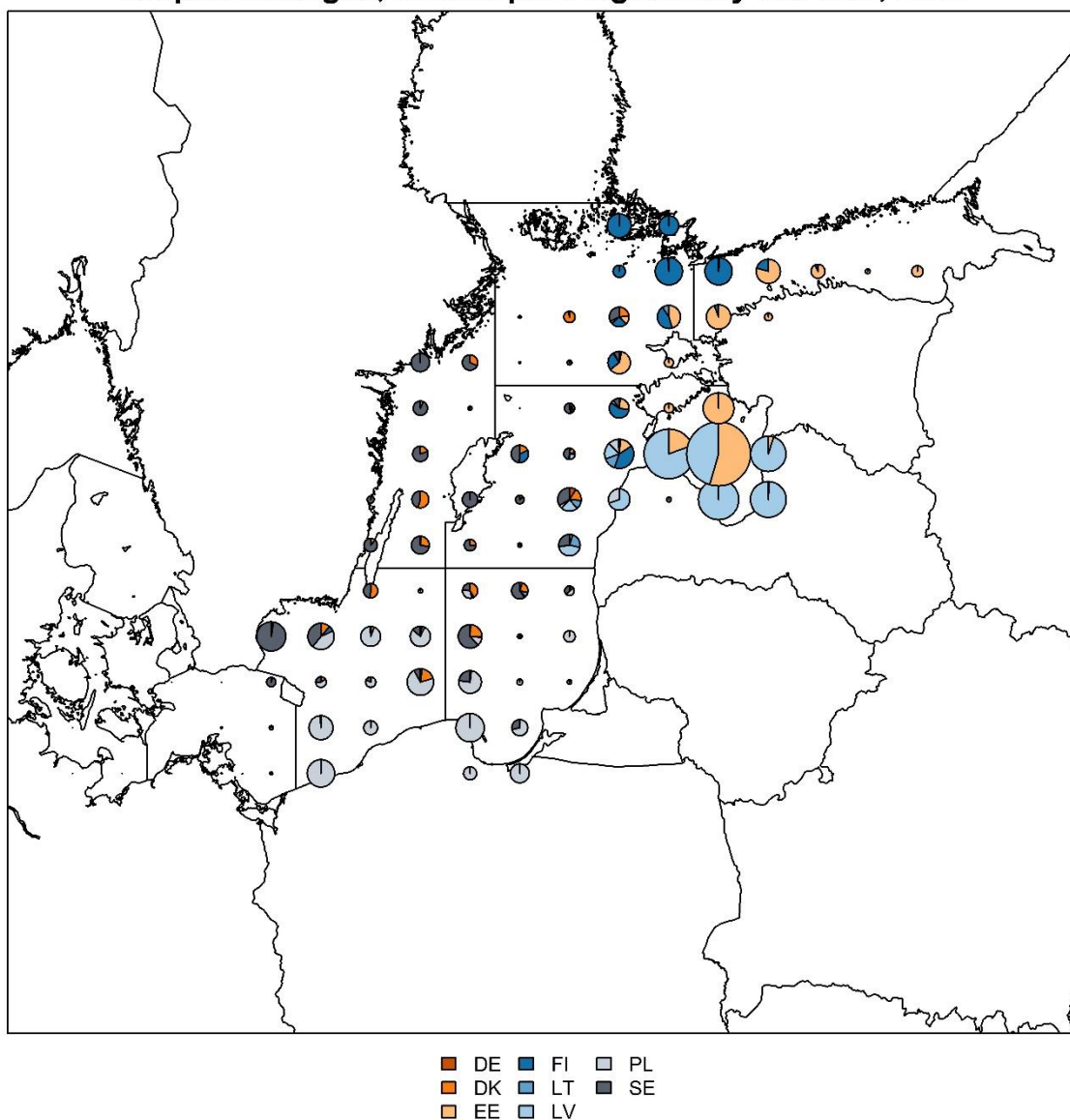


Fig. 2. Catch of herring in the Baltic in 2023 by MS. Data uploaded in RDB in 2024

Table 1. Baltic stocks covered by MS participating in the Baltic SPF regional program.

Stock	MS	Area covered by the RWP
her.27.20-24	DEU/DNK/POL/SWE	22-24
her.27.25-2932	DNK/EST/FIN/ LTU/LVA/POL/SWE	25-2932
her.27.28.1	EST/LVA	28.1
spr.27.22-32	DNK/EST/FIN/LTU/LVA/POL/SWE	22-32

Russia is presently fishing 15% of the total sprat catch and 25% of total herring catch in SDs 25-29,32. However, there are no information on sampling strategy and no data is delivered to ICES.

With some national adaptations, the vessel included in RWP are trawlers fishing for sprat and herring in the Baltic.

Table 2. Numbers of trawlers participating in the RWP based on active vessels in 2023

Country	Number of vessels included in the sampling frame (from 2023)
DEU	22
DNK	6
EST	22
FIN	23
LTU	7
LVA	39
POL	69
SWE	15

In general (with some national adaptations), vessels having low contribution to herring and sprat landings are not covered by this regional programme. These include some small trawlers or passive gears such as gillnetters landing herring. The following table gives their identifiers in the 2024-2025 national sampling programmes – details can be found in the relevant national workplan <https://datacollection.jrc.ec.europa.eu/wp-np-ar>

- If national sampling program are sampling the same stocks but in other programs these can be included here. (small scale fisheries – gillnetters / trap nets ect.) use Sampling scheme/frame identifier as it is national work plan Table 2.5

Table 3. National sampling program identifier, covering same stock but other programs.

MS	Sampling scheme identifier	Sampling frame identifier
DEU	DEU Baltic SPR	Baltic Sprat
DEU	DEU Baltic HER	Baltic herring passive 2224
DEU	DEU Baltic HER	Baltic herring active 2224
DNK	DNK industrial sampling	Sprat
EST	OnShoreCommercialCoastal	SB
FIN	On shore sampling program targeting pelagic trawl fishery of herring and sprat	OTM_SPF
LTU	Scientific observer on shore commercial landings selected species (SO-SHORE-COM-SS)*	Small scale gillnetters (BS-SSF-GN)
LTU		Small scale trap-netters (BS-SSF-TN)
LVA	SB-1(SelfAtSea)	SB-1
LVA	SB-2 (SelfAtSea)	SB-2
POL	Baltic at sea	BAL VL0010
		BAL VL1012
		BAL VL1218
		BAL VL1824
		BAL VL2440
	Baltic on shore	BAL VL0010
		BAL VL1012
		BAL VL1218
		BAL VL1824
		BAL VL2440
SWE	CommSelfAtSea - Selected species/stocks	Passive SmallPelagics HER - 27.3.b-d.23-24
		Passive SmallPelagics HER - 27.3.d.25-29

Based on 2023 national data the Table 4 gives an overview of the volumes of herring and sprat landings of by MS that are covered by the present regional sampling plan and those that are not covered by it within the stocks included in the RWP, i.e., they are to be covered by the national plans.

(only the part that is covered by the RWP – areas and quarters)

Table 4. Weight of catches (herring and sprat combined) in 2023 by MS.

	In regional plan (tons)	Outside regional plan (tons)	% in plan
DEU	15153	192	99%
DNK	27 799	1275	96%
EST	45403	9328	83%
FIN	25495	917	97%
LTU	12699	9959	59% (99% of SPR and 12.8% of HER)
LVA	57429	1641	97%
POL	66993	16394	80%
SWE	55703	13133	81%
TOTAL			

Stratification:

The program is stratified into national lists of vessels. The use of national stratification aims to achieve good spatial coverage over the broad geographical range of the fisheries as well as adequate number of samples and representation of the vast majority of commercial landings. Detailed information on strata by MS can be found in table 2.5. Presently there is no consensus with regards to possible changes to effort allocation.

Sampling design and protocols

Regional level of ambition: 3 - “Common monitoring strategy”

Present regional level: 1 - “Coordinated data reporting”

Sampling design description:

Brief description of the sampling design

- Stratified multi-stage cluster sampling design
- Active trawlers targeting the sprat/herring fishery.
- The sampling frame is stratified into national vessel lists
- Sampling units
 - Primary sampling unit (PSU): vessel
 - Secondary sampling unit (SSU): trips
 - Tertiary sampling unit (TSU): Nation specific (landing events/ haul)
- Varies by MS with regards to observation type, sample selection method and sampling frequency but in general:
 - Minimum sampling size (3kg)
 - Minimum number of fish per sample for biological analysis (50/ species)
 - Vessels outside the regional program are covered by national program (table 3.)

Biological sampling protocols:

- Minimum 3 kg random sample is provided from a trip with information on the given haul the sample has been taken from.
- Sample is sorted into species (mainly herring and sprat but other species can be present).
- Random sample of minimum 50 individuals by species is selected for length, weight and age analysis. In some countries, the selection is conducted by measuring the weight of 10 individuals and add fish until the weight of the 10 individuals x 5 has been reach. The length is measured in semi-centimetre.
- The same individuals selected for length are selected for weight measurement. The weight is measured non-stratified and in grams.
- The same individuals selected for length are selected for age readings (also non-stratified). In some countries, a specific number (maximum 5, 10 or 15) of individuals from the length class is taken for age reading.
- It is not mandatory in the regional sampling program to collect other biological parameters than, length, weight and age. However, some MS collect information on sex, maturity, stomach fullness, parasites and genetics of individuals.

Is the sampling design compliant with the 4S principle?

Yes, although this varies by MS

Regional coordination:

Yes

Link to sampling design documentation:

Some additional information:

Danish sampling program was before 2020 an ad hoc sampling program where control agency sampled vessels based on a quota system to cover the main part of the landings. As the main part of the Danish landings in the Baltic are conducted in a few but very large trips this was not the optimal ways of sampling. Since 2020 Denmark has sampled the small pelagic in the Baltic according to the new regional design. This indicates that all larger trawlers ≥ 24 meters are included if they have more than 85% sprat/herring landings. These vessels are all asked to take 1 sample per trip. Further, an additional on-shore sampling program has been sat in place covering all vessel length. Not all sampling sites are cooperating and refusal rates on landing sites are therefor included. Further species misreporting has occurred back in time, mainly with over reporting of herring and underreporting of sprat. This was partly compensated for in the data delivery for stock assessment as Denmark for some years used corrected data based on control samples used by month and area on the fleet. At the benchmark 2023 (WKBBALTPEL) the species correction was systematically corrected back in time and an updated time series for both sprat and herring were uploaded to ICES. In April 2020 a new and very detailed control system has been emplaced for all industrial landings in Denmark with a very large sampling intensity (14 10 kg samples per landing for sprat and herring in the Baltic) conducted on every landing, this has improved the quality of the data.

Latvia sampling program. Each year the Fisheries department of the Latvian Ministry of Agriculture prepares the list of vessels and companies that have the fishing permit in the Baltic Sea and the Gulf of Riga. The vessel list consists of information on vessel name, fish species and fishing subdivisions. The vessel list is sorted by fishing type and subdivision to create three segments:

- Pelagic fishery in the Central Baltic (34 vessels in 2021);
- Pelagic fishery in the Gulf of Riga (22 vessels in 2021);

- Demersal fishery (31 vessels in 2021).

Each vessel can be included in one or several segments. Not all vessels that have fishing rights participate in the actual fishery. In the pelagic fishery, six biological samples are collected each month – three samples from the pelagic fishery in the Central Baltic and three samples from the pelagic fishery in the Gulf of Riga. For each segment, fishing vessels are randomly selected from the initial vessel list using Simple Random Sampling Without Replacement (SRSWOR). After the vessel selection, it is checked whether the vessel is active and participates in the fishery of interest. If the vessel is active (according to electronic logbooks), a call is made to the company owner or other contact person to arrange the biological sample or observer participation for the next trip. If the vessel doesn't participate in the fishery of interest or doesn't fish for other reasons, the next vessel is selected according to the same principles. In case when the random selection of vessels shows the vessel that was already selected in a given quarter, this vessel is ignored and the procedure is repeated. The vessel selection process is documented to ensure the traceability of the process.

The Swedish sampling program was before 2020 a sampling program that relied on quota sample to obtain samples from each subdivision, quarter and fishery type (consumption, industrial). Samples were obtained from control and market sources. The lack of scientific control over the sampling and uncertainty in the raising totals (possible bias in species position of fleet level totals; possible bias in totals considered as consumption and industrial), increased the risk of bias and imprecision of final estimates. Since 2020 Sweden has sampled the small pelagic in the Baltic according to the new regional design that is based on probabilistic vessel and trip selection and self-sampling. The pre 2020 sampling design remains in place but is only used as a last-resort (back-up) strategy to secure data if industry refusals happen to threaten data collection.

Estonia sampling. Can be considered as an ad hoc sampling program until 2021 which aims to collect samples from all active trawlers from each subdivision during active fishing period. During the pilot program in 2020 and 2021 probabilistic sampling scheme was tried (probabilistic selection of vessel), however due to the nuance rich fisheries behaviour it was difficult to guarantee that all subdivisions were covered with enough samples. The difficulty laid in the fact that it was hard to predict which vessels were going to fish in which area/stock, especially as subdivision 28.1 (Gulf of Riga) comprises of a separate herring stock. Same vessels can fish both in open sea or in Gulf of Riga, and the fishing location is determined by many variables. To achieving probabilistic vessel selection, the vessel selection is done when the sampling day is chosen and known, which also allows the knowledge on the vessel that are active that time. Therefore, the probabilistic vessel selection works on a smaller vessel list (vessels active during selected sampling day), which achieves that all SD-s are sampled (especially Gulf of Riga).

German sampling program. The declining number of vessels in the German pelagic fishing fleets and more automated catch handling processes onboard led to a switch from observer trips to self-sampling in the last few years. Fishermen are providing mixed catch samples following an agreed sampling protocol onboard. Germany is collecting around 20-25 catch samples per year from the relevant fleets, where one sample contains around 50kg of fish. Neither the vessels nor the sampling time however are chosen randomly. Sprat samples are provided by 1-2 trawler, herring is provided by less than 10 trawler that are usually pair-trawling in the main herring distribution areas, thus missing smaller herring populations and fishing areas. Sampling times are fixed to two times per week, but extra samples might be added opportunistically.

Polish sampling program. The sampling scheme aims to collect sprat and herring to estimate length-composition, numbers at age, and mean weight at age of commercial catches. The target population consists of vessels active at least once in the period January-December in 2023, were using OTM, had total landings 10t minimum, were targeting sprat or herring (over 95%) and have length above 17.5m. The primary sampling unit applied in the sampling program is vessel*trip. The list of vessels is used as a proxy to select a trip because the list of trips is not known in advance. In total 80 vessels will be selected for 1 year case study (30 or 10 per quarter). This vessels' list is a proxy for selecting the PSUs. Each month of the sampling a coordinator calls the contact persons from the selected vessels and ask for the sample from the next trip. A coordinator calls the selected vessel's contact person five times a week maximum. The calls are to be made when the weather forecast is good, and when the staff is available to pick up the sample from the harbour. All

contacts are recorded including refusals. The vessel which is definitely not willing to cooperate is blacklisted for a period of 1 year. A coordinator asks for a sample from the next trip. The sample should be taken from unsorted catch from the first haul.

Lithuania sampling program. Selection procedure: direct contact with vessel owner to discuss possibility of accepting of observer. 0 (zero) landings in Lithuania, so only sampling at sea possible. Embarking and disembarking of observer in the ports out of Lithuania, therefore logistics (observers travelling) was main limitation for conducting the sampling. Due to travel restrictions in 2020 none of the vessel was selected for sampling. Number of vessels fishing for small pelagic is very small (in 2021 only 13 and only 5 of them have made landings in Lithuania). It makes sampling probability very unequal. Most sprat is landed in Demark, so samples were collected by Danish observers according to the agreement. Since 2021 this agreement started to be replaced by coordinated actions in the framework of this pilot study.

Only landings of herring and sprat for human consumption are sampled in Lithuania. These samples were from trawls with mesh size more than 32 mm. However, most majority of sprat and significant part of herring are landing for industrial purposes out of Lithuania. These landinds are from trawls with mesh size 16 -20 mm. Due to it, data on length distribution collected from landings in Lithuania may be different from average total.

Target population is midwater trawlers targeting spart and/or herring. The sampling scheme for herring caught by small scale coastal fleet is running in parallel.

Finnish sampling program. Finnish sampling is based on on-shore sampling program targeting pelagic trawl fishery of herring and sprat. The stocks for sampling are Central Baltic Herring (SD 25-29, 32)and Gulf of Bothnia herring (Bothnian Sea Herring (SD 30) and Bothnian Bay Herring (SD 31)) – the latter two have always belonged to same management unit and to same assessment unit since 2017 as well as the Baltic Sprat stock. Biological data are collected mostly from sampling of commercial trawl fisheries (OTM_SPF and PTM_SPF). Sampling of Herring (and sprat) is based on length stratified sub-sampling scheme, where target number of specimen for biological data is 1/ 0.5 cm length-class/sampled trip (the number of specimens is increased for maturity sampling in spring before spawning time). The herring stock-related biological data (i.e. age-length relation) is used also with the trap-net length distributions – and vice versa.

Finland has started the statistically sound sampling scheme (4S) from the trawl fisheries targeting herring and sprat, where it has been in force from the beginning of year 2019. The selection of PSU for herring (and sprat) is to do random sampling from a draw list, where probability of a fishing unit to be selected for sampling in certain SD and quarter is weighted by its previous years' combined catch of herring and sprat in the same SD and Q. During each quarter the sampling personnel go through the draw list in free order, recording all relevant info (sampling, refusal, out of area, etc.) of the interaction into our sampling database SUOMU, which also has the lottery function needed in the process. Additional lottery draw of PSU's will be done to reach the sampling target if there is a deficit.

Risks and mitigations for the regional sampling program

Different local issues have been presented from different MS.

For Lithuania landing sites are often abroad and not easily accessible for observers, this has given some challenges in respect to receive the samples. Further it has not been possible to ask the fishermen to bring the sample back to the home harbour.

In Finland the self-sampling was not possible due to the storing issues onboard the vessels which cause the sample quality to be very poor. Therefore, the Finnish sampling program has been slightly changed to have a similar selection procedure but the sample is taken from the unsorted landings on shore.

In Estonia the self-sampling is also not possible due to storing issues onboard the vessels and harbours. In addition, some vessel frequently use abroad landings sites from where it's a challenge to receive a sample.

In Sweden an initial reduction in sampling of catches for consumption was observed when the regional program was first implemented. This reduction partially related to the sampling frame being dominated by large vessels that fished essentially for industrial purposes. In 2022-2024 national strata were added to improve coverage of smaller vessels in the target area that fish for consumption. Sweden also has available in its national plan back-up ad-hoc strata that can be activate if needed (e.g., in case of industrial refusals).

In Poland in some cases landings take place abroad, and it is impossible to collect the sample from these landings.

