

Technical University of Denmark, National Institute of Aquatic Resources

**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

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

2025-2027

Version 2

Copenhagen, Denmark – 28 October 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 Danish data collection programme is organised and carried out as in previous years among the involved partners on the basis of area of national responsibility and expertise. Denmark has gradually implemented data collection methods and quality assurance systems as they have been developed through the various ICES expert, study groups and workshops. Therefore, in this work plan there are no major methodological changes compared to the previous years' work plans. Attention has been given to the requested focus on by-catch of marine sensitive species and fisheries impact on the seabed (Marine Action Plan etc.)

National institute of Aquatic Resources (DTU Aqua) is responsible for the following tasks:

Biological data on exploited biological resources caught by Union commercial and recreational fisheries.

Data on the activity of Union fishing vessels within and outside Union waters.

Data on the impact of Union fisheries on marine biological resources and marine ecosystems within and outside Union waters.

Statistics Denmark (DST) for:

Socioeconomic data on fisheries.

Socioeconomic and environmental data on aquaculture.

and **Department of Food and Resource Economics (IFRO)** for:

Socioeconomic data on the fish processing sector.

Organisational setup

In Denmark, the National institute of Aquatic Resources (DTU Aqua), Technical University of Denmark is assigned as the coordinating institute for the DCF activities. Director for Public Sector Consultancy, Anja Gadgård Boye, DTU Aqua is assigned as the National Correspondent.

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The work in Denmark is carried out by three partners:

1. National institute of Aquatic Resources (DTU Aqua) is an institute under the Technical University of Denmark. The institute carries out research, monitoring and provides advice concerning sustainable exploitation of live marine and freshwater resources. Furthermore, the institute is responsible for providing data for ICES stock assessment work and participates in various ICES assessment working groups, planning and expert groups as well as in the ACOM work. The institute is having a public sector consultancy contract with the Danish Ministry for Agriculture, Fisheries and Food.

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2. Department of Food and Resource Economics (IFRO) has its origins in the traditions and methodology developed in the Danish agriculture, forestry and food production sectors, in which the close consultative relationships developed between the private sector, public authorities and research institutions contributed significantly to positive outcomes. Research, education, research-based public-sector services and broader dissemination are IFRO's main tasks, particularly within the fields of environment, natural resources, global development, food and agriculture as well as consumption, bioethics and governance.

Danish Food and Resource Economics Institute (FOI)
Rolighedsvej 25
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3. Statistics Denmark (DST) The aim of the institution is to collect, process and publish statistical information on social and economic conditions. Additionally, DST contributes to the international statistical cooperation. Furthermore, DST is also actively involved in the statistical activities in the UN, OECD, IMF and in the Nordic countries, etc. DST is also carrying out statistical tasks for private and public customers.

Statistics Denmark
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A Steering Group has been established with members from all four involved Institutes. The main objective of the Steering Group is to coordinate the work to be carried out according to the DCF. DTU Aqua is chairing the steering group.

Information on the Danish DCF activities can be found at:

<https://www.dcf-denmark.dk/>

DNK is participating in 3 RCGs; RCG NANSEA, RCG Baltic and RCG ECON, for further details see table 1.2

Text Box 1a: Test studies description

Region: All Regions

Test study: 1 Genetics

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

Name of the regional test study: 1 Genetics

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027

Denmark is including genetics in data collection programs, in a collaboration program, cod in Northern Self area

In the Baltic Denmark is sampling genetics on cod in SD 24, the mixed area between the Eastern and Western Baltic.

Test study: 2 Diadromous species data collection

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

Name of the regional test study: 2 Diadromous species data collection

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027.

Denmark is following the agreements decided on the diadromous species data collection.

Region: Baltic

Test study: 3 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 regional test study: 3 Regionally coordinated stomach sampling program

RWP Baltic 2025-2027.

Denmark is participating in the stomach sampling in the Baltic Sea through in BITS surveys on cod and turbot. Presently Denmark is working up the stomach samples as well however, if funding is not sufficient in coming years this will be terminated.

Region: North Sea and Eastern Arctic

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

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

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

RWP NANSEA 2025-2027.

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

Denmark has now incorporated the Sea bass in the offsite questionnaire.

Test study: EM- Kattegat trawlers

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

Name of the national test study: EM-Kattegat trawlers

1. Aim of the test study

The aim of the study will be to test if the EM in the Kattegat trawler fleet can be used as an alternative to an observer sampling program.

The study will test if the relevant species can be observed with EM and if an additional sampling program collecting biological data through a co-sampling program can be introduced. The study will work both with trained personals to go through the EM to identify the amounts of the relevant species that are either kept onboard or discarded as well as their individual length. Further, the study will investigate the possibility to use machine learning for correct species identification. The study will also analyze the results derived from the control agency fleet and compare it with conducted observer trips

EM documentation will give the opportunity for better identification on by catch of sensitive species in line with the Marine Action Plan, as a more data on more trips can be investigated.

2. Duration of the test study

The study will start in the beginning of 2025 and depending on the willingness of the fleet to continue the study it will be until 2027. If vessels continue to keep the EM on a longer time scale the EM fleet will be incorporated as a standard sampling program for catch of commercial and sensitive species.

https://fiskeristyrelsen.dk/Media/638597361463094390/Evaluation_Electronic_Monitoring_in_Kattegat_2021-2023_.pdf

3. Methodology and expected outcomes of the test study

In 2025 the mandatory EM on 72 trawlers fishing in Kattegat in a mixed Neprophs and fish fishery has been changed into three different categories:

- 1) A selection of the vessels will continue to be part of the control system and all data will be made available for the agency as has been the case in 2024,
- 2) A selection of the fleet between 5-20 vessels will on a voluntary basis keep the EM system (including CCTV) on board but the information will no longer be made available for the control agency, but be made available to DTU Aqua,
- 3) A part of the fleet will remove the EM system.

The 2 first selection will be part of the test study.

- 1) From 2020 a selection of the trawler fleet in Kattegat has been equipped with EM. A fraction (5%) of the EM trips has manually been evaluated by the Danish control agency, with species detection as well as length measurement on the most relevant species. In 2025 it is unsure how many of the vessels will continue as the program will be voluntary again. It is the aim of this study to test how to use the length measurements from the EM in scientific stock assessment and to compare the results with the observer trips conducted on the same fleet segment.
- 2) It was decided that a selection of the vessels would continue to have EM installed and that this data would be made available for DTU Aqua in a test period to investigate the possibility of using EM data as an alternative to observer coverage which is a relatively expansive way to collect data. However, there are several challenges in the EM data that need to be solved before it can be an alternative to observer coverage. It is important that the species are correctly identified and that it is possible to see the length of the fish, as all representative sampling needs be derived from the CCTV. Then an additional sampling program on biological data should be sampled from the fisher to get data on age and weight. The biological sampling needs to be coordinated with self-sampling schemes including information on how to receive the samples.

Further, the project will work with machine learning to test if it is possible to use AI for species recognition and size measurements to even further reduce the cost on the program and to ensure a common sampling across personals but in the longer run also in a regional scale.

Test study: Observer trips North Sea Gillnetters

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

Name of the national test study: Observer trip North Sea Gillnetters

1. Aim of the test study

Gillnetters in the North Sea have only been sampled in a self -sampling program in former time or in our DNK EM – ETP sampling program. The reason has been that the larger part of the catch and discard has been conducted in the active fleet. However, in later years the

gillnetters have become more important in the human consumption fisheries and a gillnet sampling program will be tested in the North Sea

2. Duration of the test study

The study will be tested and conducted in 2025-2027.

3. Methodology and expected outcomes of the test study

A similar vessel selection and sampling protocol as is used in the Baltic Sea and Kattegat will be used (see Annex 1.1 observer at sea)

Text Box 1b: Other data collection activities

Region: All Regions

Activity: 1 - RCGs Secretariat

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

Name of the regional activity: 1 - RCGs Secretariat

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027.

Denmark agrees to the principle of implementation of a long-term secretariat in support of the work of all RCGs and the aim to secure a long-term, uninterrupted support.

Activity: 2 - Regional data base and estimation System (RDBES)

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

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

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027

Denmark supports the ongoing work on the RDBES and agrees that the RCGs should check the data quality in relation to RCG work, and is actively involved in RDBES training sessions, workshops and working groups.

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

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

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

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027.

Denmark is participating actively in RCG ISSGs.

Activity: 4 - Smart Dots

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

Name of the regional activity: 4- Smart Dots

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027

Denmark is engaged in SmartDots exchanges and workshops, and national experts are trained to use SmartDots.

Denmark has a national version of SmartDots (AquaDots) which is used for internal quality checking.

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

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

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

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027.

Denmark is uploading data to RDBES ensuring that the fisheries overviews are as complete as possible regarding the Danish fisheries.

SECTION 2: BIOLOGICAL DATA

Text Box 2.3: Diadromous species data collection in freshwater

Region: All Regions

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.

RWP NANSEA 2025-2027 and RWP Baltic 2025-2027.

There is no formal agreement for diadromous.

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

Method selected for collecting data.

Eel

Recruitment

Monitoring glass eel recruitment in three small brooks, Klitmøller Å, Nors Å and Slette Å. The glass eel recruitment will be monitored in each brook by electrofishing (Moran-Zippin method) two or three stations, close to the seashore, repeated three times during the year (May –August).

In Hellebækken, at River Kolding Å and in River Gudena elvers will be caught by eel ladder traps at weirs from 1 April - 31 October.

In Vester Vedsted assessment of the standing stock (all year classes) will be done by electrofishing 4 river stations three times a year, providing a relative index of the standing stock.

End-users have not requested information on age for the assessments, furthermore no age validation method is agreed upon. Therefore, Denmark is presently not reading eel otoliths.

Silver eel escapement

In River Klitmøller the silver eel-escapement will be measured using a trap catching out-migrating silver eel. The eel trap will be visited approximately 3 times a week from 1 September - 31 October.

In River Ribe, the silver eel escapement will be monitored using a capture fishery situated in the lower part of River Ribe. The efficiency of the fyke-net fishery will be estimated by the mark/recapture (Petersen) method.

Salmon

In order to follow the recruitment and status for the populations, information on parr abundance (density) and length distribution of salmon (*Salmo salar*) will be collected in 6 rivers in Western Jutland. Densities of 0+ and older parr will be determined by electrofishing (Moran-Zippin method) 30 sites in one of the rivers Storå, Varde Å, Sneum Å, Kongeå or Ribe Å each year and 40 sites in the river Skjern Å all years.

In order to estimate the recruitment of salmon smolt the smolt run will be estimated by catches in a smolt trap in a tributary to the river Skjern Å. The trap will be operated bi-annually. Efficiency of the trap will be determined by the mark/recapture (Petersen) method.

In order to follow the status for the salmon spawning populations, the number, sex and length composition of adult spawners entering the natal spawning stream will be collected for Atlantic salmon (*Salmo salar*) in 6 rivers in Western Jutland (two rivers per year). Population size will be determined by the mark/recapture (Petersen) method.

Information on freshwater recreational catches of salmon are collected by self-reporting by anglers in web-based systems. Information collected encompass number, length, weight, harvested or returned to the river, origin (wild or hatchery raised).

Sea trout

In order to follow the recruitment and status of sea trout (*Salmo trutta*) across the country, information on parr abundance (density) and length distribution will be collected in 20 rivers in different streams across the country.

Densities of 0+ and older parr will be determined by electrofishing (Moran-Zippin method).

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 Baltic 2025 – 2027.

DNK agrees and supports that recreational fisheries data should be integrated into the RDBES and is working to implement an off-site national multispecies survey, this will hopefully be implemented in 2026.

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

National sampling schemes outside RWP

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

Offsite questionnaire: the survey is an off-site recall web-based survey and is targeting all license holders (1 year license) with a Danish citizenship. A fishing license is mandatory in Denmark, for people between 18 – 65 years of age, when fishing in the sea. The target population is all recreational anglers/fishers in Denmark with a valid license. The survey is based on two sampling frames: one for passive gear license holders and one for angling licenses. A simple random approach is used to get a subsample from the total list of license holders. PSU is the passive gear fisher or angler. The survey is conducted on a bi-annually basis. The respondents are asked e.g. to give information on their fishing effort and catches (harvested and released components) for all mandatory species according to the EU regulation. Around 3000 respondents from each sampling frame participate in the survey each year. The respondent rate is around 40%. The answers (mean catch per angler/fisher per year) are extrapolated to population level by multiplying with the total number of anglers/fishers) for a given year.

Onboard_interview: The on-site survey is targeting charter-boat anglers in the ICES SD23. The target population is all tour boat anglers in the ICES SD23. The sampling frame is a list of all the Danish charter boats in the ICES SD23. The coverage and the sampling intensity of the charter boats trips (PSU) was previously based on information on the number of trips for each boat in each quarter (strata). The sampling was probability proportional to size based (PPS), the more trips per quarter the higher the sampling effort. However, since the recreational cod fishery in the western Baltic Sea is prohibited, the coverage and sampling intensity is now non-probability based. This can change back to a probability-based sampling design if the recreational cod fishery opens again.

The survey gives information on the cod catches (harvested and released components) per trip per angler (SSU), biological information on the catches (age, length and weight). The information on cod catches/biological data is used to adjust offsite questionnaire survey data for cod in the western Baltic Sea (ICES SD22, 23 and 24) which is used in the stock assessment for the western Baltic cod.

Access point_interview: The on-site survey is targeting trolling anglers in the Baltic Sea sailing from the Island of Bornholm. The survey is an access-point survey, where a clerk interviews trolling anglers when they return to the harbour after a finished fishing trip. The sampling is not probability based. The survey gives information on mean catches (harvested and released components) of Baltic Salmon and sea trout per angler per trip.

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 NANSEA 2025 – 2027.

DNK agrees and supports that recreational fisheries data should be integrated into the RDBES and is working to implement an off-site national multispecies survey.

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

National sampling schemes outside RWP.

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

Offsite questionnaire: the survey is an off-site recall web-based survey and is targeting all license holders (1 year license) with a Danish citizenship. A fishing license is mandatory in Denmark, for people between 18 – 65 years of age, when fishing in the sea. The target population is all recreational anglers/fishers in Denmark with a valid license. The survey is based on two sampling frames: one for passive gear license holders and one for angling licenses. A simple random approach is used to get a subsample from the total list of license holders. PSU is the passive gear fisher or angler. The survey is conducted on a bi-annually basis. The respondents are asked e.g. to give information on their fishing effort and catches (harvested and released components) for all mandatory species according to the EU regulation. Around 3000 respondents from each sampling frame participate in the survey each year. The respondent rate is around 40%. The answers (mean catch per angler/fisher per year) are extrapolated to population level by multiplying with the total number of anglers/fishers) for a given year.

Text Box 2.5: Sampling plan description for biological data

Region: Baltic

Sampling scheme name: Small Pelagics in the Baltic

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): Small Pelagics in the Baltic

RWP Baltic 2025-2027.

Denmark agrees to follow the sampling scheme as described in Annex 1.1 of the RWP Baltic 2025-2027.

Denmark is further conducting an on-shore sampling from the vessels refusing to participate in the co-sampling program.

Region: All Regions

Sampling scheme name: DNK Market 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): DNK Market sampling

Purpose: Sampling scheme collecting biological samples from commercial landings at markets from a list of selected stocks according to table 2.1. Every year the list of PSUs is updated.

The PSU is defined as harbour*week. The stocks selected for market sampling are listed by the harbours where the fish are sold. The selected harbours are ranked by weight of landings, percentage of total landings, number of landings by harbour and the costs of getting to the harbour, and only harbours where 80% of the landings of the selected stocks are landed have been included in the sampling programme based on the previous year's landing data, and in the NWP 2025-2027 the average annual number of PSUs in the period 2021-2023 are indicated under the sampling frame 'On-shore PSUs sampled'. The PSUs not included in the sampling scheme are mainly smaller harbours and the number of PSUs are indicated under the sampling frame 'On-shore PSUs unsampled'. A total of 23 harbours/ landings sites have been selected based on 2021-2023 data, and the list of selected harbours is updated annually based on the previous years' data, and the number of samples per quarter depends on the stock.

Temporal Stratification: Quarterly.

Sampling scheme name: DNK EM – ETP species bycatch 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): DNK EM – ETP species bycatch sampling

Purpose: Sampling scheme collecting detailed information on bycatches of sensitive species in net fisheries and a census of the fishing activity of selected vessels using video-based electronic monitoring (EM).

The ETP (Endangered, Protected, and Threatened) species bycatch monitoring programme uses video-based EM to collect fine-scale spatiotemporal data on the distribution and magnitude of ETP species bycatch in commercial set net fisheries and to associate these to the corresponding fishing effort measured at haul level (i.e. as the product of soak duration and net length). The PSU is defined as "vessel", and at least one haul within each fishing trip with EM analysed for bycatch of ETP species. Sampling is not randomised; instead, participating gillnet fishers are volunteers and receive a compensation in the form of an additional quota (taken from the Danish scientific quota, which represents 2% of the quota of each stock under quota). Vessels are selected according to their location and average yearly fishing effort. All species of marine mammals, seabirds, and elasmobranchs (as well as chelonians) are registered and identified at the lowest taxon possible down to species level. Presently, captures of non-target fish are not registered. In the NWP 2025-2027, the average

annual number of PSUs ($n = 10$) is maintained compared to the previous 2021-2023 period, which corresponds to an increase in sampling effort owing to the reduction in the number of active vessels in Denmark in recent years.

This monitoring program also provides data and information in relation to the Marine Action Plan on by-catches on harbour porpoises. The data collected is used to estimate the by-catch rate for the harbour porpoises in the Danish gillnet fisheries.

Temporal Stratification: Quarterly.

Sampling scheme name: DNK At-sea 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.

Sampling scheme name: DNK At-sea Observer

Purpose: At-sea Observer Programme for length, age, weight data of landings and discards of demersal species as well as for brown shrimps and deep water shrimp. All species caught are registered for total weight and length but only selected species for the area are collected for age and individual weight. The main aim of the observer trips is to measure the discarded part and only weight by species is recorded for the landed part.