A brief summary of the existing time-series:

Time period	Description Denmark
1994 - 2019	Ad Hoc Sampling (NPAH)
2020 – present	Simple Random Sampling Without Replacement (SRSWOR)
	Description Estonia
- 2021	Ad Hoc Sampling (NPAH)
2022 -present	Simple Random Sampling With Replacement (SRSWR)
	Description Latvia
-2016	Ad Hoc Sampling (NPAH)
2017-present	Simple Random Sampling Without Replacement (SRSWOR)
	Description Finland
1974-1997	Simple random sampling on ad hoc basis
1998-2019	Length-stratified random(quota-) sampling on ad hoc basis
2019-2020	Length-stratified random(quota-) sampling on probabilistic basis
2021-present	Simple random sampling on probabilistic basis
	Description Germany
1992 - present	Non-Probabilistic Judgement Sampling (NPJS)
	Description Lithuania
2004-2016	Ad Hoc Sampling (NPAH)
2017-present	Simple Random Sampling With Replacement (SRSWR)*
	Description Poland
2004-2016	Ad Hoc Sampling (NPAH)
2017-present	Simple Random Sampling With Replacement (SRSWR)
Time period	Description Sweden (more details in ICES WKBBALTPEL report, 2023)
– 1976	Documentation not yet available
1977 – 2000	Ad Hoc Sampling (NPAH) (length stratified, sorted landings)
2001 – 2019	Ad Hoc Sampling (NPAH) (not length stratified, unsorted landings)
2020 – present	Simple Random Sampling Without Replacement (SRSWOR)

Further information

More information on this regional sampling program can be found in the 2021 and 2022 RCG reports:

RCG NANSEA RCG Baltic 2022. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2022. Part I Report, 101 pgs. Part II Decisions and Recommendations, 13 pgs. Part III, Intersessional Subgroup (ISSG) 2021-2022 Reports, 159 pgs. (<https://datacollection.jrc.ec.europa.eu/docs/rcg>)

RCG NA NS&EA RCG Baltic 2021. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2021. Part I Report, 78 pgs. Part II Decisions and Recommendations, 16 pgs. Part III, Intersessional Subgroup (ISSG) 2020-2021 Reports, 350 pgs. (<https://datacollection.jrc.ec.europa.eu/docs/rcg>)

Compliance with international recommendations:

Yes
Sampling implementation
Regional level of ambition: 3 - “<i>Common monitoring strategy</i>” Present regional level: 1 - “<i>Coordinated data reporting</i>” Recording of refusal rate: Yes Refusals and other types of non-responses are recorded at vessel level Monitoring of sampling progress within the sampling year: Routine follow-up meetings between MS are organized minimum twice a year. At these meetings the sampling protocols, age reading workshop, species misreporting etc. are discussed.
Data capture
Regional level of ambition: 1 - “<i>Coordinated data reporting</i>” Present regional level: 0 - “<i>No coordination or not relevant</i>” Means of data capture: Presently not regionally coordinated Data capture documentation: Presently not regionally coordinated Quality checks documentation: Presently not coordinated, however is planned to be part of the coordination. The BioDataQualityTFA could be used as a common documentation. Regular international age reading workshops are held but presently no other international data checks are conducted.
Data storage
Regional level of ambition: 4 - “<i>Joint data collection</i>” Present regional level: 2 - “<i>Agreed guidelines</i>”

National database:

Database name	Location (e.g. host institute)	Format (database / spreadsheet)	Years of data stored
Fiskeline	DTU Aqua	database	1990-present
Fiskdata 2	SLU Aqua	database	1985-present
NPZDR	NMFRI (MIR)	database	2004-present
DMAR-01	Thünen-OF	database	2002-present
SPMAFI (sprat) HeMaFI (herring)	Thünen-OF	database	2001-1992
BIODATA	BIOR	database	2003-present
SUOMU	LUKE	database	2009-present
	EMI-UT	database	2009-present
ZDIS	Fisheries Service (LTU)	database	2010- present (effort and landings)
KOPGALIS DRP	KU MRI (LTU)	CSV and Rdata	2017 – present (samples of biological data)

International database:

Small pelagic scheme targeting the herring and sprat fisheries: RDB/RDBES at ICES uploaded as common name “Baltic SPF regional” to the RDBES

Database name	Location (e.g. host institute)	Format (database / spreadsheet)	Years of data stored
RDBES	ICES	database	2021-present

(*) database is undergoing final tests with data deletions occurring before updates

Quality checks and data validation documentation:

Common documentation and agreement on relevant national data checks based on RDBES format. (RCG/ / ICES) will be developed

Sample storage

Regional level of ambition: 0 - “No coordination or not relevant”

Present regional level: 0 - “No coordination or not relevant”

Storage description:

Presently not regionally coordinated

Sample analysis:

Presently not regionally coordinated

Additional information:

Data processing

Regional level of ambition: 4 - “Joint data collection”

Present regional level: 1 - “Coordinated data reporting”

Evaluation of data accuracy (bias and precision):

Scripts will be developed based on the RDBES data format that make use of common functions being developed by groups such as the ICES WGRDBES-EST.

Age reading comparison. It has been agreed to quality ensure the age reading on a regional level regular and as a minimum before benchmarks. Dates for last regional age reading exercise via SmartDots are indicated in the table per stock

Stock	year	MS
her.27.20-24	2018	Reported in WGBIOP 2018, Annex 3, p 46-47
her.27.25-2932	2022	DNK, POL, SWE, GER, LVA, LTU, EST & FIN
her.27.28	2015	WGBIOP 2017 Report, Annex 5, p 75
her.27.3031	2019	SWE, FIN
spr.27.22-32	2022	DNK, POL, SWE, GER, LVA, LTU, EST

Editing and imputation methods:

A design-based estimator is under development. Documentation will be available in RDBES scripts and outputs when that system is in production.

Quality document associated to a dataset:

Documentation will be available in RDBES scripts and outputs when that system is in production.

Link to estimation documentation;

Documentation on estimation will be made available after it has been coordinated.

Validation of the final dataset:

Final validation takes place when data is compiled at ICES stock coordination level.

Sampling scheme identifier: SF Observer

MS : DEU
Region: North Sea and Eastern Arctic, North Atlantic
Sampling scheme identifier: SF Observer
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: 2025-2027
This sampling scheme comprises 11 sampling frames: Arctic 1 and 2, North Sea 1-5, and North Atlantic 1-4. It is aiming to collect biological samples (length/weight/age/sex/maturity depending on species) from target species of the German fisheries in the North Sea and Eastern Arctic and the North Atlantic to fulfil the national sampling obligations and secure the data delivery for the assessment. Furthermore, information on the overall catch composition and incidental catches of sensitive species are collected by scientific observers. See general remark in Text Box 2.5 for the overall rationale to collect the data with scientific observers only.
RWP 2025-2027 with regard to Pelagic Freezer Trawler Case Study
Description of the population
Population targeted: Primary sampling units (PSUs) are fishing trips in the different sampling frames. Population sampled: Arctic 1: Factory trawlers targeting gadoid species (cod, saithe, haddock) with demersal gears. Peak season: 1st and 3rd quarter. Area: Northeast Arctic waters. Duration of trips: 4 weeks to 3 months. Number of vessels operating: 2 (2024). Arctic 2: Pelagic freezer trawlers targeting Atlanto-Scandian herring with pelagic gears. Peak season: August to November. Area: Norwegian Sea. Duration of trips: 3 to 4 weeks. Number of vessels operating: 2 (2024). Nur noch Helen Mary/Maartje in 2024 North Sea 1: Beam trawlers targeting brown shrimp in the German coastal area. Peak season: March to October with peaks in the 2nd and 3rd quarter. Area: German North Sea coastal waters. Duration of trips: 1 to 3 days. Number of vessels operating: 144 (2023). North Sea 2: Pelagic freezer trawler targeting North Sea and channel herring with pelagic gears. Peak season: 3rd quarter/December. Area: North Sea and English Channel. Duration of trips: 3 to 4 weeks. Number of vessels operating: 4 (2024). North Sea 3: Otter trawlers, pair trawlers and seine trawlers targeting gadoid species (cod, saithe, haddock). Peak season: All year round. Area: Northern North Sea and Skagerrak. Duration of trips: 1 to 2 weeks. Number of vessels operating: 8 (2023). North Sea 4: Trawlers targeting flatfish (sole, plaice) and Norway lobster. Peak season: All year round. Area: Central and southern North Sea. Duration of trips: 5 to 8 days. Number of vessels operating: 18 (2023). North Atlantic 1: OTB factory trawlers targeting Greenland halibut / redfish in ICES 12, 14, 5a. Peak season: 2nd/3rd/4th quarter. Area: East and West Greenland. Duration of trips: 6 weeks to 3 months. Number of vessels operating: 2 (2024). North Atlantic 2: Pelagic freezer trawlers targeting mainly mackerel, horse mackerel, blue whiting in 6, 7bcjk, 7e, 7fgh, 8, 5-14, (4a). Peak season: seasonal depending on main target species (e.g. mackerel: Jan/Feb and Oct/Nov, blue whiting: Mar/April). Area: Northern North Sea, West British waters and Bay of Biscay. Duration of trips: 3 to 4 weeks. Number of vessels operating: 2 (2024). North Atlantic 3: OTM targeting redfish in 12, 14, 5a. Peak season: 2nd/3rd quarter. Duration of trips: 4 weeks to 3 months. Sporadic fishery which is not carried out every year. Currently, fishery has stopped because of 0 quota. North Atlantic 4: OTB targeting cod in 14. Peak season: 2nd/3rd quarter. Duration of trips: 4 weeks to 3 months but landings in between into Iceland. Number of vessels operating: 2 (2024). North Atlantic 5: OTB factory trawlers targeting Greenland halibut / redfish in NAFO SA1-2. Peak season: 2nd/3rd/4th quarter. Area: East and West Greenland. Duration of trips: 6 weeks to 3 months. Number of vessels operating: 2 (2024).

Stratification:

Populations are stratified by regions and fleet characteristics (gear, target species).

Sampling design and protocols

Sampling design description: Vessels to sample are selected from a telephone list. However, the approach is an opportunistic randomised PSU selection and not fully probability-based due to the low number of vessels within the segments. The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

Is the sampling design compliant with the 4S principle?: N, not fully implementable due to the low numbers of vessels within the fleet segments

Regional coordination: No regional coordination yet in place. However, within the sampling of the pelagic freezer trawler fleet, joint reports of the Dutch and German sampling programs are produced (e.g. Overzee HMJ van, Ulleweit J, Helmond ATM van, Bangma T (2020) Catch sampling of the pelagic freezer trawler fishery operating in European waters in 2017-2018 - joint report of the Dutch and German national sampling programmes. IJmuiden: Stichting Wageningen Research, Centre for Fisheries Research (CVO), 53 p, CVO Rep 20.004, DOI:10.18174/512809)

Link to sampling design documentation: <https://www.dcf-germany.de/sampling/>

Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. WGCATCH).

The sampling program was externally evaluated (Christman, M. 2020: Evaluation and Optimization of the National German Catch Sampling Programme for North Sea and North Atlantic Fisheries)

Link to sampling protocol documentation: <https://www.dcf-germany.de/sampling/> and Overzee HMJ van, Ulleweit J, Panten K, Bangma T (2024) Catch sampling of the pelagic freezer trawler fishery operating in European waters in 2021-2022 : Joint report of the Dutch and German national on-board sampling programme. IJmuiden: Centre for Fisheries Research (CVO), 50 p, CVO Rep 24.001, DOI:10.18174/645872

Compliance with international recommendations: Y, the sampling design complies with ICES standards (e.g. WGCATCH).

The sampling program was externally evaluated (Christman, M. 2020: Evaluation and Optimization of the National German Catch Sampling Programme for North Sea and North Atlantic Fisheries)

Sampling implementation

Recording of refusal rate: Y, refusal rates are available at the end of the sampling year.

Monitoring of sampling progress within the sampling year: Sampling progress is discussed quarterly and adjusted if needed and followed-up. No specific mechanisms are in place to resolve issues and adopt mitigation measures during the sampling year.

Data capture

Means of data capture: Observers are equipped with measuring boards, marine scales plus additional equipment, e.g. boxes, knives, forceps etc. Measurements are mainly first written on paper or sound-recorded before typed into a special input programme. This programme is based on MS Access.

Data capture documentation: <https://www.dcf-germany.de/sampling/>, protocols are stored as hard copies and electronically on an internal server of the Thünen institute.

Quality checks documentation:

Y, data quality is regularly checked internally. Input values are checked within the input programme based on MS Access routines. Currently, a new input programme is developed.
Data storage
National database: Access data files, Thünen Sea Fisheries SQL data base. International database: Data are uploaded into the RDB, RDBES trials and InterCatch which are all hosted by ICES and provided to ICES working groups with internal data bases (e.g. WGBYC) as well as to EU institutions. See for details: https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx, https://www.ices.dk/data/data-portals/Pages/InterCatch.aspx , https://datacollection.jrc.ec.europa.eu/data-calls Quality checks and data validation documentation: No link for national data base. Data quality is permanently checked internally at different levels of the processing chain (e.g. cross checks during the data input, database checks for completeness, logic and consistency, range checks and cross checks with official census data. After upload to the international data bases ICES / EU institutions are responsible for further quality checks. See for details: https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx, https://www.ices.dk/data/data-portals/Pages/InterCatch.aspx , https://datacollection.jrc.ec.europa.eu/data-calls
Sample storage
Storage description: With regard to sampling of the commercial fishery, mostly only otoliths are stored dark and dry in the Thünen institute of Sea Fisheries. Sample storage is perpetual. The internal server of the Thünen institute contains the single fish data that can be linked to the stored otoliths. Sample analysis: The Thünen Institute of Sea Fisheries is participating in all relevant methodology workshops and following the international agreed methods and manuals, see also https://www.ices.dk/community/Pages/PGCCDBS-doc-repository.aspx
Data processing
Evaluation of data accuracy (bias and precision): Evaluation of data accuracy is based on the developed R-codes. The aim of the codes is to identify a potential source of bias and high variance (e.g. refusals, incomplete coverage, noisy data etc.). The codes are stored internally and permanently improved. Editing and imputation methods: Data cleaning/editing process is based on the developed R-codes and involves: outliers detecting, detection and correction of individual input errors, range checks etc.). To avoid the problems related to missing data, imputation approaches are used, in particular to handle: (1) missing age data to produce ALKs (imputing based on annual values/larger length bin/non-commercial survey data), (2) missing weight data (imputing based on regression). Quality document associated to a dataset: Y, the estimation process is documented internally and the data quality is regularly checked internally. Validation of the final dataset: Before upload, the data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: CECAF at sea sampling

MS : DEU
Region: CECAF
Sampling scheme identifier: CECAF at sea sampling
Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): Under the EU Data Collection Framework, based on the activity of the commercial fishing vessels, the EU long distance fishery targeting small pelagic species in the CECAF waters was selected for biological sampling. Biological data collection from the EU fisheries for small pelagics by freezer trawlers as well as data validation, processing and delivery to the relevant end-users is coordinated and executed following the Multi-lateral agreement between Germany, Latvia, Lithuania, The Netherlands and Poland for biological data collection of small pelagics fisheries in CECAF waters. The observation of the presence of PETS is included in the sampling scheme and is a part of the routine data collection on board. The current agreement is valid until the end of 2027 with an option for further extension. Details can be found in Annex 1.1 of NWP NLD 2025-2027. RWP LDF 2025-2027
Description of the population
Population targeted:
Population sampled:
Stratification:
Sampling design and protocols
Sampling design description: Is the sampling design compliant with the 4S principle?: Regional coordination: Link to sampling design documentation: Design follows international recommendations: Link to sampling protocol documentation: Protocol follows international recommendations:
Sampling implementation
Recording of refusal rate:
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture: Data capture documentation: Quality checks documentation:
Data storage
National database:
International database:

Quality checks and data validation documentation:
Sample storage
Storage description:
Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision):
Editing and imputation methods:
Quality document associated to a dataset:
Validation of the final dataset:

Sampling scheme identifier: NPFC at sea sampling

MS : DEU
Region: NPFC
Sampling scheme identifier: NPFC at sea sampling
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): On the basis of a multilateral agreement between Germany, Lithuania, Netherlands and Poland, a joint sampling programme for the collection of biological data from pelagic fisheries in NPFC waters was set. Sampling is carried out on EU vessels active in pelagic fisheries in the North Pacific. Scientific observers from the EU Member States involved collect data from catch sampling, length distribution and biological parameters of fish in accordance with the requirements of the NPFC. The observation of presence of PETS is included in the sampling scheme. The current multi-lateral agreement is valid until the end of 2027 with an option for further extension. Details can be found in Annex 1.1 of NWP NLD 2025-2027. RWP LDF 2025-2027
Description of the population
Population targeted:
Population sampled:
Stratification:
Sampling design and protocols
Sampling design description: Is the sampling design compliant with the 4S principle?: Regional coordination: Link to sampling design documentation: Design follows international recommendations:

Link to sampling protocol documentation:
Protocol follows international recommendations:
Sampling implementation
Recording of refusal rate:
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture:
Data capture documentation:
Quality checks documentation:
Data storage
National database:
International database:
Quality checks and data validation documentation:
Sample storage
Storage description:
Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision):
Editing and imputation methods:
Quality document associated to a dataset:
Validation of the final dataset:

Sampling scheme identifier: SPRFMO at sea sampling

MS : DEU
Region: SPRFMO
Sampling scheme identifier: SPRFMO at sea sampling
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words):
On the basis of a multilateral agreement between Germany, Lithuania, Netherlands and Poland, a joint sampling programme for the collection of biological data from pelagic fisheries in SPRFMO waters was set. Sampling is carried out on EU vessels active in pelagic fisheries in the South Pacific. Scientific observers from the EU Member States involved collect data from catch sampling, length distribution and biological parameters of fish in accordance with the requirements of the SPRFMO. The observation of presence of PETS is included in the sampling scheme. The current multi-lateral agreement is valid until the end of 2027 with an option for further extension.

Details can be found in Annex 1.1 of NWP NLD 2025-2027.
RWP LDF 2025-2027
Description of the population
Population targeted:
Population sampled:
Stratification:
Sampling design and protocols
Sampling design description: Is the sampling design compliant with the 4S principle?: Regional coordination: Link to sampling design documentation: Design follows international recommendations: Link to sampling protocol documentation: Protocol follows international recommendations:
Sampling implementation
Recording of refusal rate:
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture: Data capture documentation: Quality checks documentation:
Data storage
National database: International database: Quality checks and data validation documentation:
Sample storage
Storage description: Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision): Editing and imputation methods: Quality document associated to a dataset: Validation of the final dataset:

Sampling scheme identifier: SURVEY BITS Q1 and Q4

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: SURVEY BITS Q1 and Q4
Sampling scheme type: Survey

Observation type: NA
Time period of validity: 2025-2027
The main aim of the Baltic International Trawl Survey (BITS) is to determine the year-class strength of the commercially important fish species in the Baltic Sea. The target data are abundances, weight and length distributions of all fishes and length-weight-age-sex-maturity data of target species as well as hydrographic data (temperature, salinity and oxygen). In addition, marine litter and various biological samples (e.g. stomachs, livers, DNA, etc. from target species) are sampled for national and international studies. RWP 2025-2027
Description of the population
Population targeted: The target species are mainly Baltic cod (<i>Gadus morhua</i>) and the flatfish species flounder (<i>Platichthys flesus</i>), plaice (<i>Pleuronectes platessa</i>), dab (<i>Limanda limanda</i>), turbot (<i>Scophthalmus maximus</i>) and brill (<i>Scophthalmus rhombus</i>) in the ICES subdivisions 21 to 28. Germany is responsible for sampling from SD22 and SD24 in the western Baltic region. Population sampled The target species are demersal fish species. Stratification: The international trawl surveys are carried out in form of a stratified random survey. The ICES subdivisions and depth layers within eight ICES subdivisions (SD21-SD28) are used as strata. Six layers between 10 to 120 m (10 – 39 m, 20 – 39 m, 40 – 59 m, 60 – 79 m, 80 – 99 m and 100 – 120 m) depending on ICES subdivision are covered by the surveys in aggregated areas in nm² by 10-m depth layers and ICES rectangles.
Sampling design and protocols
Sampling design description: The numbers of planned stations of all participating countries are summarized for the western Baltic area (ICES Subdivisions 22–24) and for the eastern Baltic area (ICES Subdivisions 25–28). Then the total number of planned trawl stations is allocated to subdivisions according to the area and the 5 years running mean of the cpue derived from the BITS survey in spring for each region. The number of planned stations of each the ICES Subdivision is then allocated to the depth layers. Is the sampling design compliant with the 4S principle?: NA Regional coordination: The BITS Survey sampling design is a regional agreement developed by the ICES Working Group on Baltic International Fish Survey (WGBIFS) with the participation of Denmark, Germany, Latvia, Poland, Sweden (all from 1991), Russia (from 1995), Estonia (from 1996) and Lithuania (from 2005). Link to sampling design documentation: https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37133 Compliance with international recommendations: Y Link to sampling protocol documentation: National sampling protocols are in line with the international agreed fishing method, Sampling of trawl catches and collect Environmental data in the Manual for the Baltic International Trawl Surveys (BITS),

https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37133 Compliance with international recommendations: Y
Sampling implementation
Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: NA
Data capture
Means of data capture: Measuring boards, scales, dissection equipment, tubs & buckets, different sampling protocols, national fish data input software (FishInput), CTD probe with data processing software. Data capture documentation: https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37133 Quality checks documentation: Digitized and checked target data at sea by means of national software 'FishInput' is at land reviewed using different views and upload to national server (MySQL/ PostGre SQL).
Data storage
National database: Database for Monitoring Aquatic Resources (DMAR). International database: ICES trawl surveys database DATRAS, https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx Quality checks and data validation documentation: Quality checks for data validation run when the data is uploaded from the national server to ICES-DATRAS.
Sample storage
Storage description: Otoliths from cod and flatfish (plaice, flounder, dab, turbot and brill) are collected by German BITS every year in spring and autumn in the ICES subdivisions 22 and 24 since 1991. Most of the otoliths are dry stored in archive of the Thünen Institute of Baltic Sea Fisheries in Rostock. Otoliths of stored cod otoliths are approx. 60500 (SD22/SD24: 17500/43000) and a total of approx. 89000 for flatfish (plaice, SD22/SD24: 7000/27000), flounder, SD22/SD24: 8500/19000, dab, SD22/SD24:11500/9000, turbot, SD22/SD24: 1200/5500 and brill, SD22/SD24: 100/200). Sample analysis: https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37133
Data processing
Evaluation of data accuracy (bias and precision) Y

Data capture occurs according to BITS standards in its manual,

<https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37133>

Target data is collected strictly according to ICES-DATRAS requirements,

https://datras.ices.dk/Data_products/ReportingFormat.aspx

Editing and imputation methods:

Y

ICES Data validation performed upon data submissions is mostly automated, and produces data quality reports with quality flagged data for the submitter to verify if the data need any correction.

<https://www.ices.dk/data/tools/Pages/data-validation.aspx>

Quality document associated to a dataset:

All data quality control checks performed by the online screening programmes, or by ICES data officers before data are uploaded to the thematic portals are documented in the Quality Control Database (QC DB).

Validation of the final dataset:

When the data are used in the assessment, the assessment report and the associated management advice provide comments on the quality of the data, which is fed back to the data submitter and the ICES Data Centre.

Sampling scheme identifier: SURVEY BIAS

MS : DEU
Region: Baltic Sea / North Sea and Eastern Arctic / North East Atlantic
Sampling scheme identifier: SURVEY BIAS
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
The Baltic International Acoustic Survey (BIAS) are carried out annually in May and September- October, respectively. It is assumed that during autumn survey there is little or no emigration or immigration of pelagic stocks in the main part of the Baltic Sea so that the estimates are representing a good ‘snapshot’ of the herring, sprat and cod resources. The survey is undertaken by Germany and Denmark in the western Baltic, while Finland, Estonia, Latvia, Poland and Sweden cover the remaining parts of the Baltic sea in the BIAS surveys. Coordination and planning is undertaken during the annual WGIPS meeting. RWP 2025-2027
Description of the population
Population targeted: The survey aims to provide an annual estimate of the distribution, abundance and population structure to inform the assessment of the following herring and sprat stocks: Western Baltic Spring-spawning herring and sprat in ICES Subdivisions 21-24. Population sampled: The main target species in the surveys are pelagic clupeids (herring, sprat, sardine, anchovies). Stratification:

A stratified systematic (parallel where possible) transect design. Start point not randomized. ICES statistical rectangles used as strata for all ICES subdivisions.

Sampling design and protocols

Sampling design description:

All acoustic investigations were performed during night time to account for the more pelagic distribution of clupeids during that time. The acoustic data are collected using a Simrad EK80 scientific echosounder with 38, 70, 120 and 200 kHz transducers. The general rule is to make as many trawl hauls as time permits; at least two per ICES rectangle. The principal objective is to obtain a sample from the school or the layer that appears as an echotrace on the sounder.

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

Regional coordination:

The German Autumn Acoustic Survey (GERAS) is coordinated by ICES WGIPS and the ICES Baltic International Fish Survey Working Group (WGBIFS). During the current reporting cycle, the survey provided the Herring Assessment Working Group (HAWG) and the Baltic Fisheries Assessment Working Group (WGBFAS) with index values for stock sizes of herring and sprat in the Western Baltic area (ICES Subdivisions 21-24).

Link to sampling design documentation:

Details on survey specific methods are reported annually in the cruise reports that appear in the WGIPS report: WGIPS: <http://www.ices.dk/community/groups/Pages/WGIPS.aspx>

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

ICES. 2017. Manual for the International Baltic Acoustic Surveys (IBAS). Series of ICES Survey Protocols SISP 8 - IBAS. 47 pp. <http://doi.org/10.17895/ices.pub.3368>

Compliance with international recommendations:

Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Survey results of the most recent surveys are summarized and uploaded into a Share point data folder, including a map showing the echo integration tracks and the location of trawling activities.

Data capture

Means of data capture:

Echo integration and further data analyses are carried out using GERIBAS II software and Microsoft Office. The total number of fish (total N) in one rectangle was estimated as the product of the mean Nautical Area Scattering Coefficient (NASC; SA) and the rectangle area, divided by the corresponding mean cross section σ . The total number was separated into the categories mentioned above and further into herring and sprat according to the mean catch composition. For herring and sprat either representative or length stratified samples are taken for maturity, age (otolith extraction) and weight.

Data capture documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey

Protocols SISP 9 – IPS. 92 pp.

ICES. 2017. Manual for the International Baltic Acoustic Surveys (IBAS). Series of ICES

Survey Protocols SISP 8 - IBAS. 47 pp. <http://doi.org/10.17895/ices.pub.3368>

Quality checks documentation: Y. ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

ICES. 2017. Manual for the International Baltic Acoustic Surveys (IBAS). Series of ICES

Survey Protocols SISP 8 - IBAS. 47 pp. <http://doi.org/10.17895/ices.pub.3368>

Sampling scheme identifier: SURVEY SPRAS

MS : DEU

Region: Baltic Sea

Sampling scheme identifier: SURVEY SPRAS

Sampling scheme type: Survey

Observation type: NA

Time period of validity: 2025-2027

The main objective of this hydroacoustic survey is the annual assessment of small pelagic fish stocks, especially sprat, in the Baltic proper (SD 24-29). SPRAS is internationally co-ordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) where timing, surveyed area and the principal methods of investigation are discussed and agreed. The investigation area surveyed by Germany covers ICES SD 24-29, and thus most of the total area. The SPRAS combines hydroacoustic measurements and fishing hauls to estimate the biomass, weight and length distributions, and length-weight-age-sex-maturity data. Further, hydrographic data (temperature, salinity and oxygen) are collected.

RWP 2025-2027

Description of the population

Population targeted:

Target species is sprat (*Sprattus sprattus*) in the Baltic proper in ICES Subdivisions 24-29

Population sampled: pelagic survey

Stratification: -

Sampling design and protocols

Sampling design description:

The acoustic and ichthyological sampling stratification is based on ICES statistical rectangles (0.5 degree in latitude and 1 degree in longitude). The daily surveyed distance amounts to approximately 70-90 nautical miles with an objective of 60 nautical miles per statistical rectangle. In general, each ICES-rectangle is covered with two parallel transects spaced by a maximum of 15-18 nm whenever possible.

Fishing is conducted with a pelagic trawl according to hydroacoustic indications and subsequent biological measurement of catches (species, length composition, sex, maturity and age) are taken. Hydrographic measurements are recorded with a CTD probe on predetermined stations and after each fishing station when distant from the planned CTD station (circa 10nm).

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

Regional coordination:

SPRAS is internationally co-ordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) where timing, surveyed area and the principal methods of investigation are discussed and agreed. In addition to Germany, other parts of the Baltic Sea are covered by Sweden, Lithuania, Latvia, Estonia, Russia and Poland

Link to sampling design documentation:

see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

Compliance with international recommendations: Y

Link to sampling protocol documentation:

see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture:

hydroacoustic measurements with an echosounder (38 kHz), measurement boards, scales, for further details see survey manual below

Data capture documentation:

see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

Quality checks documentation: Y

Data storage

National database: NA

International database:

ICES Acoustic trawl database

<https://www.ices.dk/data/data-portals/Pages/acoustic.aspx>

Quality checks and data validation documentation:

<https://acoustic.ices.dk/validationrules>

Sample storage

Storage description:

otoliths for age readings are stored dry and dark in the archives of the Thünen Institute of Baltic Sea Fisheries

Sample analysis: see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

Data processing

Evaluation of data accuracy (bias and precision):

Y for acoustic measurements through calibration, see survey manual:
<http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

Editing and imputation methods: NA

Quality document associated to a dataset: <http://doi.org/10.17895/ices.pub/7581>

Validation of the final dataset:

Quality check by scientist before upload and validated by ICES after uploading to database

Sampling scheme identifier: SURVEY RHLS

MS : DEU

Region: Baltic Sea

Sampling scheme identifier: SURVEY RHLS

Sampling scheme type: Survey

Observation type: NA

Time period of validity: 2025-2027

The target species is the western Baltic spring-spawning herring. The main aim is to monitor spawning activity and reproductive success of the spring-spawning herring of the Western Baltic Sea in its main spawning area, the Greifswald Bay. The target data are high-resolution spatial and temporal records of the larval abundance during the entire spawning period as well as hydrographic data (temperature, salinity and oxygen). The survey contains weekly sampling of larval herring on 35 stations using a 335µm Bongo net. The collected data are stored nationally and in the ICES Fish Eggs and Larvae data base.

Description of the population

Population targeted:

Larval herring (*Clupea harengus*) in Greifswald Bay

Population sampled:

Western Baltic spring-spawning herring. Larvae are sampled up to 20 mm total length as proxy for recruitment strength

Stratification:.

NA

Sampling design and protocols

Sampling design description:

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

NA

Regional coordination:

NA

Link to sampling design documentation:

<https://www.ices.dk/community/groups/Pages/WGSINS.aspx>

Oeberst R, Dickey-Collas M, Nash RDM (2009) Mean daily growth of herring larvae in relation to temperature over a range of 5-20°C, based on weekly repeated cruises in the Greifswalder Bodden. ICES J Mar Sci 66(8):1696-1701, [DOI:10.1093/icesjms/fsp193](https://doi.org/10.1093/icesjms/fsp193)

<https://academic.oup.com/icesjms/article/66/8/1696/677425?login=true>

Oeberst R, Klenz B, Gröhsler T, Dickey-Collas M, Nash RDM, Zimmermann C (2009) When is year-class strength determined in western Baltic herring? ICES J Mar Sci 66(8):1667-1672, DOI:10.1093/icesjms/fsp143 https://academic.oup.com/icesjms/article/66/8/1667/675141?login=true Polte P (2013) Ruegen herring larvae survey and N20 larval index. Working Document WKPELA. Benchmark Workshop on on Pelagic Stocks (WKPELA): 4-8 February 2013. Copenhagen: ICES, 10 p Compliance with international recommendations: Y Link to sampling protocol documentation: https://www.ices.dk/community/groups/Pages/WGSINS.aspx Oeberst R, Dickey-Collas M, Nash RDM (2009) Mean daily growth of herring larvae in relation to temperature over a range of 5-20°C, based on weekly repeated cruises in the Greifswalder Bodden. ICES J Mar Sci 66(8):1696-1701, DOI:10.1093/icesjms/fsp193 https://academic.oup.com/icesjms/article/66/8/1696/677425?login=true Oeberst R, Klenz B, Gröhsler T, Dickey-Collas M, Nash RDM, Zimmermann C (2009) When is year-class strength determined in western Baltic herring? ICES J Mar Sci 66(8):1667-1672, DOI:10.1093/icesjms/fsp143 https://academic.oup.com/icesjms/article/66/8/1667/675141?login=true Polte P (2013) Ruegen herring larvae survey and N20 larval index. Working Document WKPELA. Benchmark Workshop on on Pelagic Stocks (WKPELA): 4-8 February 2013. Copenhagen: ICES, 10 p Compliance with international recommendations: Y
Sampling implementation
Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: Sampling progress is <i>inter alia</i> presented and adjusted by ICES expert groups https://www.ices.dk/community/groups/Pages/WGALES.aspx
Data capture
Means of data capture Data capture documentation: https://www.thuenen.de/en/of/fields-of-activity/research/reproduction-biology/reproduktionsbiologie-des-herings/n20-rekrutierungsindex-aus-dem-heringslarvensurvey/ (in German language) Oeberst R, Klenz B, Gröhsler T, Dickey-Collas M, Nash RDM, Zimmermann C (2009) When is year-class strength determined in western Baltic herring? ICES J Mar Sci 66(8):1667-1672, DOI:10.1093/icesjms/fsp143 https://academic.oup.com/icesjms/article/66/8/1667/675141?login=true Polte P (2013) Ruegen herring larvae survey and N20 larval index. Working Document WKPELA. Benchmark Workshop on on Pelagic Stocks (WKPELA): 4-8 February 2013. Copenhagen: ICES, 10 p (ICES Report) Quality checks documentation: Internal report of ICES WGSINS, annually Dec/Jan
Data storage

National database: NA International database: ICES eggs & larvae database https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx Quality checks and data validation documentation: Quality check & data validation is conducted on the level of institutional expertise.
Sample storage Ichthyoplankton samples of the target species and remaining content are stored at the national sampling institute fixated in buffered formalin for a duration of at least a decade (most samples > 2 decades). Sample quantities include 35 (+1) samples/week over an annual period of 15-17 weeks. As a consequence, an average of 560 samples /year is stored for future reference. Sample analysis: See https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=35921 Polte P, Kotterba P, Hammer C, Gröhsler T (2014) Survival bottlenecks in the early ontogenesis of Atlantic herring (<i>Clupea harengus</i>, L.) in coastal lagoon spawning areas of the western Baltic Sea. ICES J Mar Sci 71(4):982-990, doi:10.1093/icesjms/fst050 Polte P, Kotterba P, Moll D, Nordheim L von (2017) Ontogenetic loops in habitat use highlight the importance of littoral habitats for early life-stages of oceanic fishes in temperate waters. Sci Rep 7:42709, DOI:10.1038/srep42709
Data processing Evaluation of data accuracy (bias and precision): N The RHLS is conducted by a single, national research team. Raw data are evaluated by the responsible scientist according to larval herring abundance/m³. Malfunctions of flowmeter devices are the most abundant source of biased data. Erroneous flowmeter reading can be fully recognized and corrected by time series means of m³/depth data. This can only be conducted on the level of the sampling institute. Editing and imputation methods: Oeberst R, Klenz B, Gröhsler T, Dickey-Collas M, Nash RDM, Zimmermann C (2009) When is year-class strength determined in western Baltic herring? ICES J Mar Sci 66(8):1667-1672, DOI:10.1093/icesjms/fsp143 Quality document associated to a dataset: N Validation of the final dataset: Validation of the raw data is conducted by the responsible national survey scientist. Validation of survey methods, computation of indices etc. is validated by the respective ICES expert groups (WGSINS; WGALES; HAWG).

Sampling scheme identifier: SURVEY FEJUCS (Fehmarn Juvenile Cod Survey)

MS : DEU
Region: Baltic Sea
Sampling scheme identifier: SURVEY FEJUCS (Fehmarn Juvenile Cod Survey)
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027

The objective of FEJUCS is to provide an independent estimate of the strength of the young-of-year cohort of Western Baltic cod, i.e. age-0 cod, using standardised length frequency samples of juvenile cod collected from commercial pound nets set in shallow waters around Fehmarn. The FEJUCS time series is used as a tuning fleet in the assessment of the Western Baltic cod stock by the ICES Baltic Fisheries Assessment Working Group (WGBFAS) as fishery-independent abundance index since 2019.

Description of the population

Population targeted:

Western Baltic Cod (*Gadus morhua*) – cod2224.

Population sampled:

Juvenile cod in shallow waters (<5 m depth) in ICES Subdivision 22.

Stratification:

NA

Sampling design and protocols

Sampling design description:

From September to December, cod samples are provided by two full-time, commercial pound net fishers who operate from the island of Fehmarn in Germany (Baltic Sea). The pound net fishers each maintain 3-5 stationary, uncovered pound nets in shallow waters (<5m) close to the coast (see figure below). The nets are set perpendicularly to the coast in a seagrass-dominated substrate and span over the entire water column. The pound net fishers target eel, but undersized cod are also retained in the catch chamber, when they migrate between daytime resting sites in deeper waters and night-time feeding sites in structured shallow water habitats.

The catch chambers are emptied by the fishers every 1-17 days (mean = 2.3 days) depending on the weather conditions. On each trip, samples (average sample weight: 3kg) of small cod (<38cm in length) are collected and weighed, and the weight of the entire catch of small cod including the sub-sample is estimated by the fisher and recorded in a protocol.

The undersized cod are frozen (-20°C) after landing at the port (Burgstaaken, Fehmarn). Cod from the frozen samples are later defrosted, measured and processed at the Thünen Institute of Baltic Sea Fisheries.

A detailed description is available on pages 293-310 of

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

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

NA

Regional coordination:

No, FEJUCS is a national survey.

Link to sampling design documentation:

A detailed description is available on pages 293-310 of ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Compliance with international recommendations:

NA

Link to sampling protocol documentation:

A detailed description is available on pages 293-310 of

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Compliance with international recommendations:

No, but the approach was accepted by ICES during the benchmark of Baltic cod in 2019.

A detailed description is available on pages 293-310 of

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

NA

Data capture

Means of data capture:



Figure above: A commercial pound net near the mouth of Burgstaaken harbour, Fehmarn, Germany (Baltic Sea); from front to back: first chamber, wings and guiding net or leader (with white buoys), beach (photo: U. Krumme). Buoys at the head line and weights at the lead line force fish to enter the catch chamber (mesh size 12mm) at the seaward end. The catch chamber is stretched by ropes attached to fixed pillars (see figure above).

For more details, please refer to pages 293-310 of

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Data capture documentation:

For more details, please refer to the pages 293-310 of

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Quality checks documentation:

Y. The age of juvenile Western Baltic cod has been validated using multi-year length-frequency distributions and otoliths of chemically-marked recaptures.

For details, please refer to:

McQueen K, Hrabowski J, Krumme U (2019) Age validation of juvenile cod in the western Baltic Sea. ICES J Mar Sci 76(2):430-441, [DOI:10.1093/icesjms/fsy175](https://doi.org/10.1093/icesjms/fsy175)

Krumme U, Stötera S, McQueen K, Pahlke E (2020) Age validation of age 0-3 wild cod *Gadus morhua* in the western Baltic Sea through mark-recapture and tetracycline marking of otoliths. Mar Ecol Progr Ser 645:141-158, [DOI:10.3354/meps13380](https://doi.org/10.3354/meps13380)

Plonus R, McQueen K, Günther C, Funk S, Temming A, Krumme U (2021) Is analysis of otolith microstructure a valid method for investigating early life history of Western Baltic cod? Mar Biol 168:30, [DOI:10.1007/s00227-021-03834-x](https://doi.org/10.1007/s00227-021-03834-x)

Data storage

National database:

National database (without a special name)

International database:

NA

Quality checks and data validation documentation:

Routine quality checks during and after data input

Sample storage

The otoliths are stored (in envelopes, dry, dark) in the otolith archive of the Thünen Institute of Baltic Sea Fisheries in Rostock, Germany. Otoliths are stored indefinitely.