Denmark has applied 6 fleet lists (sampling frames) for the at sea observer programme with a similar selection design however, with different target species and effort. The vessel list are presently covering:

- Beam trawlers - Crangon - North Sea
- Trawlers – Pandalus - Skagerrak
- Trawler / seiners - Mixed - Baltic
- Gillnets - Demersal - Baltic
- Trawler / seiners - Mixed - Skagerrak
- Trawler / seiners - Mixed – North Sea

Effort allocation (observer trips) between the vessel lists are based on the total effort (trips) available allocated according to the numbers of trips in each vessel list group. Each stratum has incorporated a minimum number of 2 trips. Each vessel list is stratified by quarter. Each vessel on a given list has equal chance of being selected.

The species list has been evaluated in 2024 and some species are now grouped in families to ensure a more correct species ID.

The fishermen answers are recorded and refusal rates calculated for each vessel list.

The sampling areas covers the Baltic Sea and North Sea, including Skagerrak and Kattegat.

Temporal Stratification: Quarterly

Sampling scheme name: DNK small pelagic and Industrial sampling, large vessels

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): DNK small pelagic and Industrial sampling, large vessels

Co-sampling scheme aiming at collecting of length and biological variables samples (length, weight and age) from fisheries targeting small pelagic and industrial fish for biological measures on the targeted species. The fisheries involved are covering mackerel, horse mackerel, Blue Whiting, Norway Pout, boar fish, sprat and herring.

Lengths, ages and weights are measured on all species encountered in the samples. Biological variables are taken on the target species and by-catch of herring in the fishery for Norway pout and sprat.

As a few Danish large vessels (18 vessels in 2024) are fishing the main part of the small pelagic and industrial fishery, a dedicated co-sampling program towards this fleet segment has been developed.

Observation type is set to 'SelfAtSea' and these vessels take the majority of the landings (vessels with length overall ≥ 24 meters).

All the targeted fisheries have separate strata.

1. Blue Whiting,
2. Spat,
3. Boarfish,
4. Horse Mackerel,
5. Mackerel,
6. Herring,
7. Norway Pout

This program is linked to the "DNK small pelagic and Industrial sampling, small vessels" as the latter program is sampling on shore and mainly covering the smaller vessels. However, if there is a refusal on the larger vessels the onshore samples have been instructed to take a sample also from the larger vessel.

Sampling scheme name: DNK small pelagic and Industrial sampling, small vessels

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): DNK small pelagic and Industrial sampling, small vessels.

In April 2020 the Danish control agency introduced a new sampling plan in the industrial fishery based on an opening memorandum sent from the Commission to ensure samples from every industrial landing conducted in Denmark. The amount and species composition of the samples have been worked up by either 3 party companies (independent companies hired to conduct the sampling) or by the factories buying the fish. A cooperation has been initiated between most of the 3 party companies and DTU Aqua ensuring one sample per landing from all Danish vessels, landing in Denmark. These samples are referred to as 3. parties samples

As DTU Aqua receives samples from the landing sites as well as self-sampling it is possible to receive a sample from a given vessel even if the vessel has not conducted the sample as agreed (or refused) in the other sampling program "DNK SPF Industrial Sampling Large vessels". In the post stratification one sample per 14 days is chosen randomly per fishery from the smaller vessels. From the larger vessels a sample is only chosen if there is a refusal. The quality of a self-sample is considered better as

the fish is frozen immediately and there is a position on the sampled. The 3-party sample will be in worse condition and without an exact position the only information is the trip.

The targeted fisheries are sprat and herring as these are fished by smaller vessels as well. However, if larger vessels are refusing the other fisheries will be sampled as well (Blue Whitting, Boarfish, Horse Mackerel, Norway Pout). Mackerel is only very rarely landed in Denmark and can only be sampled in a co-sampling program.

Region: North Sea and Eastern Arctic

Sampling scheme name: DNK sand eel

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):

The sampling is a co-sampling scheme aiming at collecting length and biological variables samples (length, weight and age) from fisheries targeting sand eel. The program is very similar to the DNK_SPF_Industrial_Sampling_Large_vessels, however as sampling for biology is mandatory according to the fishing license all vessels are obliged to conduct the sampling and DTU Aqua receives samples from all vessel length. The sampling effort can change with the TAC per sand eel area with a higher effort (1 sample per haul) in areas with a low quota and lower effort (1 sample per day) in areas with a higher TAC, for small vessels fishing the sampling effort is 2 samples per week.

The sampling strategy is sent out to the fishers together with a sampling protocol and license to fish.

Text Box 2.6: Research surveys at sea

Region: North Sea and Eastern Arctic

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 NANSEA 2025, 2026 and 2027.

If UK contributes to additional survey time, this survey will be shortened with 2 days in 2027.

Research survey: Kattegat Cod Survey (CODS_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: Kattegat Cod Survey (CODS_Q4)

RWP NANSEA 2025, 2026 and 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 NANSEA 2025, 2026 and 2027.

Genetics will be collected from all cod in Q1 in 2025, if additional information is required in 2026 and 2027 this will be collected as well.

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 NANSEA 2025, 2026 and 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 NANSEA 2025, 2026 and 2027.

Genetics are sampled length stratified by station on a regular basis on herring in the mixed area to be used in stock splitting.

Research survey: Nephrops UWTV (UWTV3-4)

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: Nephrops UWTV (UWTV3-4)

RWP NANSEA 2025, 2026 and 2027.

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 NANSEA 2025, 2026 and 2027.

Research survey: Mackerel Egg Survey (triennial) (NSMEGS)

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: Mackerel Egg Survey (triennial) (NSMEGS)

RWP NANSEA 2025.

Mackerel Egg Survey (triennial) (NSMEGS)

The North Sea Mackerel Egg Survey is conducted together with UK and a tri annual survey is planned for 2025.

If Denmark has lack of funding, the number of days in this survey will be reduced with 2 days.

Research survey: North Sea Sandeels Survey (NSSS)

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 Sandeels Survey (NSSS)

1. Objectives of the survey

The survey is part of the mandatory surveys in Table 1.

The objective of the survey is to improve the scientific advice on sandeel. It provides the basis for setting a preliminary index for the sandeel fishery for the coming year. The data are used for calculating a 0-group abundance index, which is used in the stock assessment.

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

The survey is carried out in November/December.

Storr-Paulsen, Marie; Degel, Henrik; van Deurs, Mikael; Olesen, Hans Jakob (2021): Sandeel survey 2020. Technical University of Denmark. Dataset.
<https://doi.org/10.11583/DTU.14798028.v1>

Survey data and manuals from 2017 are open source and can be found via DTU.data or by using the link above. The survey has since 2022 been available in ICES survey database DATRAS.

The survey is conducted with chartered commercial vessels and the sampling of sandeels is conducted with a modified scallop dredge. Three replicates are taken at each station. The sandeels are sorted from the catches, representative subsamples are measured and age samples are taken. Planning is done on a national level.

The survey is presently only conducted by Denmark.

Research survey: Flatfish Survey in the Kattegat and Skagerrak (FSS)

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: Flatfish Survey in the Kattegat and Skagerrak (FSS)

1. Objectives of the survey

The objective of the survey is to establish a time series of catch and effort data independent of the commercial fishery for sole and plaice in the Kattegat and the southern Skagerrak. The survey has been initiated in 2004 and provides currently the main input data set for the 3a sole and turbot assessment conducted by ICES WGBFAS.

The survey is not part of the mandatory surveys in Table 1.

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

The survey is carried out in November

The survey was originally designed in order to establish fisheries independent CPUE indices by means of annual fishing at 120 fixed stations, 60 stations were placed by the fishermen and 60 by DTU-Aqua. In 2010 the total number of stations reduced to 116. In 2011 the survey was reduced further to 80 stations, all included in the originally set up, and in 2016 10 stations were added to the survey.

The survey is conducted with RV Havfisker and one chartered commercial vessel. Fishing is done at night with a Twin "Icelandic-sole-trawl" with 140 mm mesh and rockhopper type ground gear with 150 mm rubber discs and a cod end mesh size of 55 mm.

Planning is done on a national level.

The survey is presently only conducted by Denmark.

Region: Baltic Sea

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, 2026 and 2027.

Denmark collect ichthyoplankton during the night.

Denmark will in addition to cod stomachs also collect turbot stomachs.

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, 2026 and 2027.

Denmark will in addition to cod stomachs also collect turbot stomachs.

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, 2026 and 2027.

Research survey: Baltic Ichthyoplankton Survey– BIS

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 Ichthyoplankton Survey– BIS

This survey will only be conducted if funding is available.

The survey is not part of the mandatory surveys in Table 1.

1. Objectives of the survey

The main aim of the Baltic Ichthyoplankton Surveys is monitoring of the spatial distribution and abundance of fish eggs and larvae. Several individual survey cruises are conducted each year in close collaboration between several institutes around the Baltic Sea. The data resulting from these surveys are utilized to produce a fishery independent SSB estimate as well as a larval index, which are used in the stock assessment of Baltic cod.

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

The surveys are conducted between March and November, aiming to cover the entire spawning season of the target species, Baltic cod. However, depending on the time of sampling, eggs and larvae of other species are caught as well, such as e.g. sprat, herring and flounder as well as several non-commercial species. As spawning of Baltic cod is presently mainly restricted to the Bornholm Basin due to the ambient hydrographic conditions, the main survey area is located in ICES SD 25, but some cruises also cover adjacent areas to account for potential spatial extension of spawning activity. In addition to the ichthyoplankton sampling, a number of trawl hauls are conducted to obtain information on the adult cod, in particular on their fecundity and sex ratios. Furthermore, hydrological parameters are recorded throughout the survey area via CTD casts, and their vertical and horizontal variations are taken into account during analysis and interpretation of survey results.

Ichthyoplankton is sampled on a regularly spaced station grid consisting of 45 stations in the Bornholm Basin, with approximately 10 nautical miles between stations. The sampling gear is a Bongo net with an opening diameter of 60 cm and nets of 320 cm length, one net with 500 μ m and one net with 335 μ m mesh size. The gear is deployed at 3 knots ship speed in a double-oblique haul from the surface to 5 m above the sea floor. In addition, on each sampling station profiles of the ambient hydrographic conditions are obtained by CTD casts. Adult fish are sampled by different types of otter trawls, depending on the institute conducting the individual cruises.

Several institutes are contributing to these surveys to cover the spawning season of Baltic cod from March to November. Denmark is conducting a survey in June onboard polish RV Baltica, which is a joint survey with the National Marine Fisheries Research Institute (NMFRI) in Gdynia, Poland. In addition, ichthyoplankton sampling is also conducted at night time during the Danish Q1 and Q4 BITS surveys on RV DANA.

DTU Aqua – National Institute of Aquatic Resources, Denmark, RV DANA & RV BALTICA (charter)

NMFRI – National Marine Fisheries Research Institute, Poland, RV BALTICA

GEOMAR – Helmholtz Centre for Ocean Research Kiel, Germany, RV ALKOR
IMF – Institute of Marine Ecosystem and Fishery Science, Hamburg University,
Germany, RV ALKOR
TI-OSF – Thünen Institute of Baltic Sea Fisheries, Germany, RV CLUPEA.

SECTION 3: FISHING ACTIVITY DATA

Text Box 3.1: Fishing activity variables data collection strategy

Region: All Regions

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

RWP NANSEA 2025-2027

RWP Baltic 2025-2027

The agreements listed in the RWP NANSEA and RWP Baltic under text box 3.1 regarding methods for assigning métier codes to transversal data and regarding principles for effort calculation are implemented by Denmark. The agreement on small-scale effort reporting is also implemented by Denmark.

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

National Danish strategies on fisheries variable data collection

Regarding the variables listed in EU-MAP table 6, the majority can be derived from the Control regulation (1224/2009). In 2021 an update was made in Danish Logbook legislation (BEK nr 793 af 02/06/2022), making it mandatory to report the gillnet gear dimensions length, height and number of gillnets.

The variables that are not available from Control Regulation directly from logbook recording or assumed from sales notes reporting (small-scale fisheries) are:

- Drift and/or fixed netters soaking time: will be estimated based on available AIS and EM data, where hauling will be identified position data, and using geo-computation methods a script will search for the last time the vessel was at that position. The soaking time is requested by end-users in relation to estimation of bycatch of ETP species which is also requested in the Marine Action Plan.
- Number of pots and traps: this is not recorded under the Danish control regulation, data is therefore not available for scientific use. No end-users have requested this information. Therefore, presently Denmark does not plan any complimentary data collection on this.
- Number of hooks, number of lines: this is not recorded in the Danish control regulation, data is therefore not available for scientific use. In 2024, none of the 6 vessels fishing with lines have been fishing in the Baltic, where WGBAST requests this information. No other end-users have requested this information. Therefore, presently Denmark does not plan any complimentary data collection on this.

The complimentary data collection therefore consists of processing AIS data from Drift and/or fixed netters not collected under the Control regulation. The sampling rate percent is calculated by the number of the Drift and/or fixed netters by vessel length category having AIS in 2024, in relation to the average number of vessels in the fleet segment during 2021-2023.

Text Box 3.2: Fishing activity variables data collection strategy (for inland eel commercial fisheries)

Region: All Regions

General comment: This text box fulfils Article 5(2)(c), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 3.2 of the EU MAP Delegated Decision annex. It is intended to describe the methods and data sources used to estimate fishing capacity, effort and landings data.

National strategies.

The commercial inland eel fisheries consist of 22 entities with a license to fish eel. The method to catch eel is fyke nets and pound nets. The total landing was 5.2-ton eel in 2023. Landings are reported in logbooks by the fishers. Each eel fishing license (entity) can use a limited number of gear for fishing.

One commercial fishery is monitored, in this fishery data are collected on landing, eel stage (yellow silver), sex, length and weight.

SECTION 4: IMPACT OF FISHERIES ON MARINE BIOLOGICAL RESOURCES

Text Box 4.2: Incidental catches of sensitive species

Region: All 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.

RWP NANSEA 2025-2027, RWP Baltic 2025-2027

RDBES incorporation of bycatch data.

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

RWP NANSEA 2025-2027, RWP Baltic 2025-2027

Identification of high-risk fisheries.

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

RWP NANSEA 2025-2027, RWP Baltic 2025-2027

Incidental catches of sensitive species - List of PET Species provided by ICES.

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

DNK EM - ETP species bycatch sampling

The sampling scheme aiming at collecting incidental catches (bycatch) of protected, endangered, and threatened species (ETP) in gillnets, using video-based electronic monitoring systems installed onboard commercial vessels is described in Annex 1.1 under the sampling scheme identifier DNK EM – ETP species bycatch sampling. This sampling scheme supports the EU Marine Action Plan aims for data collection in relation by by-catch of sensitive species.

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

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

In Denmark, no general assessment of the relative risk of bycatch for the different gear types/metiers has been conducted, but bottom-set gillnets have been identified as the gears presenting the largest risk of incidental captures of ETPs (turtles, marine mammals and sea birds) in the region in the literature and from interviews with fishers. Moreover, gillnet

vessels in Denmark are often too small to require the filling of a logbook ending up in a general lack of knowledge on both the distribution and intensity of the fishing effort, as well as the amount of bycatch associated to these métiers. The bycatch monitoring program using video-based electronic monitoring (EM) originally came has a solution to fill in this gap by monitoring active fishing vessels for extended durations and recording all incoming bycatches of ETPs.

No Danish drift-net fisheries are conducted as there is a ban for using this gear type in areas where Danish fisheries are taking place.

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

Cetaceans: bottom-set gillnets

Pinnipeds: bottom-set gillnets

Seabirds (diving species): bottom-set and drift- gillnets

[Seabirds (surface-feeding species): trawl fisheries (because of cable strikes) and longlines]

- What methods are used to calculate the observation effort?

A census of the data recorded with EM on gillnet vessels are analyzed for bycatch of ETPs.

- 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.

—

Using video-based EM allows to estimate bycatch rates at a fine spatiotemporal scale, thereby reducing the uncertainty in the estimates, as recommended by expert groups like ICES WGBYC. The ETP species sampled follow agreements from RWP NANSEA 2025-2027 and RWP Baltic 2025-2027, as well as what is requested in the EU Marine Action Plan.

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?

No

- In gill nets and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?

Yes

- In large catches: does the protocol instruct 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’?

The observers are instructed to check for rare specimens during sorting of the catch at conveyor belt, but presently it is not possible to indicate the percentage of the sorting process that has been checked.

Text Box 4.3: Fisheries impact on marine habitats

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.

RWP NANSEA 2025-2027.

Regionally coordinated stomach sampling program

Denmark will work up the stomach samples collected from IBTS from the international coordinated sampling program, if the funding is ensured.

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.

Stomach sampling Baltic

Denmark will follow NANSEA BALTIC_ 2024_R18, in the NANSEA and Baltic in year 2024 recommendations and decisions.

Denmark will sample turbot stomachs and continue the sampling of cod stomachs but with the reduced effort as suggested at the NANSEA and Baltic expert meeting. The sampling will be conducted on the BITS survey. Further, Denmark will in accordance with NANSEA BALTIC_ 2024_R19 participate in the coordination of stomach sampling in the Baltic Sea.

Denmark will work up the stomach samples collected from BITS from the international coordinated sampling program, if the funding is ensured.

Region: All Regions

Study: Fisheries impact on benthic marine habitats

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

Name of the study: Fisheries impact on marine habitats

The assessment of impact of fisheries on benthic marine habitats is based on standardized procedures agreed internationally through scientific projects and ICES working groups. The work is supporting the Marine Action Plan regarding data collection in relation to impact of fishing on the seabed. The fishing effort is assessed spatially by combining position data (VMS/AIS/BlackBox/EM) with logbook/sales notes data. The fishing gear is assessed to be in contact with the seabed (i.e. fishing) when vessel speed is within defined fishery-specific speed ranges. To calculate the benthic fishing pressure (swept area ratio), the gear width is estimated using relationships between vessel length or engine power and gear width found in the EU FP-7 Benthic project (Eigaard et al, 2016) which is multiplied with the fishing time and speed of the vessel. This method has also been implemented by ICES WGSFD. To assess the fishing impact of mobile bottom-contacting fishing gears on marine habitats, the fishing pressure map (SAR) is combined with a habitat-sensitivity layer.