For age reading:

Haase S, Krumme U (2020) Report of the autumn 2019 Western Baltic cod (*Gadus morhua*) age reading exchange – SD 22. SmartDots event ID: 201. *It includes an age reading guide for Western Baltic cod (cod2224)*

For processing of samples and data, refer to the pages 293-310 of:

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Data processing

Evaluation of data accuracy (bias and precision):

Y. For age reading, please refer to McQueen *et al.* (2019), Krumme *et al.* (2020) and Plonus *et al.* (2021).

For details on the index calculation, please refer to the pages 293-310 of:

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Editing and imputation methods:

Y. The data are put in Excel; calculations are performed using R. For details, please refer to the pages 293-310 of:

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Quality document associated to a dataset:

Index calculation:

ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>

Age reading:

Haase S, Krumme U (2020) Report of the autumn 2019 Western Baltic cod (*Gadus morhua*) age reading exchange – SD 22. SmartDots event ID: 201. *It includes an age reading guide for Western Baltic cod (cod2224)*

Krumme U, Stötera S, McQueen K, Pahlke E (2020) Age validation of age 0-3 wild cod *Gadus morhua* in the western Baltic Sea through mark-recapture and tetracycline marking of otoliths. Mar Ecol Progr Ser 645:141-158, [DOI:10.3354/meps13380](https://doi.org/10.3354/meps13380)

McQueen K, Hrabowski J, Krumme U (2019) Age validation of juvenile cod in the western Baltic Sea. ICES J Mar Sci 76(2):430-441, [DOI:10.1093/icesjms/fsy175](https://doi.org/10.1093/icesjms/fsy175)

Plonus R, McQueen K, Günther C, Funk S, Temming A, Krumme U (2021) Is analysis of otolith microstructure a valid method for investigating early life history of Western Baltic cod? Mar Biol 168:30, [DOI:10.1007/s00227-021-03834-x](https://doi.org/10.1007/s00227-021-03834-x)

Validation of the final dataset:

Routine checks in the Thünen Institute of Baltic Sea Fisheries with every new data year

Sampling scheme identifier: SURVEY International Bottom Trawl Survey of the 1st quarter (IBTS-Q1)

MS : DEU
Region: North Sea
Sampling scheme identifier: SURVEY International Bottom Trawl Survey of the 1st quarter (IBTS-Q1)
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027
Sampling scheme aiming • To determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices; • To monitor changes in the stocks of commercial fish species independently of commercial fisheries data; • To monitor the distribution and relative abundance of all fish species and selected invertebrates; • To collect data for the determination of biological parameters for selected species; • To collect hydrographical and environmental information; • To determine the abundance and distribution of late herring larvae
RWP 2025-2027
Description of the population
Population targeted: herring, sprat, cod, haddock, whiting, saithe, Norway pout, mackerel, plaice in the North Sea
Population sampled: larvae, juveniles and adults of herring; juveniles and adults of sprat, cod, haddock, whiting, saithe, Norway pout, mackerel, plaice
Stratification: Random hauls by statistical ICES rectangle

Sampling design and protocols
Sampling design description: See sampling manual for details Is the sampling design compliant with the 4S principle?: NA Regional coordination: Coordinated by ICES working group - IBTSWG Link to sampling design documentation: The most recent version of the IBTS Manual is SISP 10 revision nr 11 The most recent version of the MIK-manual is SISP 13-MIK 3.0. Compliance with international recommendations: Y Link to sampling protocol documentation: See above Compliance with international recommendations: Y
Sampling implementation
Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: Y – through IBTS Q1 survey coordinator
Data capture
Means of data capture: Scales, measuring boards, staff, microscopes, computers Data capture documentation: https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx Quality checks documentation: https://doi.org/10.17895/ices.pub.8219
Data storage
National database:. NA International database: ICES - DATRAS and fish eggs and larvae database – see above for links Quality checks and data validation documentation: https://www.ices.dk/data/data-portals/Pages/default.aspx
Sample storage

Storage description:

Otoliths are stored as well as plankton samples

Sample analysis:

<https://www.ices.dk/community/groups/Pages/IBTSWG.aspx>

<https://www.ices.dk/community/groups/Pages/WGSINS.aspx>

Data processing

Evaluation of data accuracy (bias and precision):

No comprehensive analysis available, but several aspects analysed and documented in reports of the ICES IBTSWG (<https://www.ices.dk/community/groups/pages/ibtswg.aspx>), and the ICES Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA, <https://www.ices.dk/community/groups/Pages/WGISDAA.aspx>). Additional analyses regarding integration for the ecosystem approach: <https://www.ices.dk/community/groups/Pages/WGISUR.aspx>

Editing and imputation methods:

Information on data uploading process and option for data screening:

<https://datras.ices.dk/Data%20submission/Default.aspx>

Quality document associated to a dataset:

unknown, see ICES datacentre

Validation of the final dataset:

unknown, see ICES datacentre

Sampling scheme identifier: SURVEY International Bottom Trawl Survey (IBTS-Q3)

MS : DEU

Region: North Sea

Sampling scheme identifier: SURVEY International Bottom Trawl Survey (IBTS Q3)

Sampling scheme type: Survey

Observation type: NA

Time period of validity: 2025-2027

Internationally coordinated otter board survey to obtain biological data for several commercially targeted groundfish species and invertebrates, as well as the entire demersal fish communities in the North Sea. The IBTS Q3 is conducted annually since 1991; its main objectives are to determine and monitor:

- 1) Distribution, relative abundance and population age structure for the main commercial species;
- 2) Changes in their stocks, observed independently of commercial fisheries data;
- 3) Distribution and relative abundance of all fish species and selected invertebrates;
- 4) Biological parameters for selected species;
- 5) Accompanying hydrographical and environmental conditions, marine litter.

RWP 2025-2027

Description of the population

Population targeted:

Main target species, for which detailed biological data are obtained: herring, sprat, mackerel, cod, haddock, whiting, Norway out, saithe, plaice.

Survey area: North Sea incl. Skagerrak.

Population sampled:

Demersal fish communities including non-commercial species, plus commercially targeted invertebrates and cephalopods.

Stratification:

Systematic division of survey area into ICES rectangles; random distribution of hauls within trawlable area of each rectangle; if possible, sampling of each rectangle by two different ships/nations.

Sampling design and protocols

Sampling design description:

All fish species, cephalopods and larger (commercially used) invertebrates are recorded, either from the entire catch or from a representative subsample.

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

NA

Regional coordination:

International coordination through ICES, participating nations: Denmark, England, Germany, Norway, Scotland, Sweden.

Link to sampling design documentation:

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

Compliance with international recommendations:

Y, coordination through ICES International Bottom Trawl Survey Working Group (IBTSWG); <https://www.ices.dk/community/groups/pages/ibtswg.aspx>

Link to sampling protocol documentation:

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

Compliance with international recommendations:

Y, coordination through ICES International Bottom Trawl Survey Working Group (IBTSWG); <https://www.ices.dk/community/groups/pages/ibtswg.aspx>

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

Survey coordination during the ongoing operation through the Q3 survey coordinator of the IBTSWG

Data capture

Means of data capture:

Traditional catches (otter board trawl); working-up in laboratory: sorting at conveyor belt, length measurements on measuring board (partly with electronic boards); determination of individual weights for selected species; dissection to obtain biological data, tissue samples for genetic analyses or stomach contents.

Data capture documentation:

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

Quality checks documentation: ICES Data Centre performing quality checks on uploaded survey data
Data storage
National database: NA International database: ICES DATRAS website: https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx Quality checks and data validation documentation: Data are quality checked during the upload of data to the international data base. The filters and algorithms for data checking are being updated regularly, and communication between the ICES Data Centre and the survey coordination group (IBTSWG) takes place during the annual WG meeting. Upon request for the IBTSWG, new quality checks are included in the uploading routine.
Sample storage
Storage description: Storage of otoliths at the national institutes involved in the survey. Storage of other samples at the participating institutes' and based on their own decision. Sample analysis: https://www.ices.dk/community/groups/pages/ibtswg.aspx
Data processing
Evaluation of data accuracy (bias and precision): No comprehensive analysis available, but several aspects analysed and documented in reports of the ICES IBTSWG (https://www.ices.dk/community/groups/pages/ibtswg.aspx), and the ICES Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA, https://www.ices.dk/community/groups/Pages/WGISDAA.aspx). Additional analyses regarding integration for the ecosystem approach: https://www.ices.dk/community/groups/Pages/WGISUR.aspx Editing and imputation methods: Information on data uploading process and option for data screening: https://datras.ices.dk/Data%20submission/Default.aspx Quality document associated to a dataset: Unknown, see ICES data centre Validation of the final dataset: Unknown, see ICES data centre

Sampling scheme identifier: SURVEY BTS

MS : DEU
Region: North Sea and Eastern Arctic
Sampling scheme identifier: SURVEY BTS
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027

The cruise is part of the German contribution to the International Beam Trawl Survey (BTS) in the North Sea. The ICES coordinated survey aims to provide assessment and science groups with consistent and standardized data for examining spatial and temporal changes in (a) the distribution and relative abundance of fish and fish assemblages; and (b) of the biological parameters of commercial fish species for stock assessment purposes, especially dab, plaice and sole.

RWP 2025-2027

Description of the population

Population targeted:

Target species are mainly dab, plaice and sole but also associated species and larger invertebrates.

Population sampled:

All size and age classes of target species are sampled.

Stratification:

Germany samples about 63 fishing stations in a grid of ICES statistical rectangles which is tried to be kept fixed. Generally, the same stations are fished every year. The study area extends from 55° N to 55° 30' N and from 4° E to the Danish coast.

Sampling design and protocols

Sampling design description:

Four stations are placed in the most inshore rec-tangles, three in the next seaward ones, and two otherwise. Each fishing haul is limited to a duration of 30 minutes.

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

Regional coordination:

internationally coordinated survey by ICES WGBEAM

Link to sampling design documentation:

SISP 14 - Manual for the Offshore Beam Trawl Surveys (WGBEAM), Version 3.4

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

Compliance with international recommendations: Y

Link to sampling protocol documentation:

<https://www.ices.dk/community/groups/Pages/WGBEAM.aspx>.

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture:

7.2 m beam trawl with five tickler chains attached, cod-end mesh size 40 mm, measurement boards, scales, knives, forceps

Data capture documentation:

see survey manual for details (SISP 14 - Manual for the Offshore Beam Trawl Surveys (WGBEAM), Version 3.4),

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

Quality checks documentation:

see survey manual for details (SISP 14 - Manual for the Offshore Beam Trawl Surveys (WGBEAM), Version 3.4),

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

Data storage

National database: Thünen SQL data base.

International database: held by ICES Database of Trawl Surveys (DATRAS)

<https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx>

Quality checks and data validation documentation:

Germany has numerous quality checks in its self-developed data entry software. Further checks are carried out before uploading to the database. The age determination is confirmed by a second age reader.

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

Sample storage

Storage description: otoliths for age readings are stored dry and dark in the archives of the Thünen Institute of Sea Fisheries for an indefinite period of time.

Sample analysis: see survey manual for details (SISP 14 - Manual for the Offshore Beam Trawl Surveys (WGBEAM), Version 3.4)

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

Data processing

Evaluation of data accuracy (bias and precision): Y

Editing and imputation methods: Y, see survey manual for details (SISP 14 - Manual for the Offshore Beam Trawl Surveys (WGBEAM), Version 3.4)

[https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

Quality document associated to a dataset: NA

Validation of the final dataset:

Quality check by scientist before upload and validated by ICES after uploading to database

Sampling scheme identifier: SURVEY Demersal Young Fish Survey DYFS

MS : DEU

Region: North Sea and Eastern Arctic

Sampling scheme identifier: SURVEY Demersal Young Fish Survey DYFS

Sampling scheme type: Survey

Observation type:

Time period of validity: 2025-2027

The Demersal Young Fish Survey aims to collect data on abundance, distribution and biological data for demersal young fish and brown shrimp. 0-group plaice and 0-group sole indices are calculated and used for stock assessment purposes. The survey is coordinated by the ICES WGBEAM. The German part of the survey covers the German North Sea coast and the German Wadden Sea areas. RWP 2025-2027
Description of the population Population targeted: The main target species are plaice, sole and brown shrimp. The main survey area is the German North Sea coast (within 12nm) and the German Wadden Sea areas Population sampled: 0-group plaice, 0-group sole, whole population of brown shrimp. The older age groups of plaice and sole are mainly distributed further off shore and are targeted by the offshore beam trawl surveys. Stratification: Statistical areas are defined along the coast.
Sampling design and protocols Sampling design description: Otolith sampling is based on statistical areas and on length classes. Is the sampling design compliant with the 4S principle?: NA Regional coordination: The DYFS is coordinated by the ICES WGBEAM. The Netherlands, Belgium and Germany participate. Link to sampling design documentation: ICES WGBEAM report: https://doi.org/10.17895/ices.pub.8114 A manual for the inshore beam trawl surveys is not available yet but in progress. The finalization of a survey manual is one current ToR of the ICES WGBEAM. Compliance with international recommendations: Y Link to sampling protocol documentation: ICES WGBEAM report: https://doi.org/10.17895/ices.pub.8114 A manual for the inshore beam trawl surveys is not available yet but in progress. The finalization of a survey manual is one current ToR of the ICES WGBEAM. Compliance with international recommendations: Y
Sampling implementation Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: NA
Data capture Means of data capture: Scales, measuring boards

Data capture documentation: See link to sampling protocol documentation Quality checks documentation: See link to sampling protocol documentation
Data storage
National database: Thünen SQL data base International database: ICES DATRAS https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx Quality checks and data validation documentation: https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx
Sample storage
Otoliths are stored in the national institute. No special conservation needed. Sample analysis: See link to sampling protocol documentation
Data processing
Evaluation of data accuracy (bias and precision): See link to sampling protocol documentation Editing and imputation methods: See link to sampling protocol documentation Quality document associated to a dataset: See link to sampling protocol documentation Validation of the final dataset: See link to sampling protocol documentation

Sampling scheme identifier: SURVEY (IHLS I and IHLS II)

MS : DEU
Region: North Sea and Eastern Arctic
Sampling scheme identifier: SURVEY (IHLS I and IHLS II)
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027
The main objective of the survey is helping to assess the herring stocks in the North Sea. The results of the herring larvae surveys are used to calculate an overall biomass index of the SSB of North Sea autumn-spawning herring as well as the relative contribution of different stock components on the total herring reproduction. The surveys monitor the annual distribution and abundance of herring larvae at the main spawning locations, the length frequency of herring larvae, as well as ambient water temperature and salinity. All relevant herring larvae data are stored together with basic hydrographic information in the ICES eggs and larvae database. The surveys are conducted annually during autumn (September) and winter (January).

RWP 2025-2027
Description of the population
Population targeted: The IHLS covers the major herring spawning grounds in the North Sea, e.g. in the Orkney/Shetland area, the Buchan region, the Central North Sea and the Southern North Sea. Target species are newly hatched larvae of North Sea autumn spawning herring. Population sampled: The IHLS covers the major herring spawning grounds at spawning time in the North Sea. Stratification: The stratification follows the spawning areas of the four major spawning components of North Sea herring. Standard gears are high-speed GULF samplers, deployed in a double oblique manner to near the sea bed and back to surface. Stations are located on a 10 by 10 nautical miles grid. This grid includes every square that is known to contain herring larvae less than 10 mm. Herring larvae are sorted from the samples and length-measured. The number of larvae per m² at each station is used to calculate mean numbers of larvae per m² for each ICES rectangle (consist of nine IHLS stations in total). These values are raised by the sea surface corresponding to the relevant rectangle and summed over the total area to obtain larvae abundance indices.
Sampling design and protocols Standard gears are high-speed GULF samplers, deployed in a double oblique manner to near the sea bed and back to surface. Stations are located on a 10 by 10 nautical miles grid. This grid includes every square that is known to contain herring larvae less than 10 mm. Herring larvae are sorted from the samples and length-measured. The number of larvae per m² at each station is used to calculate mean numbers of larvae per m² for each ICES rectangle (consist of nine IHLS stations in total). These values are raised by the sea surface corresponding to the relevant rectangle and summed over the total area to obtain larvae abundance indices.
Sampling design description: The sampling allocation is defined by the spawning area of herring. Is the sampling design compliant with the 4S principle?: NA Regional coordination: Germany and The Netherlands participate in the IHLS sampling. The parental committee for the IHLS is the ICES Working Group on Surveys on Ichthyoplankton in the North Sea (WGSINS). Link to sampling design documentation: The manual of the IHLS is available as Annex 7 to the ICES WGIPS Report 2010. Compliance with international recommendations: Y Link to sampling protocol documentation: The manual of the IHLS is available as Annex 7 to the ICES WGIPS Report 2010. Compliance with international recommendations: Y
Sampling implementation
Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by WGSINS. Each participating country is responsible for the activities conducted on its national part of the international survey. Sampling results are presented at the herring assessment working group each year.
Data capture
Means of data capture: Standard gears are high-speed plankton samplers, deployed in a double oblique manner to near the sea bed and back to surface. Stations are located on a 10 by 10 nautical miles grid. Herring larvae are sorted from the samples and length-measured. The number of larvae per m² at each station is used to calculate

mean numbers of larvae per m² for each ICES rectangle (consist of nine IHLS stations in total). These values are raised by the sea surface corresponding to the relevant rectangle and summed over the total area to obtain larvae abundance

Data capture documentation: The manual of the IHLS is available as Annex 7 to the ICES WGIPS Report 2010.

Quality checks documentation: Y. Quality checks are included before uploading data into the ICES eggs and larvae database.

Data storage

National database: NA.

International database: ICES eggs and larvae database.

Quality checks and data validation documentation:

<https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx>

Sample storage

Storage description: The samples are stored by national institutes. This includes fish larvae, eggs and the remaining plankton. Samples are usually stored for decades and available for additional studies on request.

Sample analysis: Sampling and sample processing is described in the manual of the IHLS (Annex 7 to the ICES WGIPS Report 2010).

Data processing

Evaluation of data accuracy (bias and precision): Survey aspects are described each year in the WGSINS report (ICES. 2020. ICES Working Group on Surveys on Ichthyoplankton in the North Sea and adjacent Seas (WGSINS; outputs from 2019 meeting). ICES Scientific Reports. 2: 17. 33 pp. <http://doi.org/10.17895/ices.pub.5969>) and survey results given in the HAWG report. (ICES. 2020. Herring Assessment Working Group for the Area South of 62° N (HAWG). ICES Scientific Reports. 2:60. 1054 pp. <http://doi.org/10.17895/ices.pub.6105>).

Editing and imputation methods: Y. Survey results are uploaded by the national participants into the ICES eggs and larvae database.

Quality document associated to a dataset: Survey aspects are described each year in the WGSINS report (ICES. 2020. ICES Working Group on Surveys on Ichthyoplankton in the North Sea and adjacent Seas (WGSINS; outputs from 2019 meeting). ICES Scientific Reports. 2: 17. 33 pp. <http://doi.org/10.17895/ices.pub.5969>) and survey results given in the HAWG report. (ICES. 2020. Herring Assessment Working Group for the Area South of 62° N (HAWG). ICES Scientific Reports. 2:60. 1054 pp. <http://doi.org/10.17895/ices.pub.6105>).

Validation of the final dataset: Quality checks should be implemented by each contributor prior to data upload. However, there is already some code implemented checking for spatial and temporal integrity of the data (e.g., points on land, consistency in date and time) and logic in the data sets (e.g., water and sampler depth, volume filtered, haul duration and distance etc.). These checks will be run before the data are integrated into the eggs and larvae database. The data portal provides a file template as well as specifications of the file format of the haul meta-information and the eggs and larvae measurements.

Sampling scheme identifier: SURVEY NHAS

MS : DEU

Region: North Sea and Eastern Arctic

Sampling scheme identifier: SURVEY NHAS

Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027
The NHAS surveys are carried out annually in June/July to determine the distribution and abundance of herring and sprat in the North Sea region and to the west of Ireland and Scotland. Acoustic estimates are used as a tuning index by ICES to determine the size of the populations of herring and sprat and the results are submitted annually to HAWG. The survey is carried out by vessels from Denmark, Germany, Netherlands, Ireland, Norway and Scotland. Coordination and planning of the surveys are undertaken during the annual WGIPS meeting.
Description of the population
Population targeted: The survey aims to provide an annual estimate of the distribution, abundance and population structure to inform the assessment of the following herring and sprat stocks: Western Baltic Spring-spawning herring (in ICES Divisions 4 and 3a), North Sea Autumn Spawning herring (in 4 and 3a), West of Scotland herring (in 6aN), Malin Shelf herring (west of Scotland/Ireland in 6aN-S and 7b,c), North Sea sprat (in 4) and sprat in 3a (western Baltic). Population sampled: The main target species in the surveys are pelagic clupeids (herring, sprat, sardine, anchovies). Stratification: A stratified, systematic, parallel transect design with random starting points is used in this survey. Survey stratification is based on ICES statistical rectangles with a range of 1 degree in latitude and 2 degrees in longitude. Each ICES rectangle should be covered with a minimum of one transect and with higher intensity where historically a high abundance or variability of abundance has been detected.
Sampling design and protocols
Sampling design description: The acoustic data are collected using a Simrad EK60 scientific echosounder with 38 kHz transducers. The general rule is to make as many trawl hauls as time permits, especially if echotraces are visible on the echosounder after a blank period. The principal objective is to obtain a sample from the school or the layer that appears as an echotrace on the sounder. The trawling gear used is of little importance as long as it is suitable for catching a sample of the target-school or layer. During trawling it is important to take note of the traces on the echosounder and the netsonde in order to judge if the target-school entered the net or if some other traces “spoil” the sample. It is recommended that notes be made on the appearance and behaviour of fish in the net during every haul. Is the sampling design compliant with the 4S principle?: NA Regional coordination: The surveys are coordinated through the ICES Working Group of International Pelagic Surveys (WGIPS) as a guide to the methodologies adhered to during the planning, execution and analysis phases of WGIPS coordinated surveys. The group coordinates 29 individual surveys undertaken in the Northeast Atlantic by nine countries (Ireland, Germany, Scotland, UK (England, Scotland, Northern Ireland), Russian Federation, Norway, Netherlands, Faroe Islands, Denmark and Iceland). Link to sampling design documentation: Details on survey specific methods are reported annually in the cruise reports that appear in the WGIPS report: WGIPS: http://www.ices.dk/community/groups/Pages/WGIPS.aspx Compliance with international recommendations: Y Link to sampling protocol documentation:

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.
Compliance with international recommendations: Y
Sampling implementation
Recording of refusal rate: NA
Monitoring of sampling progress within the sampling year: Survey participants exchange emails about survey progress while at sea. A survey coordinator is available in case transects must be swapped between participants.
Data capture
Means of data capture: Echo integration and further data analyses are carried out in national laboratories for the area they cover using either MAREC LSSS (Large Scale Survey System), Myriax Echoview or EchoAnn software as well as other nationally developed analysis programmes. The fish sample obtained from the trawl catch is divided into species by weight and by number. Length measurements are taken to the nearest 0.5 cm below for sprat and herring (and to the whole cm below for other species). For herring and sprat either representative or length stratified samples are taken for maturity, age (otolith extraction) and weight. Data capture documentation: ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. Quality checks documentation: Y. ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.
Data storage
National database: NA International database: ICES database on acoustic trawl surveys. https://www.ices.dk/data/data-portals/Pages/acoustic.aspx Quality checks and data validation documentation: ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. and annual survey reports WGIPS: http://www.ices.dk/community/groups/Pages/WGIPS.aspx
Sample storage
Storage description: Otoliths used for age determination are stored by the national labs. Sample analysis: ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. and annual survey reports WGIPS: http://www.ices.dk/community/groups/Pages/WGIPS.aspx
Data processing
Evaluation of data accuracy (bias and precision): Y Sample analysis: ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey and dedicated scrutinization workshops and working group meetings. ICES. 2021. Working Group of International Pelagic Surveys (WGIPS).