In the ICES WGFBIT group the Relative Benthic State (RBS), a method has been developed for estimating the fisheries impacts on benthic biomass, using fisheries position data in combination with environmental data and benthos sampling. Denmark is actively participating in the working group, and also applying and improving the methods nationally, to also take into account e.g., hypoxia.

1. Aim of the study

Implementing and improving the assessment of fisheries impact on coastal marine habitats in Danish EEZ.

2. Duration of the study

It is planned to continuously improve national methods for identifying fishing activity in high resolution geospatial data following development and agreement of standard methods.

3. Methodology and expected outcomes of the study

Improvements include methods for analysis of position data to estimate the fishing pressure as well as improvements and inclusion of other data sources (data collection on benthos, improved salinity, oxygen and temperature layers). This leads to better and more robust estimates of fisheries impact on marine habitats.

Reference:

Eigaard OR, Bastardie F, Breen M, et al. (2016) Estimating seabed pressure from demersal trawls, seines and dredges based on gear design and dimensions. ICES Journal of Marine Science, 73: i27-i43

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 implementation years 2025-2027.

National specific aspects

1. Description of clustering

Statistics Denmark will only apply clustering in case each fleet segment has less than 3 vessels. Segments are only clustered in data reporting for confidentiality reasons. The described clusters are made from 2023 data, hence clusters might be different in 2024 and 2025 data.

Clustered segments:

Drift and/or fixed netters 0- < 8 m and Demersal trawlers and/or demersal seiners 0- < 8 m
→ *Drift and/or fixed netters 0- < 8 m**

Drift and/or fixed netters 0- < 10 m and Vessels using Polyvalent “passive” gears only 0- < 10 m
→ *Drift and/or fixed netters 0- < 10 m**

Dredgers 0- < 10 m and Dredgers 10- < 12 m
→ *Dredgers 0- < 10 m**

Dredgers 12- < 18 m and Dredgers 40 m or larger
→ *Dredgers 12- < 18 m**

Demersal trawlers and/or demersal seiners 24- < 40 m and Demersal trawlers and/or demersal seiners 40 m or larger
→ *Demersal trawlers and/or demersal seiners 24- < 40 m**

Vessels using Pots and/or traps 0- < 8 m and Vessels using hooks 0- < 10 m
→ *Vessels using Pots and/or traps 0- < 8 m**

Vessels using Pots and/or traps 10- < 12 m and Vessels using Pots and/or traps 12- < 18 m
→ *Vessels using Pots and/or traps 12- < 18 m**

Vessels using hooks 0- < 10 m and Vessels using hooks 12- < 18 m
→ *Vessels using hooks 0- < 10 m**

Vessels using Polyvalent “passive” gears only 0-< 8 m and Vessels using Polyvalent “passive” gears only 8-< 12 m

*→ Vessels using Polyvalent “passive” gears only 0-< 8 m**

Beam trawlers 18-< 24 m and Beam trawlers 24-< 40 m and Beam trawlers 40 m or larger

*→ Beam trawlers 18-< 24 m**

Pelagic trawlers 0-< 10 m and Pelagic trawlers 12-< 18 m

*→ Pelagic trawlers 12-< 18 m **

Pelagic trawlers 18-< 24 m and Pelagic trawlers 24-< 40 m

*→ Pelagic trawlers 24-< 40 m **

All clusters have been chosen after consulting with DTU Aqua fisheries experts in order to find the best matches between segments with similar characteristics.

2. Description of activity indicator

Activity indicator has not been implemented

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

Statistics Denmark does not plan to deviate from variable definitions as listed in the ‘EU MAP Guidance Document’ on the DCF website.

PIM is not used because Statistics Denmark has not had the resources to study the methods suggested in PIM.

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.

National specific aspects

1. Description of the threshold application

Statistics Denmark does not apply a threshold to the population of commercially active aquaculture farms in Denmark.

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

Statistics Denmark does not plan to deviate from variable definitions as listed in the 'EU MAP Guidance Document' on the DCF website.

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.

National specific aspects

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

The Danish fish processing industry is defined by the Business Register using NACE code 10.20. Enterprises engaging in fish processing in Denmark are highly specialized and only a small number of enterprises are identified as having fish processing as their non-main activity. The Danish fish processing industry consisted of approximately 90 enterprises employing around 2,700 persons. The enterprises can be divided into 3 segments according to the level of employment (less than 10, 10-49 and 50-249 employees). Furthermore, the industry can be segmented according to the main species used in production using the commodities produced as an indicator.

The Danish data collection for the processing industry (NACE 10.20) 2021-2024 and the future data collection for 2025-2027 are built on data collected by Statistics Denmark to avoid multiple data collections. In order to provide the requested economic and social data under (Annex V to PGECON 2020 and Commission Delegated Decision (EU) 2021/1167 of 27 April 2021 table 9) and provide the best possible foundation for doing research and give advice related to the EU CFP and Danish governmental strategies, the following modification and improvement have been made to the basic data collection that justifies the continues and complementary data collection for the fish processing industry.

First of all, the following shortfalls are identified for the data available at Eurostat. Data collected and reported to Eurostat contains all enterprises, which main activity is fish processing (covered by NACE 10.20). However, not all economic variables listed in Annex V to PGECON 2020 are available at Eurostat. Data are only available at a total aggregated level, which does not allow for deeper analysis at a more disaggregated level. Furthermore, socioeconomic variables are not collected. To overcome these shortfalls the Danish collection of data for the processing industry will be organized and structured as follows.

Data collected by Statistics Denmark according to the European Business Statistics Regulation and Regulation (EC) No 223/2009 are used as the foundation for the additional data collection of socioeconomic data for the fish processing sector. The type of data collection used for collection of the economic and social data is all based on census. The additional data collection and amendment of data is organized in a close cooperation between the Department of Food and Resource Economics, University of Copenhagen and Statistics Denmark.

In collaboration with Statistics Denmark, data from the Industry Commodity Statistics and the National Account Statistics are combined to comply with the variables listed in Annex V to PGECON 2020. Enterprises, which have other activities than fish processing, are split up into work place units and only units with fish processing are included to get the most accurate

data for the fish processing sector activities. Furthermore, the enterprises are segmented according to employment (Eurostat), but also according to main species produced to allow for more in depth analysis of the dependencies of different species coming from either fisheries or aquaculture. In addition to the economic data, social data on gender, age, education and nationality are collected and integrated with the economic data using data from Statistics Denmark: “Register-Based Workforce Statistic” and “Labour Market Account Statistic” in accordance with the Commission Delegated Decision (EU) 2021/1167 of 27 April 2021, table 9. Merging economic statistics and social data statistics requires knowledge of enterprise and work place unit level in order to make a correct match. Thus, providing the social data requires that the matching economic data are available.

A continuous data collection of economic and social variables based on a consistent approach and methodology will avoid data series breaks, which allows for longer time series analysis of the sector. This provides opportunities for analyzing developments between small and large enterprises and developments within different segments of enterprises relying on different species for production.

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

IFRO does not plan to deviate from variable definitions as listed in the ‘EU MAP Guidance Document’ on the DCF website.

Raw material input data for the processing industry by species and origin will not be collected, based on the results from the Danish pilot study, the SECFISH (MARE/2016/22) project and PGECON recommendations.

For the fisheries processing activity “non-main” only the aggregated turnover and number of enterprises will be reported, following the guidelines of PGECON.

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

The quality report fulfils Article 6(3)(d) of Regulation (EU) 2017/1004. This document is intended to specify data to be collected under Chapter II, point 2 of the EU MAP Delegated Decision annex: Biological data on exploited biological resources caught by Union commercial and recreational fisheries

Related to table 2.5 and text box 2.5 (biological specific data collection)

Sampling scheme identifier: Baltic SPF regional.

MS : DNK
Region: Baltic
Sampling scheme identifier: Baltic SPF regional
Sampling scheme type: Commercial fishing trip
Observation type: Not coordinated, but in Denmark SelfAtSea
Time period of validity: 2025-2027
Short description (max 100 words): Denmark has used the RWP for small pelagic in the Baltic as a template for how to sample all industrial and pelagic fisheries from Danish vessels. Therefore, this sampling program is very closely linked to the sampling scheme “DNK small pelagic and Industrial sampling, large vessels”. As an additional sampling Denmark is also sampling the smaller vessels from shore in the sampling program “DNK small pelagic and Industrial sampling, small vessels”, which also samples the larger vessels with refusals. RWP Baltic 2025-2027

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier: 1. SciObs Commercial Silver eel escapement

MS : DNK
Region: North Sea
Sampling scheme identifier: SciObs Commercial Silver eel escapement
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): Escapement of out-migrating silver eel from River Ribe Å. The number of out-migrating silver eels is estimated by tag-recapture experiment. Age of out-migrating eel will be determined based on otolith age reading.
Description of the population

Population targeted: The European eel (<i>Anguilla anguilla</i>) is distributed across the majority of coastal countries in Europe and North Africa. At the continental scale, eels have a wide and scattered distribution and are found in virtually all types of water bodies from rivers and lakes to estuaries and coastal waters. The European eel is panmictic and thought to spawn in the Sargasso Sea. Population sampled: River Ribe Å. Stratification: River basins on the West coast of Denmark.
Sampling design and protocols
Sampling design description: The number of out-migrating eel will be determined by a mark recapture experiment. Tagging of eel will be done twice during the migration season. Tagged eel will be released up stream of the tagging / fishing area. Recaptures will be registered throughout the migration period. Registration of recaptures and total catch of eel will be done by a commercial fisherman. Is the sampling design compliant with the 4S principle?: NA Regional coordination: NA Link to sampling design documentation: Sampling design and calculations follow the Petersen method (single census) Page 77 in Ricker 1975. Computation and interpretation of biological statistics of fish populations. Fish. Res. Board Can. Bull. 191 1-382. Bohlin, T., Hamrin, S., Heggberget, T.G., Rasmussen, G., & Saltveit, S.J. (1989) Electrofishing - Theory and practice with special emphasis on salmonids. <i>Hydrobiologia</i>, 173, 9-43. Page 20. Design follows international recommendations: Yes see above Link to sampling protocol documentation: NA Protocol follows international recommendations: The protocol follow the recommendation of the Joint EIFAAC/ICES/GFCM Working group on eels (WGEEL).
Sampling implementation
Recording of refusal rate: NA
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture: Escapement of silver eel: The efficiency of the fyke-net fishery will be estimated by the mark/recapture (Petersen) method. Eels will be tagged with passive integrated tags (PIT) and released upstream the fykenet fishery. All the fyke-net captured eel will be scanned for PIT tags and the fyke-net efficiency calculated. Knowing the efficiency and the total catch of the

fyke-net fishery, the absolute number of the out migrating silver eel-run in River Ribe can be estimated. The mark/recapture will be repeated twice during the autumn.

Data capture documentation:

The data are kept in an internal database at DTU and uploaded to an ICES database. Uploading takes place in connection with the annual datacall in connection with ICES WGEEL meeting. (http://185.135.126.250:8080/shiny_di/.) The data are processed and reported in annual reports e.g:

ICES. 2023. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL). ICES Scientific Reports. 05:98. 138 pp. <https://doi.org/10.17895/ices.pub.24420868>

Quality checks documentation:

Data storage

National database:

Internal database at DTU Aqua.

International database:

ICES data calls uploaded to ICES/WGEEL database.

Quality checks and data validation documentation:

Data are quality checked continually and when uploaded to ICES data base.

Sample storage

Storage description: NA

Sample analysis:

Data processing

Evaluation of data accuracy (bias and precision): N

Editing and imputation methods: N

Quality document associated to a dataset: N

Validation of the final dataset: N

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier 2: SciObs_Silver eel escapement

MS : DNK

Region: North Sea

Sampling scheme identifier: SciObs_Silver eel escapement
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): The number of out-migrating silver eel are captured in River Klitmøller in a fixed silver eel trap.
Description of the population
Population targeted: The European eel (<i>Anguilla anguilla</i>) is distributed across the majority of coastal countries in Europe and North Africa. At the continental scale, eels have a wide and scattered distribution and are found in virtually all types of water bodies from rivers and lakes to estuaries and coastal waters. The European eel is panmictic and thought to spawn in the Sargasso sea. Population sampled: River Klitmøller Stratification: River basins on the West coast of Denmark.
Sampling design and protocols
Sampling design description: Out-migrating silver eel are caught in a trap catching all out-migrating eel (Wolf trap) operated from 1 September - 31 October A silver eel trap in river Klitmøller Å will be visited 3 times a week from 1 September - 31 October. Captured eel will be counted and length and weight will be measured. Is the sampling design compliant with the 4S principle?: NA Regional coordination: NA Link to sampling design documentation: The eel migrates from freshwater for spawning in the Sargasso Sea during the autumn month September – November. During that period the trap intercept out-migrating eel. F.-W. Tesch 1977 The eel: Biology and management of anguillid eels. Chapman and Hall. Pp 434 Wolf, P. 1951. A Trap for the Capture of Fish and Other Organisms Moving Downstream. Transactions of the American Fisheries Society. Vol 80, Issue 1, p 41-45 Design follows international recommendations: YES Link to sampling protocol documentation: NA Protocol follows international recommendations: The protocol follow the recommendation of the Joint EIFAAC/ICES/GFCM Working group on eels (WGEEL).
Sampling implementation
Recording of refusal rate: N
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture:

Escapement of silver eel: All river water is diverted into the silver eel trap from 1 September - 31 October. . In this period the trap is visited 3 times per week and the eels are counted, length measured and weighed.

Data capture documentation:

The data are kept in internal database at DTU until uploadet at ICES database. Uploading takes place in connection with the annual datacall in connection with ICES WGEEL meeting. (http://185.135.126.250:8080/shiny_di/.) The data are processed and reported in annual reports e.g:

ICES. 2023. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL). ICES Scientific Reports. 05:98. 138 pp. <https://doi.org/10.17895/ices.pub.24420868>

Quality checks documentation: NA

Data storage

National database:

Internal database at DTU Aqua.

International database:

ICES data calls uploaded to ICES/WGEEL database.

Quality checks and data validation documentation:

Data are quality checked continually and when uploaded to ICES data base.

Sample storage

Storage description: NA

Sample analysis:

Data processing

Evaluation of data accuracy (bias and precision): N

Editing and imputation methods: N

Quality document associated to a dataset: N

Validation of the final dataset: N

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier: 3. Sampling scheme identifier: SciObs_yellow_recruits

MS : DNK

Region: North Sea
Sampling scheme identifier: 3. Sampling scheme identifier: SciObs_yellow_recruits
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): Annual collection of data on young eel ascending a number of River basins. The data are collected from eel ladder traps in connection with weirs e.g. at hydropower dams.
Description of the population
Population targeted: The European eel (<i>Anguilla anguilla</i>) is distributed across the majority of coastal countries in Europe and North Africa. At the continental scale, eels have a wide and scattered distribution and are found in virtually all types of water bodies from rivers and lakes to estuaries and coastal waters. The European eel is panmictic and thought to spawn in the Sargasso sea. Population sampled: Inland waters (River basins). Stratification: River basins on the east coast of Denmark.
Sampling design and protocols
Sampling design description: <u>Eel ladder traps for ascending eel:</u> Each trap will be visited 3 times a week from 1 April - 31 October. The ascending eel will be weighed and in subsamples individual eel is measured. Is the sampling design compliant with the 4S principle?: NA Regional coordination: NA Link to sampling design documentation: The sampling design follow the biology of the eel. Eels ascent freshwater when water temperatures are about 9 °C. Eel passes and the trap are therefor in operating from 1 April to 31 October which follow the executive order no. 1018 of 12 December 2002 on eel passes (the Danish Fisheries Agency http://fiskeristyrelsen.dk). There is no way to evaluate how effective the eel pass trap is. However when repeating the same procedure every year the method gives a relative index of the ascend. F.-W. Tesch 1977. The eel: Biology and management of anguillid eels. Chapman and Hall. Pp 434 Dahl, J., 1983. Some observations on the ascent of young eels at the Tange Power dam, river Guden å. EIFAC Working Party on Eel, Drottningholm 1983. mimeo., pp 11. EIFAC 1993. Report on eight's session of the working party on eel, Olsztyn, Poland 24 - 29 May, 1993. EIFAC Occ. Pap. No 27, pp 21.
Design follows international recommendations: Yes
Link to sampling protocol documentation:

https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta
Protocol follows international recommendations: The Joint EIFAAC/ICES/GFCM Working group on eels (WGEEL).
Sampling implementation
Recording of refusal rate: <i>N</i>
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture: Weight of ascending eel entering the trap from 1 April - 31 October. .
Data capture documentation: The data are kept on internal database at DTU aqua until uploadet at ICES database. Uploading takes place in connection with the annual datacall in connection with ICES WGEEL meeting. (http://185.135.126.250:8080/shiny_di/ .) The data are processed and reported in annual reports e.g: ICES. 2023. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL). ICES Scientific Reports. 05:98. 138 pp. https://doi.org/10.17895/ices.pub.24420868
Quality checks documentation: NA
Data storage
National database: Internal database at DTU Aqua.
International database: ICES data calls uploaded to ICES/WGEEL database.
Quality checks and data validation documentation: Data are quality checked continually and when uploaded to ICES data base.
Sample storage
Storage description NA Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision): N No comprehensive analysis available.

Editing and imputation methods: N

Quality document associated to a dataset: N

Validation of the final dataset: N

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier: 4. **Sampling scheme identifier:** SciObs_glass_recruits

MS : DNK

Region: North Sea

Sampling scheme identifier: 4. **Sampling scheme identifier:** SciObs_glass_recruits

Sampling scheme type: NA

Observation type: NA

Time period of validity: 2025-2027

Short description (max 100 words): Annual collection of data on young eel (glass eel) ascending a number of River basins. The data are collected from electrofishing small rivers.

Description of the population

Population targeted: The European eel (*Anguilla anguilla*) is distributed across the majority of coastal countries in Europe and North Africa. At the continental scale, eels have a wide and scattered distribution and are found in virtually all types of water bodies from rivers and lakes to estuaries and coastal waters. The European eel is panmictic and thought to spawn in the Sargasso sea.

Population sampled: Inland waters (River basins).

Stratification: River basins on the West coast of Denmark.

Sampling design and protocols

Sampling design description:

Electrofishing ascending eel:

The recruitment of eel is estimated by electrofishing glass eel in the lower parts of a number of rivers.

Recruitment is estimated using densities as a proxy. Densities are determined by the removal method (Moran Zippin). All captured eel are length measured.

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

Regional coordination: NA

Link to sampling design documentation:

Bohlin T. 1982. The validity of the removal **method** for small populations-consequences for electrofishing practice [**Moran-Zippin's** estimator]. Report - Institute of Freshwater Research, Drottningholm (Sweden)

Issue 60 **ISSN** 0082-0032

Design follows international recommendations: Yes see above

Link to sampling protocol documentation: https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta Bohlin, T., Hamrin, S., Heggberget, T.G., Rasmussen, G., & Saltveit, S.J. (1989) Electrofishing - Theory and practice with special emphasis on salmonids. <i>Hydrobiologia</i>, 173, 9-43.
Protocol follows international recommendations: The Joint EIFAAC/ICES/GFCM Working group on eels (WGEEL).
Sampling implementation
Recording of refusal rate: <i>N</i>
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture: Average densities (eel/m²) of pigmented glass eel and yellow eel (elvers) will be estimated during the month May to August. Data will be the average from 3 electrofishing surveys per year, in each river basin (Moran-Zippin method). Data capture documentation: The data are kept in an internal database at DTU aqua until uploadet at ICES database. Uploading takes place in connection with the annual datacall in connection with ICES WGEEL meeting. (http://185.135.126.250:8080/shiny_di/.) The data are processed and reported in annual reports e.g: ICES. 2023. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL). ICES Scientific Reports. 05:98. 138 pp. https://doi.org/10.17895/ices.pub.24420868
Quality checks documentation:
Data storage
National database: Internal database at DTU Aqua International database: ICES data calls uploaded to ICES/WGEEL database. Quality checks and data validation documentation: Data are quality checked continually and when uploaded to ICES data base.
Sample storage

Storage description: NA
Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision): N No comprehensive analysis available.
Editing and imputation methods: N
Quality document associated to a dataset: N
Validation of the final dataset: N

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier 5: SciObs_yellow_standing stock

MS : DNK
Region: North Sea
Sampling scheme identifier: SciObs_yellow_standing stock
Sampling scheme type: NA
Observation type: NA
Time period of validity: 2025-2027
Short description (max 100 words): Annual survey of standing yellow eel stock. The data are collected from electrofishing a small river.
Description of the population
Population targeted: The European eel (<i>Anguilla anguilla</i>) is distributed across the majority of coastal countries in Europe and North Africa. At the continental scale, eels have a wide and scattered distribution and are found in virtually all types of water bodies from rivers and lakes to estuaries and coastal waters. The European eel is panmictic and thought to spawn in the Sargasso sea.
Population sampled: Vester Vedsted bæk
Stratification: River basin on the West coast of Denmark.
Sampling design and protocols
Sampling design description:
<u>Electrofishing</u> Data are obtained by electrofishing <i>removal</i> (Moran-Zippin) method. Each river station electrofished minimum two times. Captured eel counted separately for each electrofishing run and the number of eels at each station calculated using the removal method (Moran-Zippin method). Length measured of all captured eels.

Is the sampling design compliant with the 4S principle?: NA Regional coordination: NA Link to sampling design documentation: Bohlin T. 1982. The validity of the removal method for small populations-consequences for electrofishing practice [Moran-Zippin's estimator]. Report - Institute of Freshwater Research, Drottningholm (Sweden) Issue 60 ISSN 0082-0032 Design follows international recommendations: Yes see above Link to sampling protocol documentation: https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta Bohlin, T., Hamrin, S., Heggberget, T.G., Rasmussen, G., & Saltveit, S.J. (1989) Electrofishing - Theory and practice with special emphasis on salmonids. <i>Hydrobiologia</i>, 173, 9-43. Protocol follows international recommendations: The Joint EIFAAC/ICES/GFCM Working group on eels (WGEEL).
Sampling implementation
Recording of refusal rate: <i>N</i>
Monitoring of sampling progress within the sampling year:
Data capture
Means of data capture: Average densities (eel/m²) of pigmented glass eel and yellow eel (elvers) will be estimated during the month May to August. Data will be the average from 3 electrofishing surveys per year, in each river basin (Moran-Zippin method). Data capture documentation: The data are kept on a internal database at DTU aqua until uploadet at ICES database. Uploading takes place in connection with the annual datacall in connection with ICES WGEEL meeting. (http://185.135.126.250:8080/shiny_di/.) The data are processed and reported in annual reports e.g: ICES. 2023. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL). ICES Scientific Reports. 05:98. 138 pp. https://doi.org/10.17895/ices.pub.24420868
Quality checks documentation:
Data storage
National database: Internal database at DTU Aqua. International database:

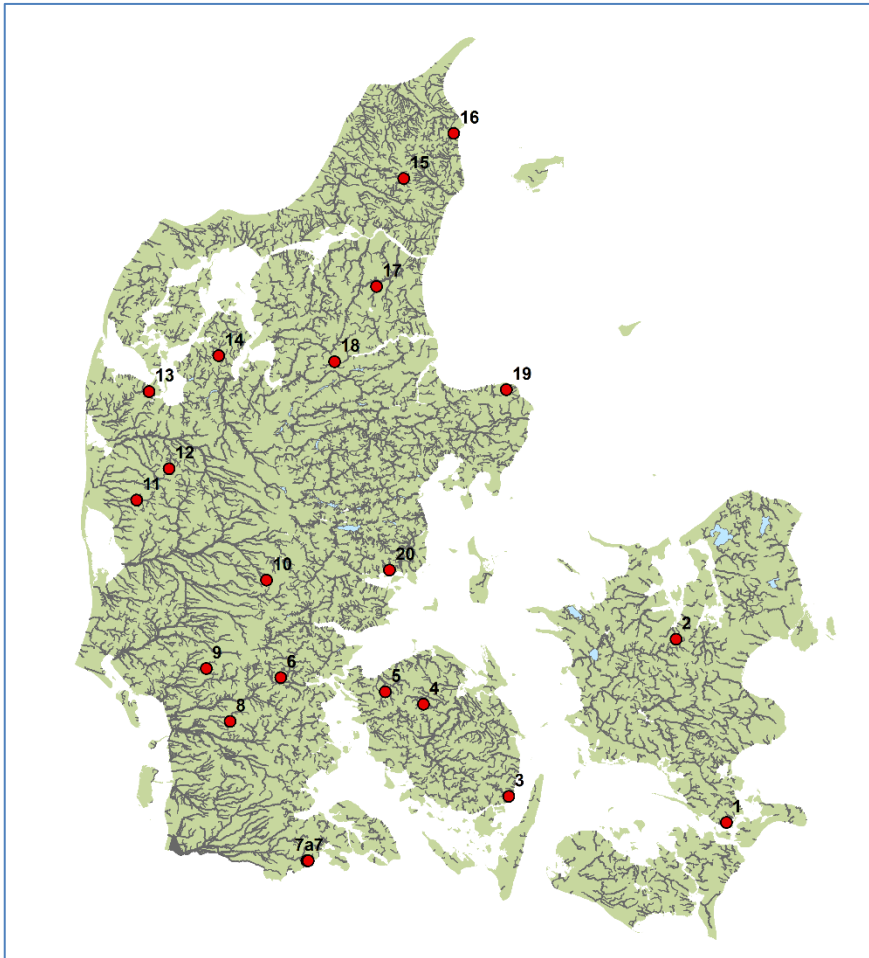
ICES data calls uploaded to ICES/WGEEL database.
Quality checks and data validation documentation: Data are quality checked continually and when uploaded to ICES data base.
Sample storage
Storage description: NA
Sample analysis:
Data processing
Evaluation of data accuracy (bias and precision): N No comprehensive analysis available.
Editing and imputation methods: N
Quality document associated to a dataset: N
Validation of the final dataset: N

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier 6: parr abundance

MS : DNK
Region: All regions
Sampling scheme identifier: parr abundance
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs (water body)
Time period of validity: 2022-2024
Short description (max 100 words): <i>e.g. sampling scheme aiming at collecting length samples from commercial landings on-shore for all species listed in Table 1 of the EU MAP Delegated Decision annex. The scheme covers mainland and all outermost regions ('RUP' in French, Portuguese, and Spanish).</i>
In order to follow the recruitment and status for the populations, information on parr abundance (density) and length distribution of salmon (<i>Salmo salar</i>) will be collected in 6 rivers in Western Jutland and sea trout (<i>Salmo trutta</i>) in 20 different rivers across the country.
Description of the population
Population targeted: Specify which are the primary sampling units (PSU), e.g. all national port*days (information present in former Table 4B). For research surveys: specify the main target species from a survey perspective (as opposed to Table 1 in the Annex to the Implementing Decision) and the main survey area.
Information on salmon will be collected for populations in four rivers with genetically original populations (Rivers Storå, Skjern å, Varde å and Ribe å) and in two rivers with more recently established populations (rivers Kongeå and Sneum å).
Sea trout abundance will be collected in 20 different rivers across the country (numbers refer to map below. 1. Lollikebæk, 2. Elverdamsåen, 3. Vejstrup Å, 4. Stavids Å, 5. Storå, 6. Kolding

Å, 7. Fruebæk, 8. Ribe Å, 9. Sneum Å, 10. Skjern Å, 11. Hover Å, 12. Storåen, 13. Resenkær Å, 14. Vium Mølleå, 15. Rye Å, 16. Bangsbo Å, 17. Lindenberg Å, 18. Onsild Å, 19. Brøndstrup Mølleå, 20. Møllebæk).



Population sampled: Specify which part of the target population will be sampled and specify which part of the target population is unreachable for sampling or excluded for some reason to explain, *e.g. major ports being listed as auctions excluding all minor ports and no sampling during the week-ends*. For research surveys at sea describe target species in single-species surveys or ecosystem component (*e.g. demersal, pelagic*) in multispecies surveys.

Salmon and sea trout populations are sampled at the parr stage.

Stratification: Explain the logic taken to stratify the population and the number of strata generated, *e.g. population stratified in 3 geographical lots (from A to B, from B to C and from C to D). Each lot is then stratified by auction.*

Sampling will be done during late summer – autumn.

One river with genetically original population is surveyed continuous (annual) sampling (river Skjern), while the remaining rivers are fished in turn (one river per year). The reason for sampling the river Skjern every year, is because this river has been studied more intensely in previous years and consequently more information is available for this river, compared to the other salmon rivers. In addition, previous studies indicate amongst others problems on the survival from egg to ½-year old fish.

The rivers sampled in any one year is planned to be rivers where the abundance, sex and length distribution of the spawning population were sampled in the preceding year. This facilitates the estimation of survival from the egg stage to ½-year old parr.

Sea trout populations are sampled across the country. This makes it possible to follow both regional and inter-annual variations, and constitutes the basic data for data delivered to the ICES (WGBAST).

Sampling design and protocols

Sampling design description: Describe how the sampling allocation is defined; how PSU and SSU are selected for sampling; indicate for which catch fraction the sampling scheme applies.

Rivers selected for salmon parr are rivers with original populations.

One of these (river Skjern å), will be followed intensely with annual sampling of parr abundance. In this river, abundance, sex and size composition of adult spawning population (Sampling scheme identifier: salmon spawning population) is also sampled annually. In addition the relative recruitment in terms of smolt production is determined bi-annually in one major tributary (Sampling scheme identifier: DNK salmon smolt recruitment).

In the remaining five salmon rivers information on parr abundance in the year after sampling of the spawning population (Sampling scheme identifier: DNK salmon spawning population). These rivers are assessed in turn, over a five year cycle.

Rivers selected for sea trout surveillance are typical sea trout rivers, with a good geographical coverage.

Sampling parr abundance will be carried out by electro fishing. On sites where wading is possible fishing is carried out by up-stream wading. Sites positioned in deeper areas will be electro fished from boat.

Is the sampling design compliant with the 4S principle?: Y/N/NA (NA for e.g. surveys and diadromous and recreational sampling schemes)

NA

Regional coordination: Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.

N. Information on sea trout abundance is, together with habitat data, delivered to the ICES working group WGBAST.

Link to sampling design documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, Member State shall provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, Member State shall provide some details in the textbox.

No documentation is available for the sampling design regarding choice of rivers, but sites are selected as 1) representative sites suited as index sites (both salmon and sea trout) and 2) sites likely to assess change in geographic distribution in the river (salmon).

Documentation on electro fishing method and procedure for calculations:

Bohlin T., Hamrin S., Heggberget T.G., Rasmussen G., Saltveit S.J. (1989). Electrofishing — Theory and practice with special emphasis on salmonids. *Hydrobiologia*, 173, 9–43. (https://www.researchgate.net/publication/227323982_Electrofishing-Theory_and_Practice_with_Special_Emphasis_on_Salmonids)

Geertz-Hansen, P., A. Koed, et al. (2013). Manual til elektrofiskeri Vejledning til elektrofiskeri ved bestandsanalyser og opfiskning af moderfisk. DTU Aqua-rapport nr. 272-2013. Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet. 43 pp + bilag
<https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta>.

Design follows international recommendations:: Indicate 'Y' (yes) if the sampling design is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling design should be shortly explained in the text, and should be available upon request for the evaluators.

Y

(ICES. 2021. Baltic Salmon and Trout Assessment Working Group (WGBAST). ICES Scientific Reports. 3:26. 331 pp. <https://doi.org/10.17895/ices.pub.7925>)

Link to sampling protocol documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.

<https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta>

Protocol follows international recommendations: Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.

N - Sampling protocol is in accordance with methods described in <https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta>.

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.

NA

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

The sample stratification and digitization process is monitored on an on-going basis. In case of advert weather conditions (high precipitation) part of sampling may be delayed, or, (rarely) has to be omitted.

Data capture

Means of data capture: short description (+ photo optionally). Indicate what are the means for collecting the data, e.g. scales, measuring board, dedicated software, ...

Standard electro fishing equipment, measuring board, gps.

Collected parr are slightly anaesthetized and lengths are measured on analogous measuring boards. Results are recorded on standard sheets (paper) together with habitat information. Subsequently data are stored electronically.

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

N

Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

Abundance on each site is compared to abundances for the site relevant in previous years (if available). Length distribution is compared to lengths on other sites in the river.

Data storage

National database: Provide the name of national database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

NA

International database: Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

NA

Quality checks and data validation documentation: Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.

NA.

Sample storage

Storage description: Indicate the type of soft tissues and hard parts stored (e.g. age structures, stomach, plankton, genetics) and the location used for samples storage; how long the samples are stored; how conservation and maintenance as well as access to samples are organised; whether the samples are stored under the auspices/responsibility of an international organization; if yes, which one. Provide a link to information on quantities of sampled stored by species/stock, geographic sub-area and by year.

NA. Tissue samples are not collected.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

NA

Data processing

Evaluation of data accuracy (bias and precision): Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the evaluation of data accuracy exists, provide some details in the textbox.

Abundance is compared to abundance on each site investigated in previous years (if available). Length distribution is compared to lengths on other sites in the river.

Editing and imputation methods: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the editing and imputation methods exists, provide some details in the textbox.

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

N

Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user?

Data are not validated apart from described above.

Related to table 2.3 and text box 2.3 (Diadromous data collection)

Sampling scheme identifier 7: salmon spawning population

MS : DNK
Region: All regions
Sampling scheme identifier: salmon spawning population
Sampling scheme type: Diadromous (scientific)
Observation type: SciObs (water body)
Time period of validity: 2022-2024
Short description (max 100 words): <i>e.g. sampling scheme aiming at collecting length samples from commercial landings on-shore for all species listed in Table 1 of the EU MAP Delegated Decision annex. The scheme covers mainland and all outermost regions ('RUP' in French, Portuguese, and Spanish).</i> In order to follow the status for the populations, the number, sex and length composition of adult spawners entering the natal spawning stream will be collected for Atlantic salmon (<i>Salmo salar</i>) in 6 rivers in Western Jutland.
Description of the population
Population targeted: Specify which are the primary sampling units (PSU), e.g. all national port*days (information present in former Table 4B). For research surveys: specify the main target species from a survey perspective (as opposed to Table 1 in the Annex to the Implementing Decision) and the main survey area. Salmon in six rivers debouching into the North Sea. Population sampled: Specify which part of the target population will be sampled and specify which part of the target population is unreachable for sampling or excluded for some reason to explain, <i>e.g. major ports being listed as auctions excluding all minor ports and no sampling during the week-ends</i>. For research surveys at sea describe target species in single-species surveys or ecosystem component (<i>e.g. demersal, pelagic</i>) in multispecies surveys. Adult salmon in their home river. Stratification: Explain the logic taken to stratify the population and the number of strata generated, <i>e.g. population stratified in 3 geographical lots (from A to B, from B to C and from C to D). Each lot is then stratified by auction</i>. Sampling will be done during late autumn – early winter, prior to spawning. Surveys will be conducted in four rivers with genetically original populations (Rivers Storå, Skjern å, Varde å and Ribe å) and in two rivers with recently established populations (rivers Kongeå and Sneum å).

The river Skjern å will be sampled every year, while the remaining rivers will be sampled in turn; one river per year.

The reason for sampling the river Skjern annually is that this river has been studied more intensely in previous years and consequently more information is available for this river, compared to the other salmon rivers.

Sampling design and protocols

Sampling design description: Describe how the sampling allocation is defined; how PSU and SSU are selected for sampling; indicate for which catch fraction the sampling scheme applies.