ICES Scientific Reports. 3:40. 481pp. <https://doi.org/10.17895/ices.pub.8055>

Editing and imputation methods: Y.

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey and dedicated scrutinization workshops and working group meetings

Quality document associated to a dataset:

ICES. 2021. Working Group of International Pelagic Surveys (WGIPS). ICES Scientific Reports. 3:40. 481pp. <https://doi.org/10.17895/ices.pub.8055>

Validation of the final dataset: Data analyses and combination is object of an annual post cruise meeting of NHAS participants.

Sampling scheme identifier: SURVEY REDTAS (IDEEPS)

MS: DEU
Region: North East Atlantic
Sampling scheme identifier: SURVEY REDTAS (IDEEPS)
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027
This cruise is part of a co-ordinated effort of ICES to undertake an International Deep Pelagic Ecosystem Survey in the Irminger Sea and adjacent waters in June/July, estimating the abundance and biomass of the pelagic beaked redfish (<i>Sebastes mentella</i>) stocks and conducting additional observations relevant to integrated ecosystem assessment in the area. RWP 2025-2027
Description of the population
Population targeted: The targeted stocks are the deep pelagic beaked redfish (<i>Sebastes mentella</i>) and the shallow pelagic beaked redfish (<i>S. mentella</i>). The survey covers the open waters of the Irminger Sea and adjacent waters down to 1000 m from 52°30'N to 65°30'N and from 24°W to 58°W Population sampled: REDTAS is pelagic single-species survey, targeting two different stocks of <i>Sebastes mentella</i>. The survey covers almost entirely the adult population, juvenile <i>S. mentella</i> dwell in different regions (i.e. shelf areas). Stratification: The survey is stratified in depth zones. In the depth zone that can be surveyed by hydroacoustic measurements, i.e. shallower than the deep-scattering layer (DSL; down to about 350 m), hydroacoustic measurements and identification trawls are carried out. Within and below the DSL (down to about 950 m), redfish abundance is estimated by trawls.
Sampling design and protocols
Sampling design description: Primary sampling Units: • Hydroacoustics – Elementary sampling distance units (ESDU) is 1 square nautical miles. • Trawling – Single haul or codend when using multi-sampler standardized to kg per square nautical miles. • Hydrography – Vertical CTD profile to measure water temperature, salinity and pressure. The distribution of survey tracks within the distribution area of pelagic beaked redfish and the distance between them is based on experience from the past surveys, fisheries information, number of vessels participating in the

survey and available vessel time. Parallel transects are spaced evenly in the research area with the distance between the planned cruise tracks of 30, 45 or 60 square nautical miles.

Transects can be shortened in case of continuous registrations with no redfish combined with very low catch rates and particular hydrographical conditions (low water temperature).

Sampling strategy by trawling is adaptive, i.e. trawling is conducted on redfish registration down to ca. 350 m. In addition, it is geographically stratified by statistical rectangles (one degree latitude by 2 degrees longitude) and vertically stratified by trawl type.

For the aggregation of biological data, these subareas were grouped into three larger geographical units since the 2005–2007 surveys, namely a northeastern (subarea A), southwestern (subareas D-F) and southeastern area (subareas B and C).

Hydrographical observations using CTD probes down to 1000 m depth are taken at the end of each transect and at each trawl station location.

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

Regional coordination: The sampling design was developed within the framework of the International Council for the Exploration of the Sea (ICES). The survey is coordinated by the ICES Working Group on International Deep Pelagic Ecosystem Surveys (WGIDEEPS).

<https://www.ices.dk/community/groups/Pages/WGIDEEPS.aspx>

Link to sampling design documentation:

[https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+\(sisp\)](https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp))

Compliance with international recommendations: ‘Y’

Link to sampling protocol documentation:

[https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+\(sisp\)](https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp))

Compliance with international recommendations: ‘Y’

Sampling implementation

Recording of refusal rate: ‘NA’

Monitoring of sampling progress within the sampling year: ‘NA’

Data capture

Means of data capture: scales, measuring board, Simrad EK60 split-beam echosounder and the standard frequency is 38 kHz with hull-mounted transducers. For post-processing EchoView or FAMAS can be used for echo integration. For details:

[https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+\(sisp\)](https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp))

Data capture documentation:

[https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+\(sisp\)](https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp))

Quality checks documentation:

[https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+\(sisp\)](https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp))

Data storage

National database: Data are stored on the computers of the participating scientists and are exchanged after the survey. The data are then uploaded to the relevant data base of the International Council for the Exploration of the Sea (ICES), see below. International database: DATRAS of the International Council for the Exploration of the Sea (ICES): https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx Quality checks and data validation documentation: International Council for the Exploration of the Sea (ICES): https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx
Sample storage Otoliths for age reading are stored at national labs of the participating countries. Results of age reading exercises regarding the samples from REDTAS are discussed at the ICES Northwestern Working Group (NWWG), which is the relevant assessment working group: https://www.ices.dk/community/groups/Pages/NWWG.aspx
Data processing Evaluation of data accuracy (bias and precision): 'Y': https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp) Editing and imputation methods: 'Y': https://www.ices.dk/sites/pub/publication%20reports/forms/defaultone.aspx?rootfolder=/sites/pub/publication+reports/ices+survey+protocols+(sisp) Quality document associated to a dataset: The results of the survey are published as a working group report. The latest report can be found here: https://www.ices.dk/community/groups/Pages/WGIDEEPS.aspx Validation of the final dataset: During the upload process to the DATRAS quality checks are being conducted.

Sampling scheme identifier: SURVEY GGS (Greenland Groundfish Survey)

MS : DEU
Region: North East Atlantic
Sampling scheme identifier: SURVEY GGS (Greenland Groundfish Survey)
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027
Sampling scheme aiming to collect biological samples (length/weight/age/sex) from the annual fishery-independent groundfish survey for Atlantic cod and redfish (<i>Sebastes mentella</i> & <i>Sebastes norvegicus</i>). Species of the whole groundfish assemblage present in the area are recorded. The scheme covers slope and continental shelf regions in East, South and Southwest Greenland waters.
Description of the population
Population targeted: East Greenland offshore cod (<i>Gadus morhua</i>) in ICES 14b & NAFO 1F and demersal redfish (<i>Sebastes mentella</i> and <i>Sebastes norvegicus</i>) off East Greenland.

Population sampled: For both species, mainly the adult stock is sampled. Nursery areas for redfish are still largely unknown and nursery areas for Atlantic cod are in more northern areas in West Greenland, which the survey does not cover. For deep-sea redfish (*Sebastes mentella*), only a part of the depth distribution is covered.

Stratification: The whole survey area is density-stratified and hauls are carried out proportionally to the size of the area and the expected density of the fish populations.

Sampling design and protocols

Sampling design description: The sampling area is divided into 14 strata in 7 regions. Each region is divided in a shallow and a deep stratum. 50 % of the hauls are made proportionally to the size of the stratum and 50 % according to the expected density of the target populations.

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

NA

Regional coordination: The sampling design and protocols were not developed as part of a regional coordination, but in long-term international cooperation within the ICES North-Western Working Group (NWWG).

Link to sampling design documentation:

Fock, H.O. 2007. Driving-forces for Greenland offshore groundfish assemblages: Interplay of climate, ocean productivity and fisheries. J. Northwest Atl. Fish. Sci. **39**: 103–118. doi:10.2960/J.v39.m588.

Rätz, H.J. 1996. Efficiency of geographical and depth stratification in error reduction of groundfish survey results: Case study Atlantic cod off Greenland. NAFO Sci. Coun. Stud. (28): 65–71.

Compliance with international recommendations: Y, the sampling design is in line with international recommendations (ICES NWWG).

Link to sampling protocol documentation: Detailed sampling information for the biological protocol for Atlantic cod can be found here:

Werner, K., Taylor, M., Diekmann, R., Lloret, J., Möllmann, C., Primicerio, R., and Fock, H. 2019. Evidence for limited adaptive responsiveness to large-scale spatial variation of habitat quality. Mar. Ecol. Prog. Ser. 629: 179–191. doi:10.3354/meps13120.

Measurements for other, albeit rarer gadoid species, such as saithe (*Pollachius virens*) or haddock (*Melanogrammus aeglefinus*) are taken the same way. For redfish, age is not determined.

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year:

Because this is a research survey, which only takes place once a year, issues are only resolved in the period between surveys. Mitigation measures are adopted between surveys.

Data capture

Means of data capture: Scales, measuring boards, knives, forceps

Data capture documentation:

Werner, K., Taylor, M., Diekmann, R., Lloret, J., Möllmann, C., Primicerio, R., and Fock, H. 2019. Evidence for limited adaptive responsiveness to large-scale spatial variation of habitat quality. Mar. Ecol. Prog. Ser. 629: 179–191. doi:10.3354/meps13120.

Quality checks documentation: Data quality is regularly checked internally and in collaboration with the Greenland Institute of Natural Resources.
Data storage
National database: Thünen SQL data base.
International database: NA
Quality checks and data validation documentation: The storage quality is regularly checked by the IT department at the Thünen Institute.
Sample storage
Otoliths, stomachs, plankton, genetic samples, stable isotope samples. Otoliths are stored in the archive of the Thünen Institute. Biological samples, such as plankton, fin clips are stored in ethanol or formaldehyde in safe places and analysed as soon as possible after the survey. International protocols for sample analysis are followed, see https://www.ices.dk/community/Pages/PGCCDBS-doc-repository.aspx .
AR comment: no deviations
Evaluation of data accuracy (bias and precision): Data accuracy is checked internally and in collaboration with the Greenland Institute of Natural Resources.
Editing and imputation methods: Within the ICES NWWG editing and imputation methods were covered (see ICES NWWG reports and stock annexes).
Quality document associated to a dataset: DOI publication: No. Estimation procedures are documented in the ICES NWWG reports.
Validation of the final dataset: Data sets are checked by the IT department and the scientists working with the data at the Thünen Institute.

Sampling scheme identifier: SURVEY MEGS

MS : DEU
Region: North East Atlantic
Sampling scheme identifier: SURVEY MEGS
Sampling scheme type: Survey
Observation type: NA
Time period of validity: 2025-2027
Data collected provide an estimate of the total annual egg production that in turn provides an estimate of spawning-stock biomass for both the western and North Sea Atlantic mackerel stocks. It also provides a relative abundance index of spawning for horse mackerel in the Northeast Atlantic. The mackerel egg survey has been running continuously on a triennial basis since 1977. It typically takes place between February and July and aims to cover the entire spawning area from Cadiz in the south to Northwest Scotland and since 2010, up to the waters around the Faroe Islands and southeast of Iceland. There are currently nine nations and ten institutes participating in the survey. RWP 2025-2027
Description of the population
Population targeted: NEA mackerel and horse mackerel. The German part of the survey covers typically mainly parts of ICES area 7 west of the British isles and Celtic Sea

Population sampled: Spawning mackerel and freshly spawned mackerel eggs, adult horse mackerel and horse mackerel eggs

Stratification: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, <http://doi.org/10.17895/ices.pub.7579>)

Sampling design and protocols

Sampling design description: The general method is to quantify the freshly spawned eggs in the water column on the spawning grounds and to determine the fecundity of the females. This is done by sampling sufficient numbers of gonads before during and after the spawning. These are then histologically analysed. In combination, the realised fecundity (potential fecundity minus atresia) of the females and the actual number of freshly spawned eggs in the water render an estimate of the spawning stock biomass. See survey manuals for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, <http://doi.org/10.17895/ices.pub.7579> and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, <http://doi.org/10.17895/ices.pub/7585>)

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

Regional coordination: internationally coordinated survey by ICES WGMEGS. Participating countries are Portugal, Spain, the Netherlands, Germany, Ireland, Faroe Islands, UK, Norway, Denmark

Link to sampling design documentation: SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, <http://doi.org/10.17895/ices.pub.7579>) and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, <http://doi.org/10.17895/ices.pub/7585>

Compliance with international recommendations: Y

Link to sampling protocol documentation: <https://www.ices.dk/community/groups/Pages/WGMEGS.aspx>

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year:

Survey coordination during the ongoing operation through the survey coordinator of the WGMEGS

Data capture

Means of data capture: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, <http://doi.org/10.17895/ices.pub.7579>) and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, <http://doi.org/10.17895/ices.pub/7585>

Data capture documentation: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, <http://doi.org/10.17895/ices.pub.7579>) and

WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, http://doi.org/10.17895/ices.pub/7585 and
Quality checks documentation: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, http://doi.org/10.17895/ices.pub.7579) and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, http://doi.org/10.17895/ices.pub/7585
Data storage
National database: NA
International database: hold by the international survey coordinator (Brendan o'Hea, MI) and https://data.ices.dk/view-map?dataset=194734 ICES Eggs and larvae data sets
Quality checks and data validation documentation: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, http://doi.org/10.17895/ices.pub.7579) and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, http://doi.org/10.17895/ices.pub/7585 and latest WG report https://doi.org/10.17895/ices.pub.8249
Sample storage
Plankton samples from the German part of the survey are stored in formaldehyde locally in the home institute. In average 200 plankton samples plus the fish eggs fractions and up to 800 fecundity samples are taken during the survey. Fecundity samples are sent to other institutes for further investigations. Otoliths from adult mackerel catches are stored dry and dark in the archives of the Thünen Institute of Sea Fisheries
Sample analysis: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, http://doi.org/10.17895/ices.pub.7579) and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, http://doi.org/10.17895/ices.pub/7585
Data processing
Evaluation of data accuracy (bias and precision): Y, see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, http://doi.org/10.17895/ices.pub.7579) and WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel Version 11.0, http://doi.org/10.17895/ices.pub/7585 and https://www.ices.dk/community/groups/Pages/WGMEGS.aspx
Editing and imputation methods: see survey manual for details (SISP 6 - Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Version 1.3, http://doi.org/10.17895/ices.pub.7579) and https://www.ices.dk/community/groups/Pages/WGMEGS.aspx and latest WG report https://doi.org/10.17895/ices.pub.8249
Quality document associated to a dataset: NA
Validation of the final dataset: plankton data are first checked by the scientists working with the data at the Thünen Institute and then validated by the survey coordinator and ICES WGMEGS

Sampling scheme identifier: SURVEY EELS

MS : DEU
Region: North East Atlantic
Sampling scheme identifier: SURVEY EELS
Sampling scheme type: Survey

Observation type: SelfAtSea
Time period of validity: 2025-2027
Current stock assessment of the European eel (<i>Anguilla anguilla</i>) is solely based on glass eel arrival time series. In addition, all EU member states are obliged to report silver eel escapement (EC No 1100/2007). However, little information is available to show either a stock-recruitment relationship as an implicit basis for the intended increase in spawning biomass or a direct correlation between silver eel escapement and subsequent glass eel arrival. The EELS survey fulfils the urgent need of an eel larvae time series investigation in the Sargasso Sea by assessing spatially resolved larval abundances and length distributions.
Description of the population
Population targeted: The main target species of this research larval survey (EELS) is the European Eel (<i>Anguilla anguilla</i>) and the main survey area is the Sargasso Sea (22°N-31°N and 54°W-70°W). The European eel is a facultatively catadromous species with a complex life history as a long-lived semelparous and widely dispersed species. During its continental phase, the European eel is unevenly distributed across most coastal countries in Europe and North Africa, with its southern limit in Morocco (30°N), its northern limit situated in the Barents Sea (72°N) and spanning the entire Mediterranean basin. The shared single stock is considered genetically panmictic and data indicate that the spawning area is in the southwestern part of the Sargasso Sea. The newly hatched leptocephalus larvae drift with the ocean currents to the continental shelf of Europe and North Africa, where they metamorphose into glass eels and enter continental waters. Glass eel densities are greatest in the centre of their distribution around the Bay of Biscay, with high densities also occurring in the eastern Mediterranean and in the Bristol Channel. The growth stage, known as yellow eel, may take place in marine, brackish (transitional), or freshwaters. This stage may last typically from two to 25 years (and can exceed 50 years) prior to metamorphosis to the “silver eel” stage, maturation and spawning migration. The European eel is classified as a category 3 stock: “stocks for which survey-based assessments indicate trends. Includes stocks for which survey or other indices are available that provide reliable indications of trends in stock metrics, such as total mortality, recruitment, and biomass” (ICES, 2019). The reason for this is that there are not enough data available for a quantitative assessment (category 1 and 2 stocks), but there is an index available which functions to indicate a trend in eel recruitment. For those stocks in category 3, without reference points, and with extremely low biomass relative to previous estimates, the provision of a precautionary Advice includes a zero-catch Advice (ICES, 2021). The recurrent ICES advice on fishing opportunities for eel is based on a statistical analysis of several time-series on recruitment (here defined as glass eel and or a mixture of glass + yellow eels, and of young yellow eel time-series). However, glass and young yellow eel time-series reflect spawning plus impacts during the oceanic migration to continental waters. Reference points such as B_{lim} used in traditional stock assessments are not available since spawning in the wild has not been observed or quantified and escapement (i.e. the biomass of silver eels that yearly leaves continental waters towards the spawning ground) as the best possible proxy of escapement at the population scale is difficult to quantify. While time-series for escapement are collected at a few sites over the distribution area, their use to infer a trend at the population scale is a challenge because of the complex ecology of eels compounded by the absence of data in some areas. Therefore, to prove a traditional stock–recruitment (SSB–R) relationship for the European eel based on silver eel escapement and subsequent glass and young yellow eel arrival, the impacts during the oceanic migration from continental waters to the Sargasso Sea for silver eels and from the Sargasso Sea to continental waters for leptocephalus larvae need to be understood and at best quantified. Since this is practically impossible to reach, a time series investigation on the abundance of young-of-the-year early life stages in the Sargasso Sea, the spawning ground of the European eel, is urgently needed to evaluate the success of management measures implemented as a consequence of the European Eel Regulation. Population sampled: The European eel is considered to be a panmictic species without population structure. Its presumed spawning time is in early spring. The EELS survey is conducted between mid-March and mid-April in an area between 22°N and 31°N and 54°W and 70°W. For practical reasons (limitations in ship-time and funding), the survey is

currently only conducted on a triennial basis. The sampling scheme is assumed to cover the main spawning area shortly after and/or during peak spawning. However, annual variations in the spatial distribution of distinct areas of increased spawning activity and therefore larval distribution cannot be excluded.

Stratification:

Since the survey is intended to cover the main spawning area after peak spawning, a further regional and seasonal stratification is not envisaged. However, annual surveys would improve coverage.

Sampling design and protocols

Sampling design description:

The main sampling area is allocated between 22°N and 31°N and 54°W and 70°W. Location and timing are defined based on previous findings on European eel larval abundance and individual larval size. The survey takes place in the region and season where smallest larvae were ever collected. The survey covers the main spawning area in a North-South transect sampling scheme. Transects are each 3 degrees longitude apart. Single sampling stations are located every 1 degree latitude. The number of transects and their northern and southern extent may vary between surveys, depending on local larval abundance/distribution and hydrographic conditions. A 500 µm meshsize Isaacs-Kidd Midwater Trawl (IKMT) is the main sampling gear.

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

NA

Regional coordination

No

Link to sampling design documentation:

The data are stored on local servers and will be publicly available after publication in scientific journals. Collected data include larval densities per haul and per area, individual body lengths and genetic species identity. All eel larvae are stored for further analyses (e.g. body composition, otolith analyses, gut content analyses).