The number of spawners will be determined by mark-recapture (Petersen method). 200 salmon collected by electro fishing in October - early November will be tagged and returned to the river. Approx. 3-4 weeks later, electro fishing is repeated and tagged / untagged fish will be recorded separately for calculation of the entire spawning population. The spawning run (number of fish entering the stream) will be calculated by adding the number of fish removed by angling.

One river with genetically original population is surveyed continuous (annual) sampling (river Skjern), while the remaining rivers are fished in turn (one river per year in turn).

Is the sampling design compliant with the 4S principle?: Y/N/NA (NA for e.g. surveys and diadromous and recreational sampling schemes)

NA

Regional coordination: Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.

N

Link to sampling design documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, Member State shall provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, Member State shall provide some details in the textbox.

Documentation on electro fishing method and procedure for calculations:

Bohlin T., Hamrin S., Heggberget T.G., Rasmussen G., Saltveit S.J. (1989). Electrofishing — Theory and practice with special emphasis on salmonids. *Hydrobiologia*, 173, 9–43. (https://www.researchgate.net/publication/227323982_Electrofishing-Theory_and_Practice_with_Special_Emphasis_on_Salmonids)

Geertz-Hansen, P., A. Koed, et al. (2013). Manual til elektrofiskeri Vejledning til elektrofiskeri ved bestandsanalyser og opfiskning af moderfisk. DTU Aqua-rapport nr. 272-2013. Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet. 43 pp + bilag <https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta>.

Design follows international recommendations: Indicate ‘Y’ (yes) if the sampling design is in line with international recommendations, and ‘N’ if not. If no relevant expert or coordination groups exist, the sampling design should be shortly explained in the text, and should be available upon request for the evaluators.

Y

Information on spawner abundance is in compliance with requests from NASCO

Link to sampling protocol documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.

Geertz-Hansen, P., A. Koed, et al. (2013). Manual til elektrofiskeri Vejledning til elektrofiskeri ved bestandsanalyser og opfiskning af moderfisk. DTU Aqua-rapport nr. 272-2013. Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet. 43 pp + bilag
<https://orbit.dtu.dk/en/publications/manual-til-elektrofiskeri-vejledning-til-elektrofiskeri-ved-besta>

Protocol follows international recommendations: Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.

N

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.

NA

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

The sample stratification and digitization process is monitored on an on-going basis.

Sampling process is monitored continuously.

Data capture

Means of data capture: short description (+ photo optionally). Indicate what are the means for collecting the data, e.g. scales, measuring board, dedicated software, ...

Standard electro fishing equipment, measuring board, gps, tagging equipment, tag reading equipment.

At tagging, the position of capture is recorded, the salmon are measured on analogous measuring boards and length and sex are recorded.

A PIT tag is inserted in the dorsal musculature. In the field results are recorded on standard sheets (paper)

During recapture all salmon are measured, and scanned for tags. If the salmon are tagged, the position of recapture is recorded. All salmon are measured and sex recorded.

Subsequently data are stored electronically.

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

N

No written protocol

Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

N

Data storage

National database: Provide the name of national database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

NA

International database: Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

NA

Quality checks and data validation documentation: Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.

N

Sample storage

Storage description: Indicate the type of soft tissues and hard parts stored (e.g. age structures, stomach, plankton, genetics) and the location used for samples storage; how long the samples are stored; how conservation and maintenance as well as access to samples are organised; whether the samples are stored under the auspices/responsibility of an international organization; if yes, which one. Provide a link to information on quantities of sampled stored by species/stock, geographic sub-area and by year.

NA. Tissue samples are not collected.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

NA

Data processing

Evaluation of data accuracy (bias and precision): Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the evaluation of data accuracy exists, provide some details in the textbox.

Y

Spawning run is calculated with 95 % C.L.

(example https://www.fiskepleje.dk/nyheder/2019/02/laks_storaa_opgang_i_2018?id=920eb70e-9439-4de5-b28d-a293157d9add)

Editing and imputation methods: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the editing and imputation methods exists, provide some details in the textbox.

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

N

Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user?

N

Related to table 2.5 and text box 2.5 (biological specific data collection)

Sampling scheme identifier 8: DNK Market sampling

MS : DNK		
Region: All regions		
Sampling scheme identifier: DNK Market sampling		
Sampling scheme type: Commercial by category		
Observation type: SciObsOnShore		
Time period of validity: 2025-2027		
Short description (max 100 words): Sampling scheme collecting biological samples from commercial landings at markets for a list of selected stocks		
Description of the population		
Population targeted: The PSU is national markets*weeks. Population sampled: The PSU is defined as harbour*week. The stocks selected for market sampling are listed by the harbours where the fish are sold. The selected harbours are ranked by weight of landings, percentage of total landings, number of landings by harbour and the costs of getting to the harbour, and only harbours where 80% of the landings of the selected stocks are landed have been included in the sampling programme based on the previous year's landing data, and in the NWP 2025-2027 the average annual number of PSUs in the period 2021-2023 are indicated under the sampling frame 'On-shore PSUs sampled'. The PSUs not included in the sampling scheme are mainly smaller harbours and the number of PSUs are indicated under the sampling frame 'On-shore PSUs unsampled'. A total of 23 harbours/ landings sites have been selected based on 2021-2023 data, and the list of selected harbours is updated annually based on the previous years data, and the number of samples per quarter depends on the stock.		
Stock	Species	Area
COD-23	Cod	23
COD-22+24	Cod	22, 24
COD-2532	Cod	25-32
COD-21	Cod	3aS
COD-43AN	Cod	3aN, 4
PLE-2123	Plaice	21-23
PLE-2432	Plaice	24-32
PLE-43AN	Plaice	3aN, 4
DAB-2232	Dab	22-32

DAB-43A	Dab	3a, 4
WHG-43A	Whiting	3a, 4
TUR-43a	Turbot	3a, 4
SAI-43A	Saithe	3a, 4
LIN-43A	Ling	3a, 4
HKE-43A	Hake	3a, 4
HAD-43A	Haddock	3a, 4
WIT-43A	Witch flounder	3a, 4
ANG-4	Anglerfish	4
LEM-4	Lemon sole	4

Stratification: The harbours/auctions are geographically stratified to take into account two different locations of staff. One group is located in Hirtshals in the Northern part of Jylland and the other group is located in Lyngby in the eastern part of the country. The sampling is further stratified by quarter

Sampling design and protocols

Sampling design description:

The PSUs are calculated by the end of the year for selecting markets*14 days period to be sampled. The selection of markets has been described in section “population sampled”. At a harbour visit the fish boxes (SSU) are selected as one box of each commercial size sorting per selected species which is measured for length, individual weight and age. For flatfish species only 2 fish per cm is measured for length, weight and age. There are presently no guidelines for how the boxes are selected within a market visit and for some harbours sampling fish boxes has been selected by the Danish Fisheries Control Agency or bought at the action. This sampling scheme is for landings of human consumption for selected stocks (EU MAP 2021/1167 table 1)

Is the sampling design compliant with the 4S principle?: Y, harbours selection (PSU) are in accordance with the 4S principles. However, the selection of the SSU (fish boxes) are presently not selected randomly.

Regional coordination: No

Link to sampling design documentation: www.dcf-denmark.dk (Manual for harbour sampling of fish for human consumption conducted by DTU Aqua)

Design follows international recommendations: Y (partly) see sampling design description. The sampling period for the PSU is a 14 day period * landing site (and not as recommended a given day).

Selection (SSU) of a given fish box is presently not conducted in a random way. For each harbour /auction a list with selected stocks (species * area) have been appointed and 1 box per sorting size for a given stock should be collected if they are available the given day. In small harbours it is possible to collect over several day (2-3 days), with all relevant information on landing dates, vessel ID ect.

<https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKPICS3/01%20WKPICS313.pdf>

Link to sampling protocol documentation: [Harbour sampling manual](#)

Protocol follows international recommendations: Y

Sampling implementation

Recording of refusal rate: N, presently we have full compliance in all harbours. However, for SSU sometimes the relevant fish has been sold and this is presently not properly documented as a kind of refusal.

Monitoring of sampling progress within the sampling year: In most cases this is not relevant in the market sampling program as 80% off all landings sites are included and this will reflect the fishery. However, sometimes, especially with very low landings events, additional measures are taken and the relevant fishery is directly targeted to achieve samples. This is the case with herring in the Western Baltic, Cod in SD 23 and Kattegat cod.

Data capture

Means of data capture: Presently, at the sampling sites and electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

Presently, electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

An age reading quality assurance manual can be found here: www.dcf-denmark, [age-reading-quality-assurance-manual-2021](#)

Quality checks documentation:

Y, an R script is run every quarter to ensure all information from the market samples are available and correct. It has following quality checks, but is continuously improved:

1. Check for missing information
 - Method
 - Multiple Ships (Y, N)
 - Type
 - Ship ID
 - Logbook nr.
2. Check length-weight relationship
 - By species. Is there any points that is outside the prediction interval, of linear model over the previous 4 years data from the same quarter? (using $\log(\text{weight})$ & $\log(\text{length})$)
3. Check age-length relationship

• By species. Is there any points that is outside the prediction interval, of polynomial model over the previous 4 years data from the same quarter?
Data storage
National database: FishLine International database: Data are uploaded to international databases where requested in data calls: ICES/RCG RDBES – disaggregated data ICES InterCatch and STECF FDI hosted by JRC – resulting estimates Quality checks and data validation documentation: FiskeLine: Some of the numeric fields in our national database has constrains, so only realistic values can be entered e.g. wind direction, but most of the numeric fields is only constrained by the length of the field in the database, which often is set unrealistically high e.g. mesh size is numeric (5,1). We have implemented a set-up, so it is possible to set realistic values for age, length and weight per species, but the set-up has only been used in a short period, since the technicians was tired of all the warnings. All categorical information have defined code lists in our national database, except skipper contact details. All forms has a free text field for remarks. Rectangles are constrained within areas in our national database. A mapping function allows for ad-hoc check of positions. RDBES: https://github.com/ices-tools-dev/RDBES
Sample storage
Storage description: DTU Aqua has an otolith archive were all otoliths are labelled and stored. Information with year, survey, haul, and fishID is printed on each otolith bag. Pictures of otoliths are for selected species stored in a closed folder system with information including year, survey, haul, and fishID. Genetics are stored with similar information and additional a QR code is printed on the label. Sample analysis: An age reading quality assurance manual can be found here: age-reading-quality-assurance-manual-2021
Data processing
Evaluation of data accuracy (bias and precision): N – documentation will be available in 2025 Evaluation is not done as a routine Editing and imputation methods: N – documentation will be available in 2025 Editing: Overall, if inconsistencies or discrepancies are found then data are checked e.g. against original papers, re-reading of ages, census data. If no error is found, then the value is accepted. In rare case, when an outlier is spotted just before submission of data and it has a strong influence on the result, then the sample is left out and checked afterwards.

Imputation:

Missing sampling of a size sorting strata: Since size sorting category is hidden within the domain (fleet) asked for by the primary end-user, ICES AWG's, then missing values are imputed from other strata. The procedure is not documented, but everything done is documented in SAS or R scripts.

Gaps in age length key: Imputed with average or model

Gaps in weight length key: Imputed with model

Quality document associated to a dataset: No DOI

The estimation process more or less follows procedure documented in ICES CM 2008/R:26

Validation of the final dataset:

Comparison of estimated mean weight per length/age vs. total weight (SOP check on results). If extreme, this is often due to an outlier.

Amount of landings are compared with official records (sale slips)

Numbers at length/age per stock, area and fishery are compared visually with a time series. If great difference, then these are investigated. If errors, then these are corrected, if no errors, then the results are accepted

Related to table 2.5 and text box 2.5 (commercial fisheries data collection)

Sampling scheme identifier 9: DNK EM – ETP species bycatch sampling

MS : DNK
Region: All regions
Sampling scheme identifier: DNK EM – ETP species bycatch sampling
Sampling scheme type: Commercial fishing trip
Observation type: EMAtSea
Time period of validity: 2025-2027
Description of the population
Population targeted: The PET species targeted in this monitoring programme are all marine mammals, birds, non-commercial elasmobranchs, and chelonians captured incidentally in Danish commercial gillnets. The PSU is fishing vessel. Figure 1 shows the sampling effort distribution during the reference period.

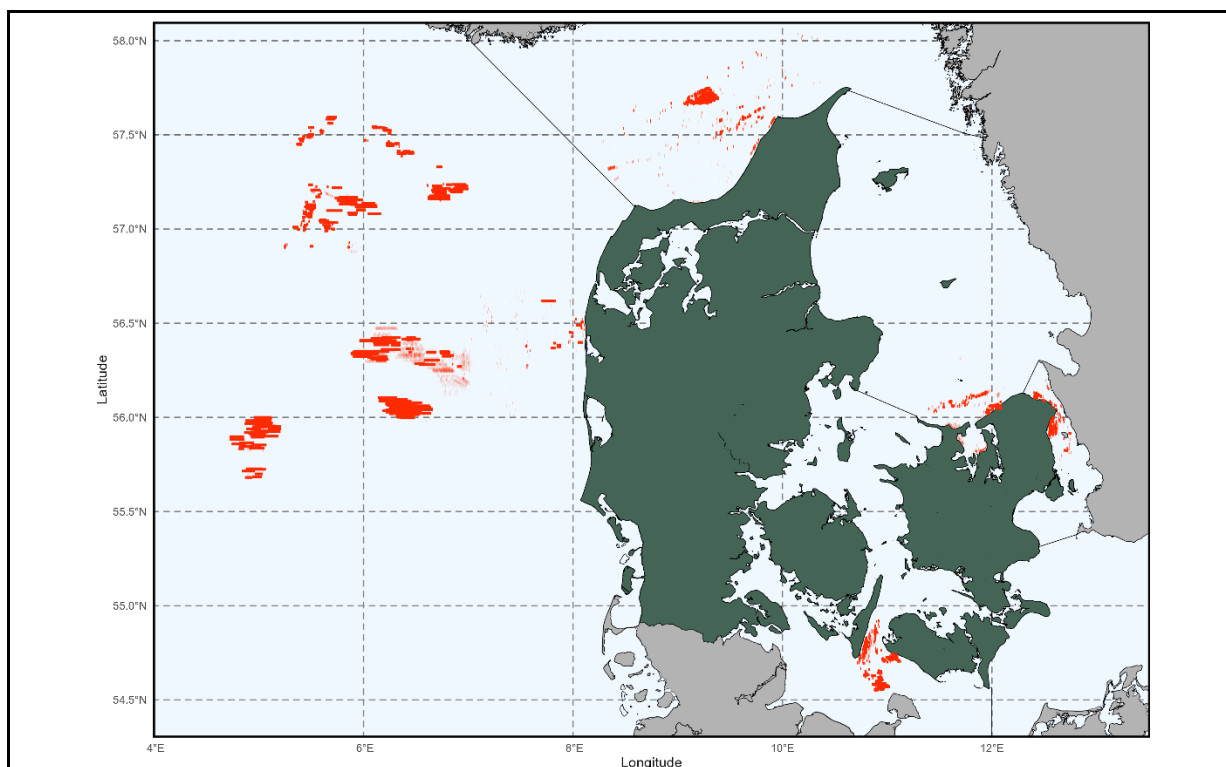


Fig. 1 Location of the hauls recorded in the Danish bycatch monitoring programme, using electronic monitoring with videos on commercial gillnetters. Data from 2021 to 2023. Hauls are represented as red lines. Delimitations between ICES areas are marked as plain grey lines.

Population sampled:

All air-breathing and elasmobranch ETP species (i.e., not fish) captured incidentally in gillnets.

Stratification:

The sampling units (commercial vessels) were selected opportunistically based on the list of volunteering gillnet vessels whose main fishing location and/or home harbour was situated in ICES areas IV, IIIa, IIIb, and IIIc. This excluded *de facto* from the monitoring programme the fraction of the fishing boats whose vessel master was refractory to video monitoring. Moreover, vessels fishing only seasonally with gillnets or during limited periods of the year were also excluded. No participating vessel was originating from the Baltic Proper and the island of Bornholm during the reference period. There were more volunteers than EM systems available during the reference period, so new EM monitoring effort was directed towards areas where few historical bycatch data existed (namely the North Sea and Kattegat) using vessels that had registered more fishing effort in the previous years than the fleet average in these areas. Average fishing effort of the sampled fleet represented approximately 3.5 % of the yearly fishing effort of the entire Danish gillnet commercial fleet (in fishing days) during the reference period.

Sampling design and protocols

Sampling design description:

As described in the previous section, the PSUs are the commercial fishing vessels using gillnets as their primary gear most of the year in the North Sea, Skagerrak, and Western Baltic, since gillnets have been identified in Denmark as the most problematic gear with regards to bycatch of ETP species.

From the primary stratification level (vessel), the SSU are – by increasing resolution level – fishing trip, fishing day, and individual haul within each fishing day. A census of the fishing activity recorded with EM was analysed for bycatch of ETP species. This means that the videos of every haul in the EM database was watched through by a trained EM analyst. Any bycaught animal was marked (associating the position and time of the bycatch within each SSU/PSU) as either bird, mammal, or elasmobranch (or chelonian, but none was caught). Identification of the animals at species-level (and for some species sexing and aging) was done afterwards independently of the EM analysing process. As a result, bycatch rates could be estimated for each species in each ICES statistical area (provided that enough data had been collected in for that species in the considered stratum).

Is the sampling design compliant with the 4S principle?

N (selection of PSU is not random).

Regional coordination:

N

Link to sampling design documentation:

[Manual for video-based electronic monitoring of bycatch in gillnets \(updated manual has been added to homepage\).](#)

HELCOM report “[Bycatch in Baltic Sea commercial fisheries: High-risk areas and evaluation of measures to reduce bycatch](#)”

Scientific journal article “[Assessing seabird bycatch in gillnet fisheries using electronic monitoring](#)”

Design follows international recommendations:

Y (partly) see earlier description

Link to sampling protocol documentation:

[Manual for video-based electronic monitoring of bycatch in gillnets](#)

HELCOM report “[Bycatch in Baltic Sea commercial fisheries: High-risk areas and evaluation of measures to reduce bycatch](#)”

Scientific journal article “[Assessing seabird bycatch in gillnet fisheries using electronic monitoring](#)”

Protocols follows international recommendations:

N. There is presently no protocol to sample bycatch of ETP species in gillnets agreed upon at international level. However, in the absence of reliable fine-scale data on ETP species bycatch in most fisheries in the EU, fine-scale species-specific bycatch rates as estimated in the Danish long-term bycatch electronic monitoring programme provide essential data to model and forecast the effects of fishing on affected ETP species populations in the region, following notably the recommendations of OSPAR (<https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/thematic-assessments/>) and HELCOM (<https://helcom.fi/baltic-sea-trends/indicators/>) biodiversity indicators, both in line with MSFD D1C1 criterium.

Sampling implementation

Recording of refusal rate:

NA, the sampling design is based on voluntary participation of fishers.

Monitoring of sampling progress within the sampling year:

At least twice a month, incoming EM data are controlled for every vessel. If technical issues are encountered (no data or faulty video or positional data), the fishers are contacted, and a technician is sent onboard to fix the potential issues. If the EM system is turned off manually or impaired with, this constitutes a breach to the contract, so the incriminating fishers are first contacted to explain the situation, their EM data are compared to landings declarations and/or logbook, and if this constitutes a breach in the contract indeed, they are excluded from the EM monitoring and lose their additional quota. Moreover, contracts are renewed on a yearly

basis. Therefore, fishers have the possibility to renew or end the EM data collection each year.

Data capture

Means of data capture:

The hardware of an EM system consists of a control box installed in the wheelhouse, associated with 2 to 4 waterproof rugged closed-circuit television (CCTV) cameras recording the activity on deck from different angles, and linked to a position sensor (GPS receiver). Recorded data are stored onboard and uploaded to a dedicated server automatically every time the vessel is in an area covered with Wi-Fi or 3G/4G mobile network (e.g., the harbour). Analyses of the temporal and spatial characteristics of the fishing trips are done using a dedicated electronic monitoring analyser software (EM analyser), here Anchorlab BlackBox Analyzer (<https://www.anchorlab.net/EFM.aspx?tab=Analyzer>). Simply put, the recordings made on-board the fishing vessels are stored in a database that associated time, GPS positions, and videos. For the end-user, the EM analyser software presents one or several fishing trips at a time for each vessel, displaying alongside a map with the GPS trace, a timeline indicating the instantaneous vessel speed, and the video recordings from the different cameras. The EM analyst interacts with the software by putting annotations and notes along the timeline, which can be extracted as a database with the geo-localisation of each fishing operation and bycatch event, associated with additional operational and ecological parameters. Annotated images to train algorithms able to detect bycatch events automatically are also collected and stored locally on secured servers.

Data capture documentation:

[Manual for video-based electronic monitoring of bycatch in gillnets](#)

Quality checks documentation:

Y. New raw EM data are checked for every vessel at least twice a month manually (check if the data are uploaded on the server, and if they are correct in terms of video quality, number of cameras recording, GPS recording and cleanliness of the lenses). Logs of the quality check are kept on a separate spreadsheet (not available online).

Additionally, between five and ten percent of the processed video data from EM analysts are checked at random every quarter for missing fishing activity and bycatch events (not available online).

Related to table 2.6 and text box 2.6 (biological specific data collection)

Sampling scheme identifier 10: NSSS

MS : DNK
Region: North Sea (Area 4a and 4b)
Sampling scheme identifier: NSSS
Sampling scheme type: Research survey at sea
Observation type:
Time period of validity: 2025-2027
Short description (max 100 words): The survey is a trawl survey targeting sand eel when they are buried in the sediment during night time. A modified mussel dredge is used. The objective of the survey is to improve the scientific advice on sand eel. It provides the basis for setting a preliminary index for the sand eel fishery for the coming year. The data are used for calculating a 0-group abundance index, which is used in the annual stock assessment.
Description of the population
Population targeted:

The target species is *Ammodytes marinus* (Lesser sand eel). The survey is conducted in the North Sea incl. Skagerrak.

Population sampled:

Ammodytes marinus (Lesser sand eel).

Stratification:

The so called Sand eel fishing banks has been identified prior to the initialization of the survey time series. These banks have been identified based on historical information about the commercial fishery and investigation of the sediment in order to identify potential suitable areas where sand eels are buried during winter. A fixed number of stations at fixed locations are fished on each bank

Sampling design and protocols

Sampling design description:

The sampling design is a fixed grid design stratified in the defined Sand eel fishing banks. The sampling scheme applies to the whole population of Lesser sand eel in the north Sea and Skagerrak.

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

NA (research survey)

Regional coordination:

No regional coordination as only DEN is carrying out the survey.

Link to sampling design documentation:

The file "Manual Tobisskrabetogtet.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Design follows international recommendations:

Y

Link to sampling protocol documentation:

The file "Manual Tobisskrabetogtet.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Protocol follows international recommendations:

Y (HAWG)

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.

Data capture documentation:

The file "Manual Tobisskrabetogtet.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Quality checks documentation

Y. Upon working up the catch, data are scrutinized by the cruise leader onboard. If irregularities are discovered these are rectified in the raw data. Further details can be found in the file "Manual Tobisskrabetogtet.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Data storage

National database:

Raw data are as well available on the DTU data website <https://doi.org/10.11583/DTU.14798028.v1>

International database:

Survey data is available from ICES survey database DATRAS.

Quality checks and data validation documentation: When punched in into the national database (Fiskeline) several checks are made including species name evaluation and work up sampling strategy consistency in connection with raising from sampling level to total catch. Various plots of length and age information are made and outliers are investigated in the raw data.

Sample storage

Storage description:

Otoliths from the samples brought back to the lab are stored dry in archive at DTU-Aqua Otoliths library.

Information about the amount of samples stored are available on request to the DTU-Aqua. Annual sampling effort is as well forwarded to the ICES HAWG.

Sample analysis:

The annual ICES assessment WG.

<https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=37880>

Data processing**Evaluation of data accuracy (bias and precision):**

The use of raw survey data is part of the assessment process, which is carried out by ICES. The accuracy of the survey estimates are not formally calculated as the assessment of sand eel in the North Sea is of category 5 and no analytical stock assessment. The quality and accuracy of the assessment including survey data and other input is described in

ICES. 2017. Report of the Benchmark on Sandeel (WKSand 2016), 31 October - 4 November 2016, Bergen, Norway. ICES CM 2016/ACOM:33. 319 pp.

Editing and imputation methods:

Y. During the survey the results are registered in Excel sheets. These sheets are continuously forwarded to key persons for inspection and check during the survey. Imputation to the national database is made by hand from the Excel sheets. No imputation is made for survey data.

The process during the survey is described in the file “Manual Tobisskrabetogtet.docx” can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Quality document associated to a dataset:

N

Validation of the final dataset:

As raw data are submitted no further quality assurance are made beside the assurance made during the collecting and imputation process.

Related to table 2.6 and text box 2.6 (biological specific data collection)

Sampling scheme identifier 11: FFS

MS : DNK

Region: North Sea (Area 3a)

Sampling scheme identifier: FFS

Sampling scheme type: Research survey at sea

Observation type:

Time period of validity: 2025-2027

Short description (max 100 words):

The objective of the survey is to establish a time series of catch and effort data independent of the commercial fishery for sole and plaice in the Kattegat and the southern Skagerrak. The survey has been initiated in 2004 and provides currently the main input data set for the 3a sole assessment conducted by ICES WGBFAS.

Description of the population

Population targeted:

Sole (*Solea solea*) in area 3a

Population sampled:

Sole and other flatfish

Stratification:

None

Sampling design and protocols

Sampling design description:

The survey was originally designed in order to establish fisheries independent CPUE indices by means of annual fishing at 120 fixed stations, 60 stations were placed by the fishermen and 60 by DTU-Aqua. In 2010 the total number of stations reduced to 116. In 2011 the survey was reduced further to 80 stations, all included in the originally set up, and in 2016 10 stations were added to the survey.

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

NA (Research survey)

Regional coordination:

N (National survey)

Link to sampling design documentation:

The file "Manual Tunesurvey.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Design follows international recommendations:

Y (WGBFAS)

Link to sampling protocol documentation:

The file "Manual Tunesurvey.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Protocol follows international recommendations: Y (WGBFAS)

Sampling implementation

Recording of refusal rate:

NA

Monitoring of sampling progress within the sampling year:

NA (scientific survey)

Data capture

Means of data capture:

Traditional catches (otter board trawl); working-up on board: sorting, length measurements on measuring board. Determination of individual weights for selected species; dissection of sole to obtain biological data.

Data capture documentation:

The file "Manual Tunesurvey.docx" can be found on: <https://www.dcf-denmark.dk/manuals-documentation>

Quality checks documentation:

Upon working up the catch, data are scrutinized by the cruise leader onboard. If irregularities are discovered these are rectified in the raw data
Data storage
National database: Raw data are stored in the national database “Fiskeline”. Fiskeline is not accessible through a website. International database: NA Quality checks and data validation documentation: The file “Manual Tunesurvey.docx” can be found on: https://www.dcf-denmark.dk/manuals-documentation
Sample storage
Storage description: Otoliths from the samples brought back to the lab are stored dry in archive at DTU-Aqua Otoliths library. Information about the amount of samples stored are available on request to the DTU-Aqua. Annual sampling effort is as well forwarded to the ICES WGBFAS. Sample analysis: ICES WGBFAS annual assessment report https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/HAWG_publication%20with%20multiple%20files/HAWG%202021_Full%20report.pdf
Data processing
Evaluation of data accuracy (bias and precision) Data are processed on national basis. An annual index (number at age) is calculated based on a GAM model. The model is describe in: Berg, C.W. and Kristensen, K. 2012. Spatial age-length key modelling using continuation ratio logits. Fisheries Research, 129:119-126. And Vinther, M. and J. Boje. 2015. Sole survey indices. Working doc 2, IBPSOLKAT 2015. The accuracy of the survey estimates are calculated as part of the assessment procedure (SAM assessment model). The accuracy of the assessment including survey data and other input is described in: ICES. 2015a. Report of the Inter-Benchmark Workshop on Sole in Division IIIa and Subdivisions 22–24 (Skagerrak and Kattegat, Western Baltic Sea), 1 July–31 October 2015, by correspondence. ICES CM 2015/ACOM:57. 36 pp. Editing and imputation methods: During the survey the obtained data are registered in hard copies on paper. These data are later punched in into the national database. No imputation is made for survey data. The process on board is described in the file “Manual Tunesurvey.docx” can be found on: https://www.dcf-denmark.dk/manuals-documentation Quality document associated to a dataset: N. Validation of the final dataset: Overall, if inconsistencies or discrepancies are found then data are checked e.g. against original papers, re-reading of ages, census data. If no error is found, then the value is accepted. In rare case, when an outlier is spotted just before submission of data and it has a strong influence on the result, then the sample is left out and checked afterwards. The assessment process including survey data and other input is described in: ICES. 2015a. Report of the Inter-Benchmark Workshop on Sole in Division IIIa and Subdivisions 22–24 (Skagerrak and Kattegat, Western Baltic Sea), 1 July–31 October 2015, by correspondence. ICES CM 2015/ACOM:57. 36 pp.

Related to table 2.6 and text box 2.6 (biological specific data collection)

Sampling scheme identifier 12: Baltic Ichthyoplankton Survey - BIS

MS : DNK
Region: Baltic Sea
Sampling scheme identifier: Baltic Ichthyoplankton Survey - BIS
Sampling scheme type: Research survey at sea
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): The main aim of the Baltic Ichthyoplankton Surveys is monitoring of the spatial distribution and abundance of fish eggs and larvae, with Baltic cod as the main target species. In addition to the ichthyoplankton sampling, a number of trawl hauls are conducted to obtain information on the adult cod, in particular on their fecundity and sex ratios. Furthermore, hydrological parameters are recorded throughout the survey area via CTD casts. The data resulting from these surveys are utilized to produce a fishery independent SSB estimate as well as a larval index, which are used in the stock assessment of Baltic cod. If funding is not provided for this survey in the time period 2025-2027 it will not be conducted as it is not part of the mandatory surveys
Description of the population
Population targeted: The main target species is Baltic cod (<i>Gadus morhua</i>). However, depending on the time of sampling, eggs and larvae of other species are caught as well, such as e.g. sprat (<i>Sprattus sprattus</i>), herring (<i>Clupea harengus</i>) and flounder (<i>Platichthys flesus</i>) as well as several non-commercial species. Population sampled: Same as described above under “Population targeted”. Stratification: The surveys are carried out on a regularly spaced station grid in the main spawning areas of Baltic cod, with approximately 10 nautical miles between sampling stations.
Sampling design and protocols
Sampling design description: Several individual survey cruises are conducted each year in close collaboration between several institutes around the Baltic Sea. The surveys are conducted between March and November, aiming to cover the entire spawning season of the target species, Baltic cod. As spawning of Baltic cod is presently mainly restricted to the Bornholm Basin in ICES SD 25 due to the ambient hydrographic conditions, this area is also the main survey area which is covered by a standard station grid consisting of 45 stations. In addition, some cruises also cover adjacent areas to account for potential spatial extension of spawning activity. Is the sampling design compliant with the 4S principle?: A fixed station allocation is used in the design Regional coordination: The Baltic Ichthyoplankton Surveys consist of several individual survey cruises, which are conducted each year in close collaboration between several institutes around the Baltic Sea. Participating nations are Denmark, Germany and Poland. Link to sampling design documentation: The Baltic Ichthyoplankton Surveys and the applied sampling design and sampling procedures as well as sample and data analyses have been reviewed and evaluated by ICES WGALES (Working Group on Atlantic Fish Larvae and Eggs Surveys):

ICES. 2018. Report of the Working Group on Atlantic Fish Larvae and Eggs Surveys (WGALES). 22-26 October. Lyngby, Denmark. ICES CM 2018/EOSG:04. 56 pp.

Design follows international recommendations:

Y

Link to sampling protocol documentation:

ICES. 2018. Report of the Working Group on Atlantic Fish Larvae and Eggs Surveys (WGALES). 22-26

Protocol follows 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:

Sorting equipment, stereo microscopes, different sampling protocols, CTD probe with data processing software.

Data capture documentation:

Quality checks documentation:

NA

Data storage

National database:

NA

International database:

NA so far, but potential future implementation into ICES egg and larvae database

Quality checks and data validation documentation:

NA

Sample storage

Samples are stored in archive

Data processing

Evaluation of data accuracy (bias and precision)

NA

Editing and imputation methods:

NA

Quality document associated to a dataset:

NA

Validation of the final dataset:

NA

Related to table 2.4 and text box 2.4 (recreational fisheries data collection)

Sampling scheme identifier 13: offsite questionnaire

MS : DNK
Region : North Sea and Baltic Sea
Sampling scheme identifier : offsite questionnaire
Sampling scheme type: recreational (off site surveys)
Observation type: SelfOnShore
Time period of validity : 2025 - 2027
Short description (max 100 words): Sampling scheme aims at collecting catch data (harvested and released components) for the mandatory species (Table 3, Commission Delegated Decision (EU) 2019/910) from the recreational fisheries in Denmark. The data is collected via an off-site web based questionnaire sent out to a subsample of national license holders by Statistics Denmark. The ca. 6000 yearly respondents (ca. 40%) constitutes the basis for the extrapolation to population level (the yearly total Danish catches of the mandatory species).
Description of the population
Population targeted: All Danish recreational anglers/fishers with a valid 1 year fishing license Population sampled: Subsamples of the total populations of the two types of Danish license holders. Stratification: Two different types of 1 year licenses are available in Denmark. Each type being a sampling frame for the survey and the total population stratified accordingly into the two types; passive gear fishing and angling. Temporal and geographical stratification is applied (responses on quarterly catches per ICES SD area).
Sampling design and protocols
Sampling design description: PSU (Angler or passive gear fisher) is selected by a simple random approach. Both harvested and released components are included in the sampling scheme. Is the sampling design compliant with the 4S principle?: NA Regional coordination: No regional coordination. However, Germany scale the Danish recreational catches in SD22 & SD24 for the ICES stock assessment. This agreement is not formalized. Link to sampling design documentation: The survey is described in ICES Journal of Marine Science, Volume 69, Issue 2, March 2012, Pages 323–330, Design follows international recommendations: N (it is not recommended to use a recall based questionnaire survey to collect catch data, if the recall period is up to 6 months. However, the Danish recreational catch data included in stock assessment for the western Baltic cod is adjusted by using an on-site survey). Link to sampling protocol documentation: ICES Journal of Marine Science, Volume 69, Issue 2, March 2012, Pages 323–330,
Sampling implementation
Recording of refusal rate: Y Monitoring of sampling progress within the sampling year: In the off-site survey we are aiming at a minimum respondent rate of ca. 50%. If the 50% is not reached a prolonged period for the respondents to access the questionnaire is possible. Reminders in form of follow up letters are also sent to the non-respondents.
Data capture
Means of data capture: Subsamples are created with SAS Proc SurveySelect (Statistics Denmark) and respondents answers are analysed using R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/ .

Data capture documentation:
Quality checks documentation: Y (ICES. 2015. Report of the Working Group on Recreational Fisheries Surveys (WGRFS), 1–5 June 2015, Sukarrieta, Spain. ICES CM 2015\SSGIEOM:10. 111 pp)
Data storage
National database: Fiskeline
International database: NA.
Quality checks and data validation documentation: Input data coming from statistics Denmark (respondent answers) is being quality checked for typos and outliers before included in the catch estimation analysis.
Sample storage
NA
Data processing
Evaluation of data accuracy (bias and precision): Y. Precision of the estimates for the total catches for the mandatory species is calculated as RSE values for each ICES SD area and quarter. The bias in the survey has been evaluated (ICES. 2015. Report of the Working Group on Recreational Fisheries Surveys (WGRFS), 1–5 June 2015, Sukarrieta, Spain. ICES CM 2015\SSGIEOM:10. 111 pp)
Editing and imputation methods: N
Quality document associated to a dataset: Is there a publication digital object identifier (DOI) created? N Is there a document summarising the estimation process followed? ICES Journal of Marine Science, Volume 69, Issue 2, March 2012, Pages 323–330, Orio, A., Karpushevskaia, A., Nielsen, A., Sundelöf, A., Berg, C. W., Albertsen, C. M., ... Heimbrand, Y. (2019). Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). International Council for the Exploration of the Sea (ICES). ICES Scientific Report, No. 9, Vol.. 1
Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user? Quality checks of all respondents data before entering the analysis. Output from analysis of the total catches checked by number of answers giving basis for the analysis together with the RSE.