Compliance with international recommendations:

‘Y’ The ICES Working Group on Eels (WGEEL) repeatedly highlighted the need of an international eel larval survey in the spawning area in the Sargasso Sea. The Workshop on Eel and Salmon DCF Data (WKESDCF) supported this recommendation and RCG agreed that the opportunity should be provided to assess these data, because of their importance for eel stock management. However, the sampling design itself was not yet evaluated by a relevant expert or coordination group.

Link to sampling protocol documentation:

The sampling protocol contains the following information:

Individual ID, Survey number, Station number, Time (UTC), Lat (°N), Long (°W), Net-type, Total length (mm), Pre-anal length (mm), Pre-dorsal length (mm), Total myomeres (N), Pre-anal myomeres (N), Pre-dorsal myomeres (N), Head length (mm), Body height (mm).

Compliance with international recommendations:

‘Y’ The ICES Working Group on Eels (WGEEL) repeatedly highlighted the need of an international eel larval survey in the spawning area in the Sargasso Sea. The Workshop on Eel and Salmon DCF Data (WKESDCF) supported this recommendation and RCG agreed that the opportunity should be provided to assess these data, because of their importance for eel stock management. However, the sampling protocol itself was not yet evaluated by a relevant expert or coordination group.

The sampling protocol contains the following information:

Individual ID, Survey number, Station number, Time (UTC), Lat (°N), Long (°W), Net-type, Total length (mm), Pre-anal length (mm), Pre-dorsal length (mm), Total myomeres (N), Pre-anal myomeres (N), Pre-dorsal myomeres (N), Head length (mm), Body height (mm).

Sampling implementation
Recording of refusal rate: NA Monitoring of sampling progress within the sampling year: The number of transects and their northern and southern extent may vary between surveys. The hydrographic conditions in the area are dominated by a temperature front system, which is assumed to play a key role in the allocation of spawning places of eels. The position of these fronts varies between years and even between weeks and the northern and southern extension of the survey transects is modified accordingly. In addition and in order to further narrow down the location of potential spawning sites, main catch effort is directed towards areas of high larval abundance and the presence of very small larvae.
Data capture
Means of data capture: Standardized sampling is conducted at each station with an Isaac-Kidd Midwater Trawl (IKMT) in the form of double oblique tows from the surface to 300 m depth. At selected stations, additional modified hauls (e.g. triple oblique to 150 m) are carried out in order to further study the occurrence of early development stages of eels. Additionally, at all stations a hydrographic profile is generated (CTD also including oxygen, turbidity and Chlorophyll-a measurements) down to a depth of 500 m. Further CTD profiles to a depth of 300 m are conducted in between stations to increase the resolution of the hydrographic data. All preleptocephalus and leptocephalus larvae, as well as potential Anguilla eggs, are sorted out of the catches and identified (if possible) to the species level by morphological features. In individual cases, a RT-PCR can be conducted onboard for genetical species identification of possible Anguilla specimens. All larvae are measured for at least total length and, depending on the species, additional morphometric parameters (e.g. preanal length) are recorded. All data are documented in handwritten protocols and digitalized on board. Data capture documentation: Documentation on data capture is provided in cruise reports for past cruises: Hanel, R. (2011), Cruise report WH 342 Hanel, R. (2014), Cruise report WH373 Hanel, R. (2017), Cruise report WH 404 A popular science format with photographic documentation can be found under: https://www.thuenen.de/en/topics/seas/no-fisheries-research-without-research-vessels/sea-blogs/whiii-404-reise/ and https://www.thuenen.de/de/thema/meere/keine-fischereiforschung-ohne-schiffe/see-tagebuecher/whiii-373-reise/ Quality checks documentation:. Y, see above (means of data capture/data capture documentation)
Data storage
National database: NA, data are stored locally International database: NA, data are stored locally. It is intended to provide the data to the ICES Eggs and Larvae database, though no timeframe has been established to do this. Quality checks and data validation documentation:

In addition to the ships data storage system (DataDis), station data as well as data captured alongside IKMT hauls and CTD Profiles (e.g. time, location, sampling depth etc.) are documented in handwritten protocols onboard, which are stored for subsequent evaluation.
Sample storage
Storage description: <i>Anguilla anguilla</i> leptocephali larvae collected during the survey are stored at the Thünen Institute either frozen (-20°C / -80°C) or in ethanol, depending on the requirements for planned analyses. Sample analysis: Leptocephali are sorted out of the plankton samples directly after hauls and kept in chilled seawater until they morphological identification according to Böhlke (1989). Collected leptocephali are identified using DNA-analyses (mitochondrial 16S rRNA gene for species identification and 18S rDNA and restriction fragment length polymorphisms (RFLPs) for detecting hybrids following established protocols (Frankowski & Bastrop 2010) (along with some restriction enzyme modifications (Prigge et al. 2013)). Böhlke, E.B., (Ed.), 1989a. Leptocephali. Fishes of the western North Atlantic. Mem. Sears Found. Mar. Res. 2 (9), 657e1055. Frankowski J, Bastrop R (2010) Identification of <i>Anguilla anguilla</i> (L.) and <i>Anguilla rostrata</i> (Le Sueur) and their hybrids based on a diagnostic single nucleotide polymorphism in nuclear 18S rDNA. Mol Ecol 10:173–176. Prigge E, Marohn L, Oeberst R, Hanel R (2013) Model prediction vs. reality—testing the predictions of a European eel (<i>Anguilla anguilla</i>) stock dynamics model against the in situ observation of silver eel escapement in compliance with the European eel regulation. ICES J Mar Sci 70:309–318.
Data processing
Evaluation of data accuracy (bias and precision): Data accuracy is not assessed on a regular basis but in relation to certain scientific publications. However, the data basically consist of species identification (morphologic and genetic), length measurements and the determination of filtered water volume during sampling. Editing and imputation methods: See above. There is no regular assessment of data accuracy. Data quality issues are described case by case in the respective scientific publications. Quality document associated to a dataset: No Validation of the final dataset: N/NA. So far, data have not been included in an end user data base (e.g. ICES database) and have hence not been finally validated.

ANNEX 1.2 - QUALITY REPORT FOR SOCIOECONOMIC DATA SAMPLING SCHEME

The quality report fulfils Article 6 (3) (d) of the Regulation (EU) 2017/1004. This document is intended to specify data to be collected under chapter II, points 3, 5, 6, and 7 of the Delegated Decision annex: Socioeconomic data on fisheries, aquaculture and any complementary data collection of fishing activity and fish processing. Use this document to describe quality aspects of the data collection process (design, sampling implementation, data capture, data storage and data processing etc.). The annex should be filled for each sampling scheme. Where applicable, use the handbook on sampling design (Deliverable 2.1 from MARE/2016/22 SECFISH study), available on the DCF website.

Provide information under each point in all sections.

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

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

The following scheme gives an overview of the data sources:

Source	Variable groups	Segments	Type
Fleet register	Capacity	All	Census
Logbooks	Effort, gear	All > 8m	Census
Sales notes	Landings, income, price	All active vessels	Census
Questionnaire random sampling	Most economic variables; (effort for vessels < 8m)	Passive gear < 12m (proportional to size (value of landings)), beam trawlers <12m and >24m,	Probability sampling
Questionnaire census	Most economic variables	Pelagic trawlers, demersal trawlers > 40m, drift and fixed netters >24m	Census
Accountancy network (FADN)	Most economic variables	Beam trawlers 12-24m, Demersal trawlers 10-40m, some fixed netters between 8 and 18m (being completed with PSS survey, see above)	Probability sampling

Sampling scheme identifier: Fisheries RWP ECON

Survey Specifications
<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.</i> <i>‘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>
Sector name(s): RWP ECON 2025-2027
Sampling scheme:
Variables:
Supra region(s):
Survey planning

Survey design and strategy
1. Data sources: 2. Sample sizes: 3. Survey methods: 4. Additional information used in the survey strategy:
Estimation design
1. Calculation method for population estimate: 2. Calculation method for derived data: 3. Nonresponse handling:
Error checks
Data storage and documentation
1. Data storage: 2. Documentation:
Revision
Confidentiality
1. Are procedures for confidential data handling in place and documented? 2. Are protocols to enforce confidentiality between DCF partners in place and documented? 3. Are protocols to enforce confidentiality with external users in place and documented? 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.

Sampling scheme identifier: Fishing activity PSS Questionnaire

Survey Specifications
<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.</i> <i>'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>
Sector name(s): RWP ECON 2025-2027 complementary data collection on fishing activity
Sampling scheme: PSS
Variables: For vessels without logbooks: Days at sea, Number of nets / Length, Number of hooks, Number of lines, Numbers of pots, traps, Hours fished, Fishing days, Number of trips, Number of fishing operations and Number of nets(m) * soak time (days).

Supra region(s): All supra regions	
Survey planning	
Small-scale vessels below 10m using passive gear, beam trawlers below 10m,	
Survey design and strategy	
1.	Data sources: The survey is based on questionnaires, distributed by mail.
2.	Sample sizes: The sample size is set following the principles as laid down in EWG 17-11 (“the more important, the higher the requirements”). All segments covered by this survey are economically less important for the German fleet. E.g. for the large segments of small scale vessels using passive gear a sample rate of 8-10% was regarded sufficient. The other two segments are very small (7 and 4 vessels) and of very low importance so that a coverage of 1-3 vessels is regarded cost-effective. This approach also takes into account fishermen’s willingness to respond. If they are sampled too frequent, the experience shows that the response rate decreases rapidly. The rates cannot be mathematically derived as there is neither a defined target probability error nor a robust estimate for variance. The segment is separated by activity levels (A and L).
3.	Survey methods: Questionnaires are sent and collected by mail.
4.	Additional information used in the survey strategy: The data is checked on the basis of comprehensive information on landings and effort (=auxiliary information), i.e. ratios of cost per day of per catch unit or per revenue are calculated and any observed outliers are further scrutinised
Estimation design	
1.	Calculation method for population estimate: In general, sample data are raised on the basis of auxiliary information, according to the following scheme which is the result of an investigation on highest correlations: A ratio of days at sea from the questionnaires and number of monthly sales declarations (this information is available exhaustively) is estimated. This ratio is applied to the total population. For the small-scale fishery days at sea and fishing days are set equal. Based on the estimate of total days at sea of the segment, the other variables are raised proportionally.
2.	Calculation method for derived data: See above, there are no other derived data in this survey.
3.	Nonresponse handling: In case of non-response, estimation procedures are applied, based on the abovementioned correlations. Due to the use of auxiliary information the effect of bias is counteracted. Missing entries are interpreted as item non-response, while “slash” entries are treated as zero.
Error checks	
Data collected through questionnaires are scanned for potential outliers that will be further scrutinised and checked with the suppliers. However, due to the large actual variability of these data, these checks	

have to be restricted to extreme data. Duplication of data is addressed by using the vessel ID as a link: thus, a double data set can be identified and processed. Processing errors are, as much as possible, addressed through comparison with related data sets (e.g. time series, segment average, ratio between variable and effort/landings/income).
Data storage and documentation
1. Data storage: Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place. Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: The principles of this survey are rather straightforward, as this annex contains all relevant information, no further documentation is deemed necessary.
Revision
The segmentation is created annually, based upon logbooks and sales notes, where applicable. A major concern will be the potential need for further clustering as there are several segments with few vessels only, and there is a tendency of further decrease in numbers. The sampling rates and survey methods are scrutinised ahead of any survey (= annually).
Confidentiality
<i>Are procedures for confidential data handling in place and documented?</i> Yes, following Directive 2016/680 of the EU Parliament and Council. <i>Are protocols to enforce confidentiality between DCF partners in place and documented?</i> Yes, following Directive 2016/680 of the EU Parliament and Council. <i>Are protocols to enforce confidentiality with external users in place and documented?</i> There are no external end users of confidential data. <i>Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.</i> No.

Sampling scheme identifier: Fisheries PSS FADN

Survey Specifications			
<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.</i> <i>'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>			
Sector name(s): RWP ECON 2025-2027 Fishing fleet			
Sampling scheme: PSS			
Variables: Energy consumption, Energy costs, Full-time Equivalent (FTE), Gross debt, Investments in tangible assets (net purchase of assets), Operating subsidies, Other income, Other non-variable costs, Other variable costs, Paid labour, Personnel costs, Repair and maintenance costs, Subsidies on investments, Total value of assets, Unpaid labour, Value of unpaid labour			
Supra region(s): All supra regions			
Survey planning			
Beam trawlers 12-24 m, demersal trawlers 10-40 m, and fixed netters between 8 and 18 m.			
Survey design and strategy			
1.	Data sources: The data source is the accountants' network for fisheries (FADN, on the basis of Council Regulation (EC) No 1217/2009). Fishermen are regularly invited to participate in the network.		
2.	Sample sizes: The coverage per segment has been and will be around 30-40%. Over a long period, these rates have proven to be highly sufficient to provide robust data. The rates are not mathematically derived as there is neither a defined target probability error nor a robust estimate for variance. Participation in the FADN is voluntary, and a certain fluctuation can be observed.		
3.	Survey methods: Data are in most cases compiled and submitted electronically by tax consultants, following FADN requirements.		
4.	Additional information used in the survey strategy: In addition, the data is checked on the basis of comprehensive information on landings and effort (=auxiliary information), i.e. ratios of cost per day of per catch unit or per revenue are calculated and any observed outliers are further scrutinised.		
Estimation design			
1.	Calculation method for population estimate: In general, sample data are raised on the basis of auxiliary information, according to the following scheme which is the result of an investigation on highest correlations:		
	<table border="1"> <tr> <td></td> <td><i>Basis for estimation</i></td> </tr> </table>		<i>Basis for estimation</i>
	<i>Basis for estimation</i>		

<i>Variable type to be estimated</i>	GT	kW	fishing days	days at sea	value of landings
Direct subsidies		X			
Other income		X			
Wages and salaries of crew	X		X		X
Value of unpaid labour	X		X		X
Energy costs	X		X		
Repair and maintenance costs	X				X
Variable costs	X		X		
Non-variable costs	X	X			
Investments in physical capital					X
Debt, assets					X
Engaged crew				X	

It has turned out that the fractions, which the sample represents within the considered segment, are in most cases quite similar, e.g. in TBB1218 the sample represents about 41% of the number of vessels, 41% of LoA, 44% of GT, 41% of kW, 52% of weight of landings, 49% of revenues and 45% of days at sea (example from 2008). Thus, estimations are in most cases quite robust, no matter which factor is used for estimation.

Calculation method for derived data:
On the “Value of unpaid labour”: The basis number for an average annual salary is derived from figures published by the Federal Statistical Office (e.g. 40.044 € for 2022).
On “Energy costs”: A distinction between types of fuel is being applied. Based on experts’ interviews and evidence from collected data, three different average fuel prices per liter have been calculated: one for vessels < 30kW (often fuelled with petrol), one for vessels between 30 and 3000 kW (gasoil, tax reduced) and one for larger vessels > 3000 kW (crude oil).

Nonresponse handling:
The issue of unit non-response does usually not apply to the FADN concept. Item non-response is usually identified through the plausibility check and leads to a correction loop.

Error checks					
Potential errors are identified through the abovementioned plausibility routine. Where applicable, respondents correct potential wrong entries. Duplication of data is addressed by using the vessel ID as a link: thus, a double data set can be identified and processed. Processing errors are, as much as possible, addressed through comparison with related data sets (e.g. time series, segment average, ratio between variable and effort/landings/income).					
Data storage and documentation					
1. Data storage: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: <https://www.bmel-statistik.de/fileadmin/daten/BFB-0114001-2018.pdf> <https://www.bmel-statistik.de/fileadmin/daten/0113004-2024.pdf>					
Revision					
The segmentation is created annually, based upon logbooks and sales notes, where applicable. A major concern will be the potential need for further clustering as there are several segments with few vessels					

only, and there is a tendency of further decrease in numbers. The sampling rates and survey methods follow the FADN guidelines and are updated, where applicable.	
Confidentiality	
1.	Are procedures for confidential data handling in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council.
2.	Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council.
3.	Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data.
4.	Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. No.

Sampling scheme identifier: Fisheries PSS Questionnaire

Survey Specifications
<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.</i> <i>'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>
Sector name(s): RWP ECON 2025-2027 Fishing fleet
Sampling scheme: PSS
Variables: Energy consumption, Energy costs, Full-time Equivalent (FTE), Gross debt, Investments in tangible assets (net purchase of assets), Operating subsidies, Other income, Other non-variable costs, Other variable costs, Paid labour, Personnel costs, Repair and maintenance costs, Subsidies on investments, Total value of assets, Unpaid labour, , Value of unpaid labour .
Supra region(s): All supra regions
Survey planning
Small-scale vessels below 10m using passive gear, beam trawlers below 12m, cluster of fixed netters 12-40m, when not sufficiently covered by FADN; questionnaire on enterprise level
Survey design and strategy
3. Data sources: The survey is based on questionnaires, distributed by mail. 4. Sample sizes: The sample size is set following the principles as laid down in EWG 17-11 ("the more important, the higher the requirements"). All segments covered by this survey are economically less important for the German fleet. E.g. for the large segments of small scale vessels using passive gear a sample rate of 8-10% was regarded sufficient. The other two segments are very small (7 and 4 vessels) and of very low importance so that a coverage of 1-3 vessels is regarded cost-effective. This approach also takes into account fishermen's willingness to respond. If they are sampled too frequent, the experience shows that the response rate decreases rapidly. The rates cannot be mathematically derived as there is neither a defined target probability error nor a robust estimate for variance The segment is separated by activity levels (A and L). 5. Survey methods: Questionnaires are sent and collected by mail. 6. Additional information used in the survey strategy: The data is checked on the basis of comprehensive information on landings and effort (=auxiliary information), i.e. ratios of cost per day of per catch unit or per revenue are calculated and any observed outliers are further scrutinised
Estimation design

7. Calculation method for population estimate:
In general, sample data are raised on the basis of auxiliary information, according to the following scheme which is the result of an investigation on highest correlations:

<i>Variable type to be estimated</i>	<i>Basis for estimation</i>				
	GT	kW	fishing days	days at sea	value of landings
Direct subsidies		X			
Other income		X			
Wages and salaries of crew	X		X		X
Value of unpaid labour	X		X		X
Energy costs	X		X		
Repair and maintenance costs	X				X
Variable costs	X		X		
Non-variable costs	X	X			
Investments in physical capital					X
Debt, assets					X
Engaged crew				X	

It has turned out that the fractions, which the sample represents within the considered segment, are in most cases quite similar, e.g. in TBB1218 the sample represents about 41% of the number of vessels, 41% of LoA, 44% of GT, 41% of kW, 52% of weight of landings, 49% of revenues and 45% of days at sea (example from 2008). Thus, estimations are in most cases quite robust, no matter which factor is used for estimation.

8. Calculation method for derived data:
On the “Value of unpaid labour”: The basis number for an average annual salary is derived from figures published by the Federal Statistical Office (e.g. 40.044 € for 2022).
On “Energy costs”: A distinction between types of fuel is being applied. Based on experts’ interviews and evidence from collected data, three different average fuel prices per liter have been calculated: one for vessels < 30kW (often fuelled with petrol), one for vessels between 30 and 3000 kW (gasoil, tax reduced) and one for larger vessels > 3000 kW (crude oil) (the latter is not relevant for this group).
9. Nonresponse handling:
In case of non-response, estimation procedures are applied, based on the abovementioned correlations. Due to the use of auxiliary information the effect of bias is counteracted. Missing entries are interpreted as item non-response, while “slash” entries are treated as zero.

Error checks

Data collected through questionnaires are scanned for potential outliers that will be further scrutinised and checked with the suppliers. However, due to the large actual variability of these data, these checks have to be restricted to extreme data. Duplication of data is addressed by using the vessel ID as a link: thus, a double data set can be identified and processed. Processing errors are, as much as possible, addressed through comparison with related data sets (e.g. time series, segment average, ratio between variable and effort/landings/income).

Data storage and documentation

10. Data storage:
Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place.

Digital data are stored on an institutional files server with access limited to persons who are in charge of the data collection and processing. Backups are created daily.

11. Documentation: The principles of this survey are rather straightforward, as this annex contains all relevant information, no further documentation is deemed necessary.

Revision

The segmentation is created annually, based upon logbooks and sales notes, where applicable. A major concern will be the potential need for further clustering as there are several segments with few vessels only, and there is a tendency of further decrease in numbers.

The sampling rates and survey methods are scrutinised ahead of any survey (= annually).

Confidentiality

Are procedures for confidential data handling in place and documented?

Yes, following Directive 2016/680 of the EU Parliament and Council.

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

Yes, following Directive 2016/680 of the EU Parliament and Council.

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

There are no external end users of confidential data.

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

No.

Sampling scheme identifier: Fisheries IND Capital PIM

Survey Specifications	
<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.</i> <i>'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>	
Sector name(s): RWP ECON 2025-2027 Fishing fleet	
Sampling scheme: Indirect survey	
Variables: Consumption of fixed capital, Value of physical capital	
Supra region(s): All supra regions	
Survey planning	
All vessels	
Survey design and strategy	
1.	Data sources: Indirect survey, following the Perpetual Inventory Method following the "EUMAP guidance document for the Fishing Fleet"
2.	Sample sizes: Census, applies to all vessels
3.	Survey methods: Indirect approach, fleet register and some business statistics information is used (see estimation design).
4.	Additional information used in the survey strategy: No additional information used.
Estimation design	
1.	Calculation method for population estimate
2.	Calculation method for derived data: On data estimated via PIM: degressive depreciation is applied. Several experts have been interviewed to receive specific life time and share information, but it transpired that there is no uniform pattern. Therefore, the figures as used in the Study on Capital Value ("FISH/2005/03") have been applied: - Hull share = 0.6, Engine share = 0.2, Electronics share = 0.1, "Others" share = 0.1 - Useful lifetime hull = 25, Useful lifetime engine = 10, Useful lifetime electronics = 5, Useful lifetime "Others" = 7; Degression rate hull = .07, Degression rate engine = .25, Degression rate electronics = .5, Degression rate "Others" = .35; The price per GT unit (= €10782 in 2022) is being determined as gross value from net prices of new built vessels during the period 2005-2015 with price adjustment based on the index for "producer price for commercial products, investment goods". Due to the low number of newly built vessels and hence

available price information, the same price per GT unit has to be applied to all fleet segments. 3. Nonresponse handling: Indirect estimation, no non-response
Error checks
Error checks do not apply to the PIM approach; additional information on input parameters will be implemented whenever available.
Data storage and documentation
1. Data storage: Data are stored as digital data files. Digital data are stored on an institutional files server with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: The principles of this indirect PIM survey are rather straightforward, as this annex contains all relevant information, no further documentation is deemed necessary
Revision
The segmentation is created annually, based upon logbooks and sales notes, where applicable. A major concern will be the potential need for further clustering as there are several segments with few vessels only, and there is a tendency of further decrease in numbers. Input parameters are revised upon availability of more current information.
Confidentiality
1. <i>Are procedures for confidential data handling in place and documented?</i> Yes, following Directive 2016/680 of the EU Parliament and Council. 2. <i>Are protocols to enforce confidentiality between DCF partners in place and documented?</i> Yes, following Directive 2016/680 of the EU Parliament and Council. 3. <i>Are protocols to enforce confidentiality with external users in place and documented?</i> There are no external end users of confidential data. 4. <i>Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.</i> No.

Sampling scheme identifier: Fisheries Census Questionnaire

Survey Specifications																												
<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.</i> <i>'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>																												
Sector name(s): RWP ECON 2025-2027 Fishing fleet																												
Sampling scheme: Census																												
Variables: Energy consumption, Energy costs, Full-time Equivalent (FTE), Gross debt, Investments in tangible assets (net purchase of assets), Operating subsidies, Other income, Other non-variable costs, Other variable costs, Paid labour, Personnel costs, Repair and maintenance costs, Subsidies on investments, Total value of assets, Unpaid labour, Value of unpaid labour																												
Supra region(s): All supra regions																												
Survey planning																												
Beam trawlers: 24-40 m*; Demersal trawlers >40m* and "Pelagic trawlers > 40m*" referring to individual vessels																												
Survey design and strategy																												
1. Data sources: Data sources: The survey is based on questionnaires. 2. Sample sizes: Census, applies to all vessels of the respective segments 3. Survey methods: Questionnaires are distributed by mail or by e-mail 4. Additional information used in the survey strategy: For this survey, no auxiliary information is being used																												
Estimation design																												
1. Calculation method for population estimate: As the strategy is census, there is usually no estimation procedure required. For the large beam trawlers (6 vessels) there is a low amount of non-response. Sample data are raised on the basis of auxiliary information, according to the following scheme which is the result of an investigation on highest correlations:																												
<table border="1"> <thead> <tr> <th rowspan="2"><i>Variable type to be estimated</i></th><th colspan="5"><i>Basis for estimation</i></th></tr> <tr> <th>GT</th><th>kW</th><th>fishing days</th><th>days at sea</th><th>value of landings</th></tr> </thead> <tbody> <tr> <td>Direct subsidies</td><td></td><td>X</td><td></td><td></td><td></td></tr> <tr> <td>Other income</td><td></td><td>X</td><td></td><td></td><td></td></tr> </tbody> </table>						<i>Variable type to be estimated</i>	<i>Basis for estimation</i>					GT	kW	fishing days	days at sea	value of landings	Direct subsidies		X				Other income		X			
<i>Variable type to be estimated</i>	<i>Basis for estimation</i>																											
	GT	kW	fishing days	days at sea	value of landings																							
Direct subsidies		X																										
Other income		X																										

Wages and salaries of crew	X		X		X
Value of unpaid labour	X		X		X
Energy costs	X		X		
Repair and maintenance costs	X				X
Variable costs	X		X		
Non-variable costs	X	X			
Investments in physical capital					X
Debt, assets					X
Engaged crew				X	

2. Calculation method for derived data: On the “Value of unpaid labour”: The basis number for an average annual salary is derived from figures published by the Federal Statistical Office (e.g. 40.044 € for 2022).
On “Energy costs”: A distinction between types of fuel is being applied. Based on experts’ interviews and evidence from collected data, three different average fuel prices per liter have been calculated: one for vessels < 30kW (often fuelled with petrol – but not relevant for these segments), one for vessels between 30 and 3000 kW (gasoil, tax reduced) and one for larger vessels > 3000 kW (crude oil).

3. Nonresponse handling:
In case of non-response, estimation procedures are applied, based on the abovementioned correlations. Due to the use of auxiliary information the effect of bias is counteracted. Missing entries are interpreted as item non-response, while “slash” entries are treated as zero.

Error checks					
Potential errors are identified through the abovementioned plausibility routine. Where applicable, respondents correct potential wrong entries. Duplication of data is addressed by using the vessel ID as a link: thus, a double data set can be identified and processed. Processing errors are, as much as possible, addressed through comparison with related data sets (e.g. time series, segment average, ratio between variable and effort/landings/income).					
Data storage and documentation					
1. Data storage: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: The principles of this survey are rather straightforward, as this annex contains all relevant information, no further documentation is deemed necessary.					
Revision					
The segmentation is created annually, based upon logbooks and sales notes, where applicable. A major concern will be the potential need for further clustering as there are several segments with few vessels only, and there is a tendency of further decrease in numbers. The sampling rates and survey methods are scrutinised ahead of any survey (= annually).					
Confidentiality					
1. Are procedures for confidential data handling in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council. 2. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council.					

3. Are protocols to enforce confidentiality with external users in place and documented?
There are no external end users of confidential data.
4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.
Data for the two high seas segments are confidential as they refer to less than 3 companies. However, the respective companies gave permission to publish segment data in the DCF context.

Sampling scheme identifier: Fisheries social data Census

Survey Specifications
<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.</i> <i>'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>
Sector name(s): RWP ECON 2025-2027 Fishing fleet
Sampling scheme: Census
Variables: All social data
Supra region(s): All supra regions
Survey planning
The survey applies to all segments
Survey design and strategy
1. Data sources: Data is comprehensively provided by the Employer's Liability Insurance Association where all fishermen have to be registered.. 2. Sample sizes: Census for the Liability Association data (100% coverage) 3. Survey methods: Official files from the Employer's Liability Insurance Association where all fishermen have to be registered. 4. Additional information used in the survey strategy: The surveys on fleet economic data include some questions related to social data. These surveys are to be regarded as PSS. Hence, the estimation of social data for the fleet are a combination of Census (Insurance Association) and PSS (questionnaires, FADN panel, see previous chapters). The PSS results are used only to determine ratios, e.g. age distribution, per vessel group. Then these ratios are applied to the total numbers from the Census (i.e., results from questionnaires are used for distribute totals to the groups "Long distance", "Large scale" and Small scale.)
Estimation design
1. Calculation method for population estimate: The overall data are available comprehensively, therefor no estimation of the population is required. 2. Calculation method for derived data: There are no derived data. 3. Nonresponse handling: There is no non-response as registration is legally binding.

Error checks	
Error checks are limited to plausibility checks in the questionnaires (e.g. age should be between 15 and 90)	
Data storage and documentation	
1.	Data storage: Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place. Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily
2.	Documentation: A documentation of this survey which goes beyond this description in the WP is not deemed necessary.
Revision	
Data collection by the Employer's Liability Insurance Association is revised in the event of change in legislation. Beyond this, no further revision of the sampling in the DCF context is scheduled at regular intervals.	
Confidentiality	
1.	Are procedures for confidential data handling in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council.
2.	Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council.
3.	Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data.
4.	Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. Data for the two high seas segments are confidential as they refer to less than 3 companies. However, the respective companies gave permission to publish segment data in the DCF context.

Sampling scheme identifier: socioeconomicAQPS

Survey Specifications
<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.</i> <i>'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>
Sector name(s): socio economic data on aquaculture
Sampling scheme: Probability sample survey (trout and carp segments)
Variables: Gross sales per species, Operating subsidies (trout segments), Subsidies on investments, Other income, Personnel costs, Value of unpaid labour, Energy costs, Raw material: feed costs, Repair and maintenance, Other operating costs, Consumption of fixed capital, Investments in tangible assets (net purchase of assets), Total value of assets, Gross debt, Financial income, Financial expenditures, Fish feed used, Paid labour, Number of hours worked by employees and unpaid workers (optional), Employment by age, Employment by level of education
Supra region(s): NA
Survey planning
Freshwater aquaculture operations for trout (ponds; tanks and raceways) and carp (ponds) larger than 0.3 ha respectively 200 m ³ .
Survey design and strategy
1. Data sources: The probability sample survey on economic and social variables for trout and carp segments is conducted via a standardised questionnaire. 2. Sample sizes: Starting from a basic population of 2150 farms (=N) that build the German aquaculture sector in 2022 (Destatis) and applying a confidence interval of 95% (z=1.96) together with a sample proportion P=0.5 (Q=1-P) due to an unknown variance and a margin of error ε = 0.05, the resulting sample rate would correspond to a census survey in order to reach a sample size (=n) of 326 responses representing 15 % of total farms. $n \geq \frac{N}{1 + \frac{(N-1) * \epsilon^2}{z^2 * P * Q}}$ However, due to the strict interpretation and application of data protection law of the German state offices of statistics, the Thünen-Institute has no access to the official register of freshwater fish farmers' addresses combined with information about cultured species and volume that would allow such a census survey. Alternatively, a database has been built up containing freshwater aquaculture enterprises whose addresses are available via public sources. This database underlies a continuous updating process based on responses from the sector (e.g. termination of business, concerns about data protection, fish farms with a scale <0.3 ha or with a volume <200 m³). This database currently covers 836 addresses (including approx. 273 for carp and 360 trout) (covering about 39% of the total number of farms in Germany), which pre-define the sample rate and lead - according to the average response rate in previous years - to an achieved sample size of about 100 for the standardised questionnaire. Although this sample size is smaller than targeted (about 4.7% of total farms), the covered production volume of the sample size still represented more than 30% of the total German aquaculture

sector over the last 4 years (2019-2022 data).

3. Survey methods:

The standardised survey is distributed by post, queries are answered by telephone and email. National statistics utilized for the projection of the probability sample survey to the whole sector are publicly available (Destatis data on aquaculture production; BA data on employment by age, gender and level of education).

4. Additional information used in the survey strategy:

Typical farms are used as supplementary data source for farm economics and labour characteristics (social variables) to balance shortcomings of the survey (e.g. insufficient response behaviour in case of some variables). For example for the variable “Value of unpaid labour”, the information from typical farms is a valuable additional information. Typical farms are defined according to the typical farm approach, which is a standardized sampling and data collection strategy for farm economic datasets that reflect the prevailing production system with common technology, capital input, labour resources and typical production volume within a representative region (see reference links below for more information).

Estimation design

1. Calculation method for population estimate:

The main reference for projection of the sample survey to the whole sector is directly or indirectly the total sales volume, which is collected in a census by the German Federal Statistical Office “Destatis” (see also Annex 1.2 on Census). For the segment of carp ponds (segment 4.1) the data can be projected directly, for the two relevant trout segments 2.1 and 2.2, a further allocation is based on the survey response shares for these segments as Destatis does not differentiate between these two segments. This approach is applied for the following variables derived from the probability sample survey: “Gross sales per species”, “Subsidies on investments”, “Other income”, “Personnel costs”, “Value of unpaid labour”, “Energy costs”, “Raw material: feed costs”, “Repair and maintenance”, “Other operating costs”, “Consumption of fixed capital”, “Investments in tangible assets (net purchase of assets)”, “Total value of assets”, “Gross debt”, “Financial income”, “Financial expenditures”, “Fish feed used”.

The variable “Unpaid labour” is projected based on the total number of farms, collected in a census by the German Federal Statistical Office “Destatis”. For the segment of carp ponds (segment 4.1) the data can be projected directly, for the two relevant trout segments 2.1 and 2.2 a further allocation is based on the survey response shares for these segments as Destatis does not differentiate between these two segments.

The variables “Paid labour” and “Number of hours worked by employees and unpaid workers (optional)” are projected on sector level on the basis of the employment census conducted by the German Federal Employment Agency (Bundesagentur für Arbeit, BA) (see also Annex 1.2 on census).

The variables “Employment by age”, “Employment by level of education” are directly derived from the sample survey and not projected to the whole sector.

2. Calculation method for derived data:

Total turnover is projected from the sample survey to the whole sector per segment based on Destatis (total sales volume) and further used for turnover depending variables. Therefore, a correlation coefficient according to Bravais-Pearsons is applied, each for the correlation between the variables sales volume and turnover from the survey as well as between turnover and depending variables.

The variable “Value of unpaid labour” is projected by using the total number of farms from Destatis assuming that every farm is run by an unpaid owner, corresponding to the vast majority of ownerships in Germany’s aquaculture. Further, the shares of paid and unpaid (family) labour from the three-annually demographic survey provide the basis to allocate total numbers of unpaid labour to the single DCF segments of aquaculture. In the next step the number of projected full- and part-time unpaid labour is transferred to hours worked (based on survey responses) and the final value is calculated based on fictive wages for unpaid owners and family labour derived from typical German carp and trout farms (according to typical farm approach, see also information on additional

methodology below).

3. Nonresponse handling:

In the case of unit-non response that leads to an underrepresentation of one or more segments, a postal reminder on the survey/the survey itself is send out to the respective segment(s). Responses that do not include information on sales volume per species are treated as a unit-non response.

In the case of item- or partial-non-response a pairwise deletion method is applied when the amount of missing data is small. In case the amount of missing data is more severe, typical farm data will be used where appropriate as supplementary data source, similar to a cold-deck imputation. In the case of data for debts, the willingness to provide data voluntarily is often low. Data for debt are calculated from the interest payment of the enterprises, based on market interest rates for enterprises. These are compared to the data from enterprises that provided data on debt, and if not appropriate adapted to the values from the sample of previous years.

Error checks

Paper questionnaires are transferred to digital data files by means of their ID and in a final step checked for duplication to avoid double counting within further data processing. To avoid respondent errors, outliers are detected manually as subsequent step to the application of the correlation coefficient.

Data storage and documentation

1. Data storage:

Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place.

Digital data are stored on an institutional files server with access limited to persons who are in charge of the data collection and processing. Backups are created daily.

2. Documentation:

Standard Operational Procedure for typical farms: https://literatur.thuenen.de/digbib_extern/dk038513.pdf
Implementation of typical farm approach, cf. PGECON 2019: <https://datacollection.jrc.ec.europa.eu/docs/pgecon>

Revision

Revision is conducted annually on demand. This includes the allocation of segments per species and relevance of segments for data collection according to the predefined thresholds.

Confidentiality

1. Are procedures for confidential data handling in place and documented?

Yes, following Directive 2016/680 of the EU Parliament and Council.

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

Yes, following Directive 2016/680 of the EU Parliament and Council.

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

There are no external end users of confidential data.

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

No.

Sampling scheme identifier: socioeconomicAQ Census

Survey Specifications
<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.</i> <i>'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>
Sector name(s): socio economic data on aquaculture
Sampling scheme: Census (segments specified per variable)
Variables: Weight of sales per species (all segments), Employment by employment status (all segments), Employment by nationality (all segments), Employment by gender (all segments), Gross sales per species (mussel on-bottom), Operating subsidies (mussel-on-bottom, carp ponds), Subsidies on investments (mussel on-bottom), Other income (mussel on-bottom), Personnel costs (mussel on-bottom), Value of unpaid labour (mussel on-bottom), Energy costs (mussel on-bottom), Raw material: livestock costs (mussel on-bottom), Repair and maintenance (mussel on-bottom), Other operating costs (mussel on-bottom), Consumption of fixed capital (mussel on-bottom), Investments in tangible assets (net purchase of assets) (mussel on-bottom), Total value of assets (mussel on-bottom), Gross debt (mussel on-bottom), Financial income (mussel on-bottom), Financial expenditures (mussel on-bottom), Livestock used (mussel on-bottom), Paid labour (mussel on-bottom), Unpaid labour (mussel on-bottom), Number of enterprises by size category (mussel on-bottom), Employment by age (mussel on-bottom), Employment by level of education (mussel on-bottom)
Supra region(s): NA
Survey planning
Freshwater aquaculture operations for trout (ponds; tanks and raceways) and carp (ponds) larger than 0.3 ha respectively 200 m ³ as well as on-bottom blue mussel culture operations as indicated for the respective variables.
Survey design and strategy

1. Data sources:

The Federal Statistical Office in Germany (Destatis) coordinates an annual aquaculture census on production data (volume, species, number of farms, used fish farming technique per federal state). In case of the German on-bottom blue mussel cultures, the National Sea Fishery Agency (Staatliches Fischereiamt Bremerhaven, SFA) and the State Office for Agriculture, Environment and Rural Areas (Landesamt für Landwirtschaft, Umwelt und Ländliche Räume, LLUR) are in charge of control and marketing of fishery activities and collect data on landings (SFA for the sector in Lower Saxony and LLUR for activities in Schleswig-Holstein). The Federal Office for Agriculture and Food (Bundesanstalt für Landwirtschaft und Ernährung, BLE) collects data on crew and other logbook entries. Further, the German Federal Employment Agency (Bundesagentur für Arbeit, BA) registers all persons employed in Germany including monthly data on employment for freshwater and marine aquaculture covering information on number of permanent employees, causal contracts, apprentices, gender and nationalities. The Federal ministries (partly) provide annual data/sums on the provision of operating subsidies for carp ponds.

2. Sample sizes:

The applied national statistics include all authorized fish farms (all aquaculture activities are registered at the state veterinarian agencies on county level in Germany) (Destatis) for the variables listed above, whereas BA conducts a census on employment for all marine and freshwater aquaculture operations (sample sizes = 100%). SFA and LLUR collect data on landings and BLE provide census data on crew, as well as the contact information of all German mussel on-bottom producers (owner register) (sample size = 100%), which allows to address this segment fully for the remaining variables in the survey. Based on the response rate of the latter, an achieved sample size of 50% is reached. This is considered sufficiently, due to the availability of additional census data from the sources listed above.

3. Survey methods:

The standardised survey for mussel on-bottom culture is distributed by post. National statistics are partly publicly accessible (Destatis data on aquaculture production), LLUR aggregated data on landing and turnover and part of the BA data. BA data on “Employment by nationality and gender” as well as BLE data on crew and other logbook entries and SFA data on landings are specifically provided for the Thuenen Institute.

4. Additional information used in the survey strategy:

No auxiliary information used.

Estimation design

1. Calculation method for population estimate:

Destatis and LLUR/SFA data are used to project survey variables to the whole sector based on sales volume. See Annex 1.2 above for more information on PSS variable projection for freshwater fish segments.

Within the mussel census survey, the following variables are projected according to sales volume derived from LLUR/SFA landing data: “Gross sales per species”, “Operating subsidies”, “Subsidies on investments”, “Other income”, “Personnel costs”, “Value of unpaid labour”, “Energy costs”, “Raw material: livestock costs”, “Repair and maintenance”, “Other operating costs”, “Consumption of fixed capital”, “Investments in tangible assets (net purchase of assets)”, “Total value of assets”, “Gross debt”, “Financial income”, “Financial expenditures”, “Livestock used”, “Paid labour”, “Number of enterprises by size category”, “Employment by gender”, “Employment by age”, “Employment by level of education”

The data for the variable “Operating subsidies” for carp (ponds) is derived from official sources via email from the Federal ministries.