Related to table 2.4 and text box 2.4 (recreational fisheries data collection)

Sampling scheme identifier 14: accesspoint interview

MS : DNK
Region: Baltic Sea
Sampling scheme identifier: accesspoint_interview
Sampling scheme type: recreational on site surveys
Observation type: SciObsOnShore
Time period of validity: 2025 - 2027
Short description (max 100 words): The survey and the sampling scheme aim at collecting Baltic Salmon and sea trout catch data (harvested and released components) from trolling boat anglers in the ICES SD 24 and 25. The access point survey data is used to adjust the mean catch per trip from the recall web based questionnaire survey (offsite_questionnaire) before extrapolating to total catch for the population. No total effort estimates are gathered or estimated from the survey.
Description of the population

Population targeted: The target population is salmon trolling anglers fishing for salmon in the Baltic Sea (ICES SD24/25) and returning to a harbour on the Island of Bornholm. The harbours are the Primary Sampling Units (PSU), the boats the Secondary Sampling Units (SSU) and anglers are Tertiary Sampling Units (TSU). Population sampled: All harbours (PSU) which are used by trolling boats (SSU) on the Island of Bornholm during the trolling season (September – June). Stratification: No stratification
Sampling design and protocols
Sampling design description: Sampling of the harbours is non-probability based. The sampling effort is increased during the peak season of the trolling fishery and are primarily conducted to the most frequently used harbours/boat hauling ramps. When the weather allows for trolling during the fishing season an observer, living at the Island of Bornholm, drives to several different locations to interview anglers when returning from their fishing trip. Sampling at the individual access point follows a protocol. At the access point the observer interviews all the anglers using a fixed set of questions (questionnaire). The questions are primarily focusing on catch and effort related to the recent ended trip. The angler is asked to give information on his/her catch on the trip (harvested and released components) and the length of the trip. Is the sampling design compliant with the 4S principle?: NA Regional coordination: N Link to sampling design documentation: N Sampling documentation is not published. Documentation will be available in 2022. Design follows international recommendations: N Since the survey is not using a probability based approach it is not following guidelines described by the ICES WGRFS. Link to sampling protocol documentation: N Sampling documentation is not published. Documentation will be available in 2022. Compliance with international recommendations: N
Sampling implementation
Recording of refusal rate: Y The number of anglers refusing to participate in the survey is collected. Monitoring of sampling progress within the sampling year: The sampling is intensified during the high peak season for the trolling fishery (April and May).
Data capture
Means of data capture: All landed salmon are measured and weighted and scales collected. Data from the interviews are uploaded to a survey server (Survey Gizmo - Alchemer) and later uploaded to the national database. Data capture documentation: Data captured using tablets installed with the survey tool Gizmo – Alchemer survey software. Quality checks documentation: Quality checks on the stored data are done on a random basis throughout the sampling, but all data is checked before being used in any further analysis.
Data storage
National database: NA International database: NA

Quality checks and data validation documentation: NA
Sample storage
Data processing

Related to table 2.4 and text box 2.4 (recreational fisheries data collection)

Sampling scheme identifier 15: onboard_interview

MS : DNK
Region: Baltic Sea
Sampling scheme identifier: onboard_interview
Sampling scheme type: Recreational on site surveys
Observation type: SciObsAtSea
Time period of validity: 2025 - 2027
Short description (max 100 words): The on-site survey is targeting charter-boat anglers in the ICES SD23. The target population is all tour boat anglers in the ICES SD23. The sampling frame is a list of all the Danish charter boats in the ICES SD23. The coverage and the sampling intensity of the charter boats trips (PSU) was earlier based on information on the number of trips for each boat in each quarter (strata). The sampling was probability proportional to size based (PPS), the more trips per quarter the higher the sampling effort. However, since the recreational cod fishery in the western Baltic Sea is prohibited, the coverage and sampling intensity is now non-probability based. This can change back to a probability-based sampling design if the recreational cod fishery opens again.
Description of the population
Population targeted: The target population is all Danish charter boats in the ICES SD23
Population sampled: All Danish charter boats in ICES SD23
Stratification: No stratification
Sampling design and protocols
Sampling design description: Sampling of the charter boats is non-probability based.
Is the sampling design compliant with the 4S principle?: NA
Regional coordination: N
Link to sampling design documentation: ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp.
Design follows international recommendations: N Since the survey is not using a probability based approach it is not following guidelines described by the ICES WGRFS.
Link to sampling protocol documentation: ICES. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp.
Compliance with international recommendations: N
Sampling implementation
Recording of refusal rate: Y The number of anglers refusing to participate in the survey is collected.

Monitoring of sampling progress within the sampling year: N
Data capture
Means of data capture: Data from the interviews are uploaded to a survey server (Alchemer) and later uploaded to the national database.
Data capture documentation: Data captured using tablets installed with the survey tool Alchemer survey software.
Quality checks documentation: Quality checks on the stored data are done on a random basis throughout the sampling, but all data is checked before being used in any further analysis.
Data storage
National database: Fiskeline
International database: NA
Quality checks and data validation documentation: NA
Sample storage
Data processing

Related to table 2.5 and text box 2.5 (biological specific data collection)

Sampling scheme identifier 16: DNK At-sea Observer

MS : DNK
Region: All regions
Sampling scheme identifier: DNK At-sea Observer
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Description of the population
Population targeted: <i>Specify which are the primary sampling units (PSU), e.g. all national port*days (information present in former Table 4B). For research surveys: specify the main target species from a survey perspective (as opposed to Table 1 in the Annex to the Implementing Decision) and the main survey area.</i> PSU: Fishing trip (vessel * day) Target population: All Danish fishing trip conducting a fishery with seine, bottom trawl, beam trawl or gillnetts targeting demersal fish and crustaceans (Nephrops, Pandalus shrimps and Crangon crangon) for human consumption in The Baltic Sea, Kattegat, Skagerrak and North Sea. The gillnetters are presently only covered in Kattegat and the Baltic, however a test study will be conducted to include gillnetters in Skagerrak and the North Sea. Denmark has a single beam trawler targeting demersal fish with large mesh, but the program do not intent to cover that vessel. Population sampled: <i>Specify which part of the target population will be sampled and specify which part of the target population is unreachable for sampling or excluded for some reason to explain, e.g. major ports being listed as auctions excluding all minor ports and no sampling during the week-ends. For research surveys at sea describe target species in single-species surveys or ecosystem component (e.g. demersal, pelagic) in multispecies surveys.</i> A description of how the sampling frames are created can be found in Observer_at_sea_sampling_frame_2020, www.dcf-denmark.dk Sampled: All vessels predominantly participating in the fisheries described in 'Target population'.

The vessels are found by excluding all vessels predominantly fishing in another fishery e.g. fisheries targeting fish for reduction or small pelagic or fishing outside the main area. Predominance is determined by assigning each fishing trip to one of the following activities (in the order specified):

1. Fishing outside area 27 -> outside area 27.3 and 27.4
2. Fishing for mussels -> mussels
4. Targeting fish for reduction or small pelagic -> reduction_SPF
5. Fishing with TBB $\geq$ 120 -> TBB>120
6. Fishing outside area 27.3 and 27.4 -> outside area 27.3 and 27.4

If a vessel spends more than 95 % of its trips in a single one of these category, then the vessel is excluded from the sampling frame. All other vessels are included.

Excluded:

None-predominantly: Due to the threshold on 95% of the trips some of the excluded vessels may be a part of the target population at rare occasions.

Inactive: Vessels with a low activity are excluded, since these are too hard to arrange a trip with. The criterion for inactivity is less than 50 days at sea and earning less than 26,845 Euro a year for gillnetters the limit of earning is set to 6,711 Euro/ year.

Too small: Vessel with an overall length less than 9.5 meters are excluded, since these are too small to allow for observers on-board. For gillnetters the selection of vessels are excluded if they are below 8 meters.

Stratification: *Explain the logic taken to stratify the population and the number of strata generated, e.g. population stratified in 3 geographical lots (from A to B, from B to C and from C to D). Each lot is then stratified by auction.*

The stratification takes the following into account

Location of homeport: DTU Aqua has two facilities for sampling of commercial fisheries. Each harbour is assigned to a facility based on logistic e.g. distance. The vessels home port is used to assign a vessel to a harbour. This is mainly a logistic stratification, which ensures short distance from lab to vessel and independence between facilities.

Main area and fishery: A vessels is assigned to a strata based on where most of fishing takes places. This secures that relevant areas and fisheries are covered, without over stratification. Presently six vessels list are used to cover the observer program in Denmark:

- Beam trawlers - Crangon - North Sea
- Trawlers – Pandalus - Skagerrak
- Trawler / seiners - Mixed - Baltic
- Gillnets - Demersal - Baltic
- Trawler / seiners - Mixed - Skagerrak
- Trawler / seiners - Mixed – North Sea

Sampling design and protocols

Sampling design description: Describe how the sampling allocation is defined; how PSU and SSU are selected for sampling; indicate for which catch fraction the sampling scheme applies.

Sampling allocation between strata is proportional to number of trips within a stratum the year before, with a minimum of 2 trips per strata. Each vessel on a given list has equal chance of being selected.

A fishing trip (PSU) is selected with UPSWOR (Unequal Probability Sampling Without Replacement) the following way

1. Selecting a vessels from the list of vessels. This is done with SRSWR in a excel sheet created with this purpose.
2. The observer calls and ask to join on the next trip conducted from the vessel

The result is UPSWOR selection of the PSU, since the selection of the trip is nested within the selection of a vessel.

For vessels conducting 1 days trip, it is part of the sampling scheme to take 2 trips in a row.

The fishing operation (SSU) is selected with NPJS, the instruction is as many as possible, but with a minimum of 1 haul per day.

Catch fraction: Other. Weight per species is recorded for all fractions (Catches (All fractions)). Lengths are in general only recorded for the discard part (Catches (DIS fraction)), except for crustaceans where length are measured for all fractions (Catches (All fractions)). As a supplement our observers often record the weight of the landings on fishing operations, where they don't have time to record discard amount and length per species.

Not all species are reported on species level. This is because some species can be hard to give correct species ID and then family level is used instead. The observers are provided with a list indicating all the species where they are allowed to use family level instead of species level. For invertebrates only commercial decapods are determined at species level.

Part of the fishing operation observed – relevant in relation to PETS: The sorting of catch and the hauling on gillnetters.

Is the sampling design compliant with the 4S principle?: *Y/N/NA (NA for e.g. surveys and diadromous and recreational sampling schemes)*

Y

Regional coordination: *Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.*

No

Link to sampling design documentation: *Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, Member State shall provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, Member State shall provide some details in the textbox.*

<https://www.dcf-denmark.dk/manuals-documentation>
[“manual for oparbejdning af fangster på kommercielle fartøjer”](#)

Design follows international recommendations: *Indicate ‘Y’ (yes) if the sampling design is in line with international recommendations, and ‘N’ if not. If no relevant expert or coordination groups exist, the sampling design should be shortly explained in the text, and should be available upon request for the evaluators.*

Y

Denmark initiated the work to improve the sampling design of the commercial on board sampling following the outcomes of ICES WKACCU, WKPRECISE, WKCATCH, WKPICS and SGPIDS. This outcome has since 2011 led to a gradually change from an ad-hoc sampling programme to a statistically sound sampling (4S) in the observer programme where trips/vessel are the primary sampling unit within some pre-defined fleet lists. The vessel list has been selected according to the home harbour and the main gear type (fleet group) and each lists accounts of unique vessels based on the fishery from the previous year, indicating that the same vessel cannot be present in more than one list.

Link to sampling protocol documentation: *Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.*

<https://www.dcf-denmark.dk/-/media/sites/dcf/manuals/manual-til-oparbejdning-af-fangster-paa-kommercielle-fartoejer-dk.pdf?la=da&hash=25EFD1E5649C762F9FC9C58AED19D2E82B8D5DD3>

protocol only exists in Danish

Protocol follows international recommendations: *Member State shall state ‘Y’ (yes) if the sampling protocol is in line with international recommendations, and ‘N’ if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.*

Y

Denmark initiated the work to improve the sampling design of the commercial on board sampling following the outcomes of ICES WKACCU, WKPRECISE, WKCATCH, WKPICS and SGPIDS3. The Danish on board sampling program has implemented the recommendation from SGPIDS3 on refusal categories and the sampling design recommended by WKPICS3.

<https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKPICS3/01%20WKPICS313.pdf>

<https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/SGPIDS/SGPIDS13.1.pdf>

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.

Y

In 2023 the Danish selection changed to refusal by vessel instead of trips. The vessel lists are now pre selected for all the vessels willing to participate in the observer program. The rest of the vessels are assumed to be refusals. Every year a meeting is conducted between the fishermen's organisation (DFPO) and DTU Aqua and the list is hereafter reviewed. This was conducted to ease the burden for the observers and only calling the fishers willing to participate. When a vessel is selected for an observer trip the vessel has to be contacted by the observer and asked for participation on the next conducted fishing trip. The fishermen answers are recorded and answers reported for each vessel list.

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

If a vessel is selected by one list and is conducting another fishery however, still part of the observer program, the trip is still conducted. If the vessel is conducting a fishery presently not included in the observer program the trip is not selected.

As to the large work load on calling fishermen not willing to participate in the observer program the selection has changed.

Data capture

Means of data capture: short description (+ photo optionally). Indicate what are the means for collecting the data, e.g. scales, measuring board, dedicated software,

Presently, at the sampling sites and electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

In the Neprops fishery electronic measuring has been developed with an automatic upload to the database.

An age reading quality assurance manual can be found here: [age-reading-quality-assurance-manual-2021](#)

Presently, electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

Maturity manuals are available at www.dcf-denmark

Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

Y

Routine check per trip and quarter: Different relevant checks are done as a routine on all at-sea observer trips, both per trip and quarter, www.dcf-denmark “discardtjek_kvartal_rapport” and “discardtrip_rapport”

N – documentation will be available in 2025

Routine check at a yearly basis: The following outliers are checked (visually, extreme percentage)

1. Age and weight per length (individual measurements)
2. Discards weights per haul and species compared to an estimated weight based on the length distribution of the sample

An age reading quality assurance manual can be found here: [age-reading-quality-assurance-manual-2021](#)

Data storage

National database: *Provide the name of national database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.*

FishLine

International database: *Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.*

Data are uploaded to international databases where requested in data calls:

ICES RDB and ICES RDBES – disaggregated data

ICES InterCatch and STECF FDI hosted by JRC – resulting estimates

Further the results are published every second year at the DTU website

<https://orbit.dtu.dk/en/publications/udsamid-af-fisk-og-skaldyr-i-dansk-fiskeri-i-2022>

Quality checks and data validation documentation: *Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.*

FisheLine: Some of the numeric fields in our national database has constrains, so only realistic values can be entered e.g. wind direction, but most of the numeric fields is only constrained by the length of the field in the database, which often is set unrealistically high e.g. mesh size is numeric (5,1). We have implemented a set-up, so it is possible to set realistic values for age, length and weight per species, but the set-up has only been used in a short period, since the technicians was tired of all the warnings. All categorical information have defined code lists in our national database, except skipper contact details. All forms has a free text field for remarks. Rectangles are constrained within areas in our national database. A mapping function allows for ad-hoc check of positions.

RDB: [ICES Regional Database](#)

RDBES: <https://github.com/ices-tools-dev/RDBES>

Sample storage

Storage description: Indicate the type of soft tissues and hard parts stored (e.g. age structures, stomach, plankton, genetics) and the location used for samples storage; how long the samples are stored; how conservation and maintenance as well as access to samples are organised; whether the samples are stored under the auspices/responsibility of an international organization; if yes, which one. Provide a link to information on quantities of sampled stored by species/stock, geographic sub-area and by year.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

DTU Aqua has an otolith archive were all otoliths are labelled and stored. Information with year, survey, haul, and fishID is printed on each otolith bag.

Pictures of otoliths are for selected species stored in a closed folder system with information including year, survey, haul, and fishID.

Genetics are stored with similar information and additional a QR code is printed on the label.

Sample analysis:

An age reading quality assurance manual can be found here: [age-reading-quality-assurance-manual-2021](#)

Data processing

Evaluation of data accuracy (bias and precision): Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the evaluation of data accuracy exists, provide some details in the textbox.

N – documentation will be available in 2025

Evaluation is not done as a routine

DTU Aqua is actively involved in ICES expert groups developing estimators for commercial catches, e.g. WGRDBES-EST, WGCATCH and WKRATIO

Editing and imputation methods: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the editing and imputation methods exists, provide some details in the textbox.

N – documentation will be available in 2025

Editing:

Overall, if inconsistencies or discrepancies are found then data are checked e.g. against original papers, re-reading of ages, census data. If no error is found, then the value is accepted. In rare case, when an outlier is spotted just before submission of data and it has a strong influence on the result, then the sample is left out and checked afterwards.

Imputation:

Missing sampling of a domain: The domains (quarter, fleet) match the primary end-user, ICES AWG's, so according to guidance the gaps are left blank

Gaps in age length key: Imputed with average or model

Gaps in weight length key: Imputed with model

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

No DOI

The estimation process more or less follows procedure documented in ICES CM 2008/R:26

Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user?

Comparison of estimated mean weight per length / Age vs. total weight (SOP check on results). If extreme, this is often due to an outlier.