For the mussel on-bottom sector, the variable “Unpaid labour” is identified via census survey and projected to the whole sector according to BLE data on crew per owner ID. The variable “Employment by gender” for the mussel on-bottom segment is projected with BA data from the census survey to the whole sector.

For all segments, the variable “Employment by nationality” is derived directly from the BA census on employment.

The variables “Employment by age”, “Employment by level of education” for the mussel on-bottom segment are directly derived from the census survey.

2. Calculation method for derived data:

Total turnover is projected from the sample survey to the whole sector per segment based on LLUR/SFA landing and marketing data and further used for turnover depending variables. Therefore a correlation coefficient according to Bravais-Pearsons is applied, each for the correlation between the variables sales volume and turnover from the survey as well as between turnover and depending variables.

The variable “Value of unpaid labour” is projected by unpaid FTE * average remuneration per paid FTE.

3. Nonresponse handling:

Not relevant for national statistics.

In the case of unit-non response that leads to an underrepresentation of the mussel on-bottom segment via census survey, mussel producer organisations are contacted personally. In the case of item- or partial-non-response a pairwise deletion method is applied when the amount of missing data is negligible. Due to the personal contact to producer organisations, no severe non-response occurred in the past.

Error checks

Paper questionnaires are transferred to digital data files by means of their ID and in a final step checked for duplication to avoid double counting within further data processing. To avoid respondent errors, outliers are detected manually as subsequent step to the application of the correlation coefficient.

Data storage and documentation

1. Data storage:

Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place.

Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily.

2. Documentation:

(<https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Land-Forstwirtschaft-Fischerei/einfuehrung.html> (access on 22/09/2024; only available in German))

<https://statistik.arbeitsagentur.de/cae/servlet/contentblob/4412/publicationFile/858/Qualitaetsbericht-Statistik-Beschaeftigung.pdf> (access on 22/09/2024; only available in German)

Revision

Revision is conducted annually on demand.

Confidentiality

1. Are procedures for confidential data handling in place and documented?
Yes, following Directive 2016/680 of the EU Parliament and Council.
2. Are protocols to enforce confidentiality between DCF partners in place and documented?
Yes, following Directive 2016/680 of the EU Parliament and Council.
3. Are protocols to enforce confidentiality with external users in place and documented?
There are no external end users of confidential data.
4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation.
No.

Sampling scheme identifier: socioeconomicAQIndirect

Survey Specifications
<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.</i> <i>'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>
Sector name(s): socio economic data on aquaculture
Sampling scheme: Other: Indirect (segments specified per variable)
Variables: FTEs by gender (all segments), Full-time equivalent (FTE) (all segments), Unpaid labour by gender (all segments), Unpaid labour (trout and carp segments), Number of enterprises by size category (trout and carp segments), Number of hours worked by employees and unpaid workers (optional) (mussel on-bottom), Livestock used (trout and carp segments), Raw material: livestock costs (trout and carp segments)
Supra region(s): NA
Survey planning
Freshwater aquaculture operations for trout (ponds; tanks and raceways) and carp (ponds) larger than 0.3 ha respectively 200 m ³ as well as on-bottom blue mussel culture operations.
Survey design and strategy
1. Data sources: The probability sample survey on economics and social variables for trout and carp segments and the census survey for mussel on-bottom are conducted via standardised questionnaires. The Federal Statistical Office in Germany (Destatis) coordinates an annual aquaculture census on production data (volume, species, number of farms, used fish farming technique per federal state) including information on hatcheries for trout and carp production. 2. Sample sizes: More information on determination of sample sizes can be found within Annex 1.2 referring to the probability sample survey for the freshwater sector and the Annex 1.2 referring to data collection by census.

3. Survey methods:

Both standardised questionnaires are distributed by post. For the mussel on-bottom segment personal contact with producer organisations is made beforehand. Queries are answered by telephone and email.

4. Additional information used in the survey strategy:

Public calendar (for public holiday information), information on the amount of holidays for fulltime workers and on German full-time employees hours in a usual week (EUROSTAT) are utilized to calculate FTE.

Typical farms are used as supplementary data source for farm economics. More information can be found within Annex 1.2 referring to the probability sample survey for the freshwater sector.

Estimation design

1. Calculation method for population estimate:

The two FTE variables are projected to the whole sector based on BA census data on employment for all segments and additional information on (public) holidays and working hours per week. For unpaid labour by gender the share of female/male family workers per segment from the three annually standardised questionnaire on demographic data is projected to the number of farms derived from Destatis (freshwater aquaculture) and BLE (mussel on-bottom).

Number of enterprises by size category for the freshwater segments is indirectly projected from number of employees of the three-annually standardised questionnaire on demographic data to the total number of farms derived from Destatis statistics.

The variable “Number of hours worked by employees and unpaid workers (optional)” for the mussel segment is indirectly derived from BLE census data in combination with the responses from the three annually standardised questionnaire on demographic data.

Data for the variable “Livestock used” for the two trout segments (ponds; tanks and raceways) and carp ponds are indirectly derived from the total number of juvenile fish from hatcheries from National statistics (Destatis). The typical biomass of stocking fish which serves as calculation basis for the variable “Livestock used” for the two derives from typical farm datasets. To derive the variable “Raw material: livestock costs”, projections of stocking fish prices are used to calculate livestock costs based on the variable “Livestock used”.

2. Calculation method for derived data:

Public calendar (for public holiday information), information on the amount of holidays for fulltime workers and on German full-time employees hours in a usual week (EUROSTAT) are utilized to calculate FTE variables based on the information of number of hours worked from the standardised surveys and the information of employees from BA statistics.

3. Nonresponse handling:

In the case of unit-non response that leads to an underrepresentation of one or more segments, a postal reminder on the survey/the survey itself is send out to the respective segment(s). Responses that do not include information on sales volume per species are treated as a unit-non response within the freshwater survey.

In the case of item- or partial-non-response a pairwise deletion method is applied when the amount of missing data is small.

Error checks

Paper questionnaires are transferred to digital data files by means of their ID and in a final step checked for duplication to avoid double counting within further data processing.

Data storage and documentation
1. Data storage: Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place. Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: Standard Operational Procedure for typical farms: https://literatur.thuenen.de/digbib_extern/dk038513.pdf Implementation of typical farm approach, cf. PGECON 2019: https://datacollection.jrc.ec.europa.eu/docs/pgecon
Revision
Revision is conducted annually on demand.
Confidentiality
1. Are procedures for confidential data handling in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council. 2. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, following Directive 2016/680 of the EU Parliament and Council. 3. Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data. 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. No.

Sampling scheme identifier: Census on fish processing by Business Register

Survey Specifications
<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.</i> <i>'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>
Sector name(s): Socio economic data on fish processing
Sampling scheme: Census
Variables: Number of enterprises, Number of enterprises by size category, Number of persons employed,
Supra region(s): All Supra regions
Survey planning
All Fish Processing Segments
Survey design and strategy
1. Data sources: The Federal Statistical Office in Germany (Destatis) holds a database (statistical business register = "Unternehmensregister"), that is a regularly updated database containing information on establishments, legal units, enterprises and groups of enterprises in all economic sectors and their relations with one another. It containing data for variables <i>Number of enterprises</i> and <i>Number of enterprises by size</i>. 2. Sample sizes: Census – all units are sampled (100%). In order for a legal unit to be included in the tabular analysis of the business register, it must exceed certain relevance thresholds in terms of turnover and/or employees. The legal unit becomes relevant for evaluation if it has a turnover of more than EUR 22,000 in the reporting year or if it has at least one employee(s) subject to social security contributions or at least 12 low-paid employees cumulatively over the 12 months of the reporting year. 3. Survey methods: Existing official statistics and reports are used. Data handling will be done by decentralised Statistical Offices of the Federal States, which are responsible for the maintenance of the register units. These administrative and statistical data are delivered to the Federal Statistical Office. 4. Additional information used in the survey strategy: No additional information used.
Estimation design
1. Calculation method for population estimate: As sampling scheme is census no estimation is required. 2. Calculation method for derived data: No derived data. 3. Nonresponse handling: As the survey is legally binding there is no nonresponse.
Error checks
Statistical offices of the federal government and the federal states check implausible and invalid answers and are corrected by machine or upon query.
Data storage and documentation

1.	Data storage: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily.
2.	Documentation: Additional methodological documentation can be found on the webpage of the Federal Statistical Office in Germany (www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Unternehmen/unternehmensregister.html)
Revision	
Methodology will be reviewed when necessary, for example if changes regarding the methodology or segmentation used by the Federal Statistical Office are implemented.	
Confidentiality	
1.	Are procedures for confidential data handling in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council.
2.	Are protocols to enforce confidentiality between DCF partners in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council.
3.	Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data.
4.	Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. In the case that only one or two units are represented, figures are anonymised and replaced by “*” for confidentiality reasons.

Sampling scheme identifier: Census on fish processing by Federal Employment Agency

Survey Specifications
<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.</i> <i>'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>
Sector name(s): Socio economic data on fish processing
Sampling scheme: Census
Variables: Employment by gender, Employment by nationality
Supra region(s): All Supra regions
Survey planning
All Fish Processing Segments
Survey design and strategy
1. Data sources: Data are submitted by companies to the authorities in charge following legal obligation. Data on <i>Number of persons employed</i>, <i>Employment by gender</i> and <i>Employment by nationality</i> are collected by Federal Employment Agency (FEA). In the social security reporting procedure, employers submit reports on all employees subject to social security contributions and marginal part-time employees. 2. Sample sizes: Census – all units are sampled (100%). 3. Survey methods: The electronic reports are transmitted to the FEA via health and pension insurance providers. There, the data is processed in statistical employment histories and analysed. 4. Additional information used in the survey strategy: No additional information used.
Estimation design
1. Calculation method for population estimate: All companies are obliged to report these data, therefore no population estimation is carried out. 2. Calculation method for derived data: No estimation is necessary for the variables as directly derived from the census. 3. Nonresponse handling: As the survey is legally binding there is no nonresponse.
Error checks
The Federal Employment Agency checks implausible and invalid answers and are corrected by machine or upon query.
Data storage and documentation
1. Data storage: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: Additional methodological documentation can be found on the webpage of the FEA

(https://statistik.arbeitsagentur.de/DE/Statischer-Content/Grundlagen/Methodik-Qualitaet/Qualitaetsberichte/Generische-Publikationen/Qualitaetsbericht-Statistik-Beschaeftigung.pdf?__blob=publicationFile&v=8)
Revision
Methodology will be reviewed when necessary, for example if changes regarding the methodology or segmentation used by the FEA are implemented.
Confidentiality
1. Are procedures for confidential data handling in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council. 2. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council. 3. Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. In the case that only one or two units are represented, figures are anonymised and replaced by “*” for confidentiality reasons.

Sampling scheme identifier: Probability Sample Survey on fish processing companies with 20 or more employees by Federal Statistical Office

Survey Specifications
<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.</i> <i>'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>
Sector name(s): Socio economic data on fish processing
Sampling scheme: Probability Sample Survey
Variables: Consumption of fixed capital, Energy costs, Financial expenditures, Full-time equivalent (FTE), Gross investments, Operating subsidies, Other income, Other operating costs, Payment for external agency workers, Personnel costs, Purchase of fish and other raw material for production, Turnover
Supra region(s): All Supra regions
Survey planning
All companies with 20 or more employees.
Survey design and strategy
1. Data sources: Questionnaires are done by the Federal Statistical Office in Germany (Destatis). It conducts a probability sample survey on several cost items with a threshold of companies with 20 and more employees ("Kostenstrukturhebung im Verarbeitenden Gewerbe sowie des Bergbaus und der Gewinnung von Steinen und Erden") for calculating the variables <i>Consumption of fixed capital, Energy costs, Financial expenditures, Full-time equivalent (FTE), Gross investments, Operating subsidies, Other income, Other operating costs, Payment for external agency workers, Personnel costs, Purchase of fish and other raw material for production, Turnover</i>. 2. Sample sizes: The sample size is 45% of the number of fish processing companies. This is a standardized sampling rate which is commonly used by Destatis. 3. Survey methods: The data are collected as part of a standardized postal survey and in electronic form. The owners or managers of the companies are obliged to provide information. 4. Additional information used in the survey strategy: No additional information used.
Estimation design
1. Calculation method for population estimate: The samples are raised with proportional to the number of companies. 2. Calculation method for derived data: No derived data. 3. Nonresponse handling: In order to compensate for the lack of information due to non-response, certain imputation procedures are used in the survey. Companies that do not participate in the survey even though they are part of the reporting group and have been legitimately invited to report are taken into account in

the extrapolation process and estimated automatically when aligned with the results of the investment survey. The lack of important variables is compensated by manually filling in the missing information, taking into account the previous year's values. If no previous year's values are available, shift-specific averages are used.
Error checks
The quality of the available data can be regarded as very high due to the fact that the data on the fish processing industry by the Federal Statistical Office (Destatis) are collected under European Structural Business Statistics (SBS) standards. The stratified random sampling covering around 45% of the sectors larger companies allows high quality of the data. The obligation to provide information ensures a high response rate and thus increases the accuracy of the results. For these reasons, no measurement errors are expected.
Data storage and documentation
1. Data storage: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily. 2. Documentation: There is a quality report available on the website of Destatis with additional methodological information https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Industrie-Verarbeitendes-Gewerbe/kostenstruktur-verarbeitendes-gewerbe.html
Revision
Destatis is changing the classification of the cost structure survey from "legal units" to "EU company definition". This is a very time-consuming process. The publication of the data via the online database has been discontinued from the reference year 2021 on. However, Destatis has agreed to make the data available on request, to interested users until the restructuring will be completed.
Confidentiality
1. Are procedures for confidential data handling in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council. 2. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council. 3. Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data 4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. In the case that only one or two units are represented, figures are anonymised and replaced by “*” for confidentiality reasons.

Sampling scheme identifier: Gross debt and Total assets on fish processing companies with 20 or more employees by Financial Accounts

Survey Specifications
<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.</i> <i>'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>
Sector name(s): Socio economic data on fish processing
Sampling scheme: Non-probability sampling
Variables: Gross debt, Total assets
Supra region(s): All Supra regions
Survey planning
All companies with 20 or more employees.
Survey design and strategy
1. Data sources: Data on the variables <i>Gross debt</i> and <i>Total assets</i> are not included in any of the available national statistics and cannot be obtained by any administrative bodies. For this reason, publicly available financial accounts (https://www.bundesanzeiger.de/pub/de/start?0) are used as basis for estimation. 2. Sample sizes: The sample consists of the publicly available financial accounts of the 10 largest German fish processing companies. These are legal documents which have to follow standardized accounting principles. However, this source of data is limited to these ten companies. No other sources are available, surveys with questionnaires resulted in unsatisfactory responses in terms of both quantity and plausibility. Data for these ten companies have proven to be more reliable for estimating figures from the entire segment. 3. Survey methods: The financial accounts are online available (https://www.bundesanzeiger.de/pub/de/start?0). The values of the variable <i>Gross debt</i> and <i>Total assets</i> are extracted manually. 4. Additional information used in the survey strategy: No additional information used.
Estimation design
1. Calculation method for population estimate: Estimation is based on turnover. The turnover documented in the financial accounts of the sample are related to the total turnover of the segment as derived from destatis. 2. Calculation method for derived data: No derived data. 3. Nonresponse handling: Not applicable
Error checks

Certain companies are obliged to publish their accounting documentation online in the “Bundesanzeiger”. Due to the existing disclosure requirements, no errors in the financial reports used as primary source are expected.

Data storage and documentation

1. Data storage: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily.
2. Documentation: Documents are approved by auditors before publication.

Revision

Methodology will be reviewed when necessary at regular intervals for examples if changes regarding the methodology or segmentation used by the are implemented. It is regularly checked whether there are official statistics or further information to determine values for these variables.

Confidentiality

1. Are procedures for confidential data handling in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council.
2. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council.
3. Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data
4. Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. Data which are used are publicly available.

Sampling scheme identifier: Census on fish processing by Questionnaires of Thünen Institute

Survey Specifications
<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.</i> <i>'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>
Sector name(s): Socio economic data on fish processing
Sampling scheme: Census
Variables: Employment by level of education, Employment by age, Financial income, Subsidies on investments, Unpaid labour, Weight of raw material by country of origin, Weight of raw material by production environment, Weight of raw material by species, Weight of raw material by type of processed material
Supra region(s): All supra regions
Survey planning
All Fish Processing Segments.
Survey design and strategy
1. Data sources: The Thünen Institute of Sea Fisheries conducts an additional standardised survey via mail questionnaires for the variables for which no data are available via other administrative bodies, i.e. <i>Financial income, Subsidies on investments, Unpaid labour, Weight of raw material by country of origin, Weight of raw material by production environment, Weight of raw material by species and Weight of raw material by type of processed material, Employment by level of education and Employment by age.</i> Experiences from former years have shown that information on this regard are achievable by questionnaires and/or telephone recalls, so this methodology will be maintained. 2. Sample sizes: Census – 100% sampling rate. The address database contains a larger number of addresses than listed in the official register, as the database contains companies that are active in fish processing according to our own research, but it is not clear whether this is their main or non-main activity. All companies included in the database are contacted for the survey. In the questionnaire, the companies are asked about their main activity and only questionnaires from companies whose main activity is fish processing are considered for the analysis of these variables. 3. Survey methods: Questionnaires are sent to companies. The standardised survey is distributed by post, queries are answered by telephone and e-mail. Missing entries are interpreted as item non-response, while “slash” entries are treated as zero. 4. Additional information used in the survey strategy: Conduct of the survey by the Thünen Institute of Sea Fisheries is time-consuming and costly. Furthermore, experience shows that frequent surveys of business reduce the response rate. Therefore, data collection by means of questionnaires is only carried out every two years (for two survey years). Due to the use of auxiliary information the effect of bias is counteracted.

The data is checked on the basis of additional information on age, fulltime and part time, employment status and education which can be accessed on the website of the Federal Employment Agency: https://statistik.arbeitsagentur.de/SiteGlobals/Forms/Suche/Einzelheftsuche_Formular.html?nn=1523064&topic_f=beschaeftigung-sozbe-bo-heft
Estimation design
1. Calculation method for population estimate: The number of the official register is used for population assumption. The variables <i>Employment by level of education</i> and <i>Employment by age</i> are projected on sector level on the basis of the employment census conducted by the German Federal Employment Agency. As reference for projection of the variable <i>Financial income</i> to the whole sector the number of enterprises per size category are used. <i>Weight of raw material by country of origin</i>, <i>Weight of raw material by production environment</i>, <i>Weight of raw material by species</i> and <i>Weight of raw material by type of processed material</i> are projected to the number of enterprises per size category. The responses to <i>Subsidies on investments</i> within the survey are projected to the number of enterprises per size category. The publication of payments within the European Maritime and Fisheries Fund (EMFF) can be accessed here: https://www.agrar-fischerei-zahlungen.de/Fischerei_empfaenger and serve as auxiliary information for validation and plausibility checks together with further consultation with regional officials for clarification on detailed uses of EMFF funds. Missing entries are interpreted as item non-response, while “slash” entries are treated as zero. 2. Calculation method for derived data: No derived data. 3. Nonresponse handling: Company non-responses are expected to be random, thus the data will be extrapolated accordingly.
Error checks
Paper questionnaires are transferred to digital data files by means of their ID and in a final step checked for duplication to avoid double counting within further data processing. Processing errors are, as much as possible, addressed through comparison with related data sets (e.g. time series). In addition, if information is clearly inaccurate, these inconsistencies are clarified by telephone or e-mail.
Data storage and documentation
1. Data storage: Data are stored in two ways, as physical files (paper questionnaires) and as digital data files. The paper questionnaires are stored in an archive and include no personal information, but an ID. The link between the sender information and the ID is stored in a separate place. 2. Documentation: Digital data are stored on an institutional fileserver with access limited to persons who are in charge of the data collection and processing. Backups are created daily.
Revision
Methodology will be reviewed when necessary at regular intervals.
Confidentiality

1. Are procedures for confidential data handling in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council.
2. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes – following Directive 2016/680 of the EU Parliament and Council.
3. Are protocols to enforce confidentiality with external users in place and documented? There are no external end users of confidential data
Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. As the segments consists of several companies, it is not expected to face confidentiality issues with publication.