Estimated total amount of discard and numbers at length per stock, area and fishery are compared visually with a time series. If great difference, then these are investigated. If errors, then these are corrected, if no errors, then the results are accepted

Related to table 2.5 and text box 2.5 (biological specific data collection)

Sampling scheme identifier 17: DNK small pelagic and Industrial sampling, large vessels

MS : DNK
Region: All regions
Sampling scheme identifier: DNK small pelagic and Industrial sampling, large vessels
Sampling scheme type: Commercial fishing trip
Observation type: SelfAtSea
Time period of validity: 2025-2027 (the design is valid back to 2021)
Description of the population
Population targeted: Specify which are the primary sampling units (PSU), e.g. all national port*days (information present in former Table 4B). For research surveys: specify the main target species from a survey perspective (as opposed to Table 1 in the Annex to the Implementing Decision) and the main survey area.
PSU: Fishing haul

Target population: All Danish fishing trip with vessels above 24 meters in total length conducting a fishery targeting unsorted fish.
 Carpos aper, Clupea harengus, Mollotus villousus, Micromesistius poutassou, Scomber scombrus, spattus sprattus, Trachurus trachurus, Trisopterus esmarkii

Target species per trip and vessel in sampling frame, the last 12 months

Sampling frame is based on the activity the last 6 months



Figure 1. Presently 18 vessels are included in the vessel list. In the figure the change in fishery over the year is evident. BLH= blue witting, BRS= spart, HAG= Boarfish, HMK= Horse Mackerel, MAK= Mackerel, SIL= herring, SPE= Norway Pout, TBS= Sand ell.

Population sampled: Specify which part of the target population will be sampled and specify which part of the target population is unreachable for sampling or excluded for some reason to explain, e.g. major ports being listed as auctions excluding all minor ports and no sampling during the week-ends. For research surveys at sea describe target species in single-species surveys or ecosystem component (e.g. demersal, pelagic) in multispecies surveys.

The vessels selected for the co-sampling program (above 24 meters) covers the main part of landings on the relevant stocks (green covered, red not covered), compared to smaller vessels

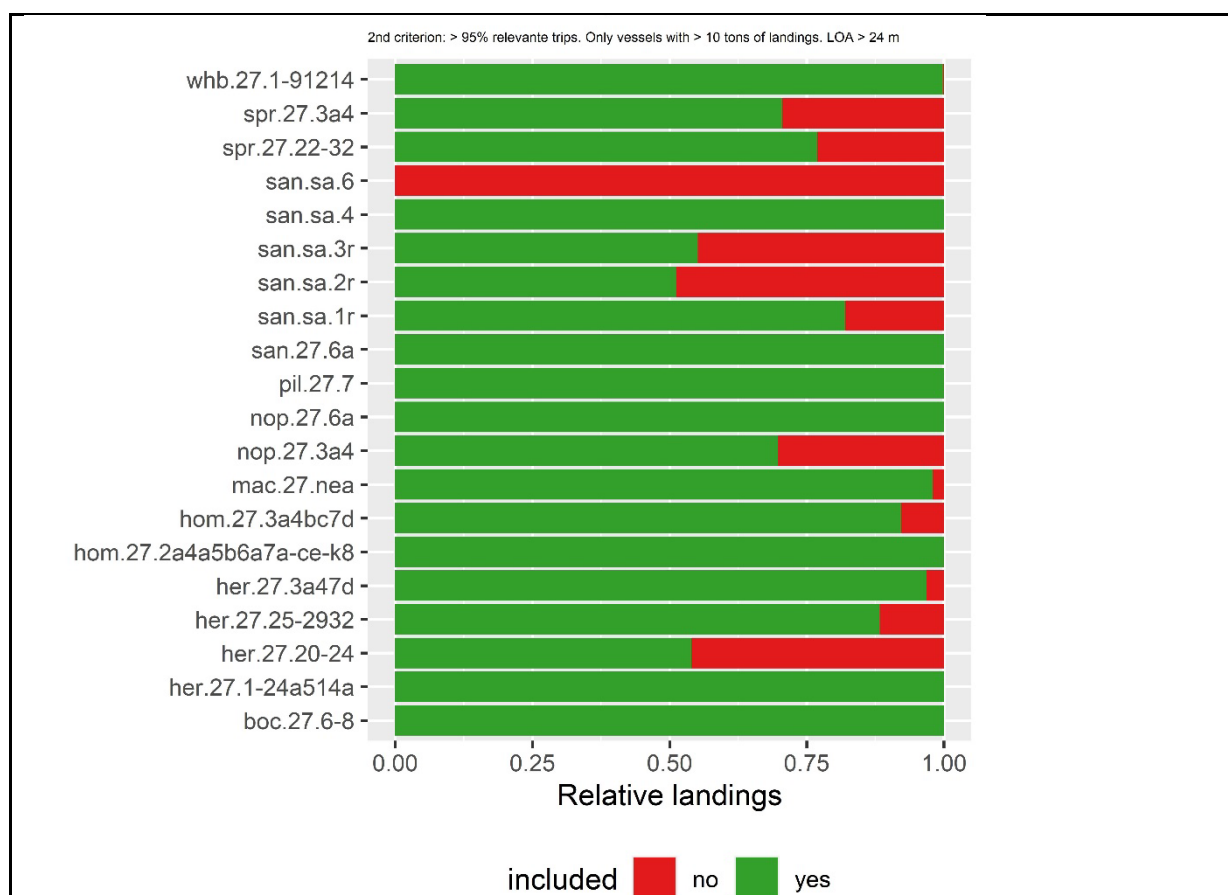


Figure 2. Relative amount of different stocks covered by the co-sampling program on larger vessels

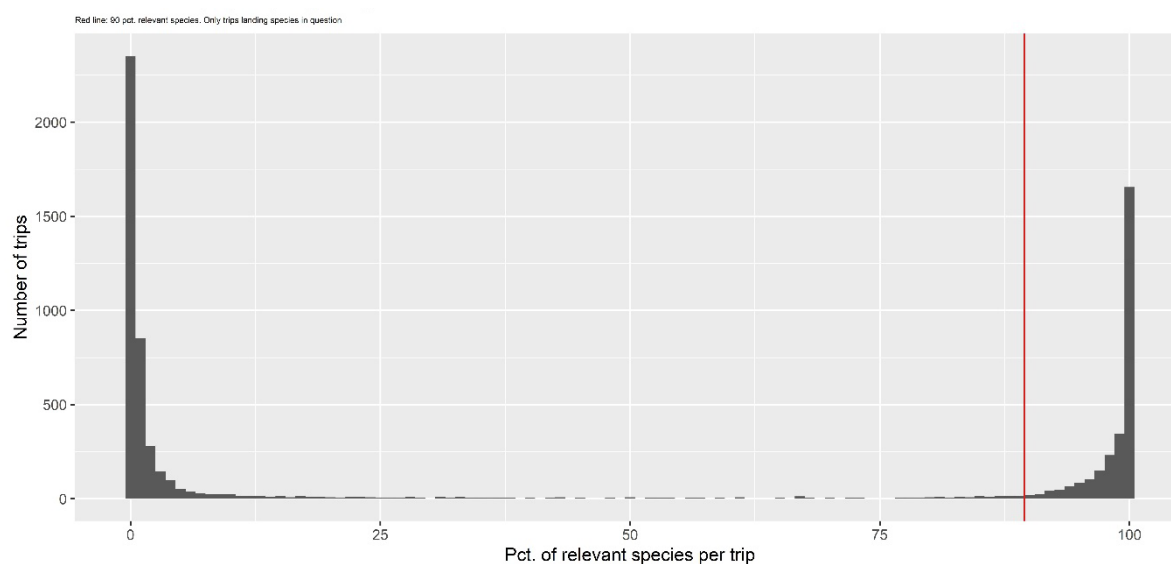


Figure 3. For the selection on the fleet only vessels with more than 90% of relevant species by trips are included.

Stratification: Explain the logic taken to stratify the population and the number of strata generated, e.g. population stratified in 3 geographical lots (from A to B, from B to C and from C to D). Each lot is then stratified by auction.

The sampling is stratified per target species given a different effort and amount of kg in the sampling depending on the target species

Sampling design and protocols

Sampling design description: Describe how the sampling allocation is defined; how PSU and SSU are selected for sampling; indicate for which catch fraction the sampling scheme applies.

All the targeted fisheries have separate strata.

	Target species	Sample size
8.	Blue witting	5 kg
9.	Spart	3 kg
10.	Boarfish	5 kg
11.	Horse Mackerel	5 kg
12.	Mackerel	10 kg
13.	Herring	5 kg
14.	Norway Pout	5 kg

Is the sampling design compliant with the 4S principle?: Y/N/NA (NA for e.g. surveys and diadromous and recreational sampling schemes)

Y

The sampling design is developed with the same principles as for the RWP with small pelagic in the Baltic 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>)

Regional coordination: Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.

Y

For the Baltic part (Baltic SPF regional) this sampling program has been used as a case study. Denmark has decided to use the same program for all the small pelagic and industrial landings. The agreement for the Baltic SPF regional is binding for 2025.

Link to sampling design documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, Member State shall provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, Member State shall provide some details in the textbox.

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>)

Design follows international recommendations: Indicate 'Y' (yes) if the sampling design is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling design should be shortly explained in the text, and should be available upon request for the evaluators.

Y

Link to sampling protocol documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.

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Protocol follows international recommendations: Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.
Y

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

As the program is conducted as co-sampling and the vessels are asked to sample from all their unsorted fisheries this ensures that the sampling is following the fisheries over the season see figure 1.

Data capture

Means of data capture: short description (+ photo optionally). Indicate what are the means for collecting the data, e.g. scales, measuring board, dedicated software,

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

www.dcf-denmark.dk (Manual til oparbejdning af industriprøver)

Presently, electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

An age reading quality assurance manual can be found here: www.dcf-denmark.dk, [age-reading-quality-assurance-manual-2021](#)

Maturity manuals are available at [www.dcf-denmark](http://www.dcf-denmark.dk)

Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

N – documentation will be available in 2025

Routine check at a yearly basis: The following outliers are checked (visually)

1. Age and weight per length (individual measurements)

Data storage

National database: Provide the name of national database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

FiskeLine

International database: *Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.*

Data are uploaded to international databases where requested in data calls:

ICES RDBES – disaggregated data

ICES InterCatch and STECF FDI hosted by JRC – resulting estimates

Quality checks and data validation documentation: *Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.*

FiskeLine: Some of the numeric fields in our national database have constraints, so only realistic values can be entered e.g. wind direction, but most of the numeric fields is only constrained by the length of the field in the database, which often is set unrealistically high e.g. mesh size is numeric (5,1). We have implemented a set-up, so it is possible to set realistic values for age, length and weight per species, but the set-up has only been used in a short period, since the technicians were tired of all the warnings. All categorical information have defined code lists in our national database, except skipper contact details. All forms has a free text field for remarks. Rectangles are constrained within areas in our national database. A mapping function allows for ad-hoc check of positions.

RDB: [ICES Regional Database](#)

RDBES: <https://github.com/ices-tools-dev/RDBES>

Sample storage

Storage description: Indicate the type of soft tissues and hard parts stored (e.g. age structures, stomach, plankton, genetics) and the location used for samples storage; how long the samples are stored; how conservation and maintenance as well as access to samples are organised; whether the samples are stored under the auspices/responsibility of an international organization; if yes, which one. Provide a link to information on quantities of sampled stored by species/stock, geographic sub-area and by year.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

DTU Aqua has an otolith archive where all otoliths are labelled and stored. Information with year, survey, haul, and fishID is printed on each otolith bag.

Pictures of otoliths are for selected species stored in a closed folder system with information including year, survey, haul, and fishID.

Genetics are stored with similar information and additional a QR code is printed on the label.

Data processing

Evaluation of data accuracy (bias and precision): Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the evaluation of data accuracy exists, provide some details in the textbox.

N

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DTU Aqua is actively involved in ICES expert groups developing estimators for commercial catches, e.g. WGRDBES-EST, WGCATCH and WKRATIO. Further, the RCG ISSG developing the regional sampling program 'Baltic SPF regional' will develop design based estimators, which can be adopted to similar sampling schemes like this one.

Editing and imputation methods: *Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the editing and imputation methods exists, provide some details in the textbox.*

Editing:

Overall, if inconsistencies or discrepancies are found then data are checked e.g. against original papers, re-reading of ages, census data. If no error is found, then the value is accepted. In rare case, when an outlier is spotted just before submission of data and it has a strong influence on the result, then the sample is left out and checked afterwards.

Imputation:

Missing sampling of a domain: The domains (quarter, fleet) match the primary end-user, ICES AWG's, so according to guidance the gaps are left blank

Gaps in age length key: Imputed with average or model

Gaps in weight length key: Imputed with model

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

No DOI

The estimation process more or less follows procedure documented in ICES CM 2008/R:26

Validation of the final dataset: *How are datasets validated (quality checked) before providing to end-user?*

Comparison of estimated mean weight per length / age vs. total weight (SOP check on results). If extreme, this is often due to an outlier.

Related to table 2.5 and text box 2.5 (biological specific data collection)

Sampling scheme identifier 18: DNK sand eel

MS : DNK
Region: North Sea and Eastern Arctic
Sampling scheme identifier: DNK sand eel
Sampling scheme type: Commercial fishing trip
Observation type: SelfAtSea
Time period of validity: 2025-2027 (the design is valid back to 2021)
Description of the population
Population targeted: <i>Specify which are the primary sampling units (PSU), e.g. all national port*days (information present in former Table 4B). For research surveys: specify the main target species from a survey perspective (as opposed to Table 1 in the Annex to the Implementing Decision) and the main survey area.</i>
PSU: Fishing haul
Target population: All Danish fishing trip conducting a fishery targeting sand ell.
Population sampled: <i>Specify which part of the target population will be sampled and specify which part of the target population is unreachable for sampling or excluded for some reason to explain, e.g. major ports being listed as auctions excluding all minor ports and no sampling during the week-ends. For research surveys at sea describe target species in single-species surveys or ecosystem component (e.g. demersal, pelagic) in multispecies surveys.</i>

Stratification: Explain the logic taken to stratify the population and the number of strata generated, e.g. population stratified in 3 geographical lots (from A to B, from B to C and from C to D). Each lot is then stratified by auction.

Stratification is by sand eel area see figure 1.

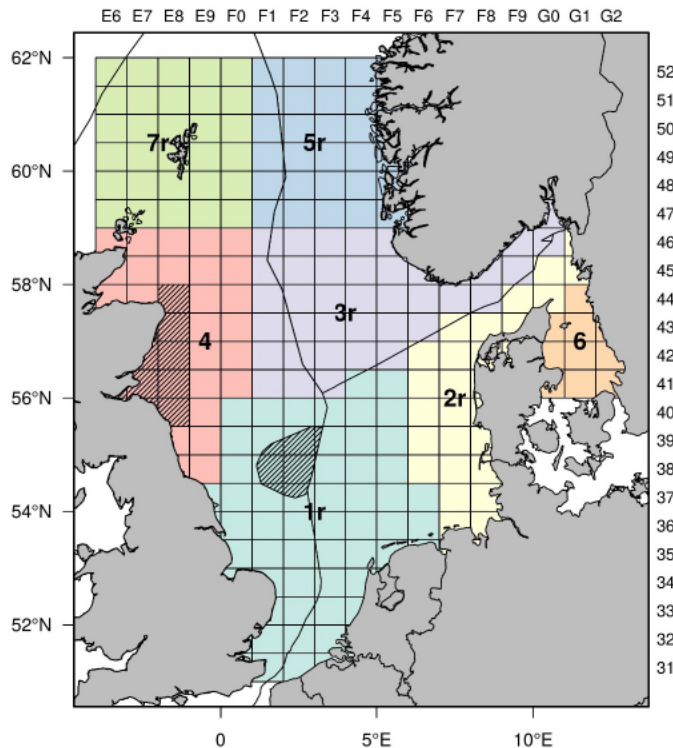


Figure 1. Sand eel areas

Sampling design and protocols

Sampling design description: Describe how the sampling allocation is defined; how PSU and SSU are selected for sampling; indicate for which catch fraction the sampling scheme applies.

Every fishing vessel targeting sand eel are obliged to conduct a biological sampling for DTU Aqua.

The sampling effort can change with the TAC per sand eel area with a higher effort (1 sample per haul) in areas with a low quota and lower effort (1 sample per day) in areas with a higher TAC, for small vessels fishing the sampling effort is 2 samples per week. This can change between year and every year an updated protocol is sent to all fishermen with a sand eel license

For processing the data a minimum of 1 sample per day per ICES rectangle is analysed.

In every sample close to 100 random fish are selected based on a subsample on the weight of 10 fish. Then all the selected sand eel are length measured in scm and grouped according the length group. Every group are counted and weighted a maximum of 3 fish per csm group are aged.

Is the sampling design compliant with the 4S principle?: Y/N/NA (NA for e.g. surveys and diadromous and recreational sampling schemes)

Y

The sampling design is developed with the same principles as for the RWP with small pelagic in the Baltic 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>)

Regional coordination: *Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.*

N

Presently Denmark is the main fishing and landing site for sand eel.

Link to sampling design documentation: *Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, Member State shall provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, Member State shall provide some details in the textbox.*

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Design follows international recommendations: *Indicate 'Y' (yes) if the sampling design is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling design should be shortly explained in the text, and should be available upon request for the evaluators.*

Y

Link to sampling protocol documentation: *Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.*

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Protocol follows international recommendations: *Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.*

Y

Sampling implementation

Recording of refusal rate: *Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.*

Y, but as sampling is linked to the license the refusal is very low

Monitoring of sampling progress within the sampling year: *Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?*

As the sampling design is close to census this is not relevant.

Data capture

Means of data capture: short description (+ photo optionally). Indicate what are the means for collecting the data, e.g. scales, measuring board, dedicated software,

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

www.dcf-denmark.dk (Manual til oparbejdning af industriprøver)

Presently, electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

An age reading quality assurance manual can be found here: www.dcf-denmark.dk, [age-reading-quality-assurance-manual-2021](#)

Maturity manuals are available at www.dcf-denmark.dk

Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

N – documentation will be available in 2025

Routine check at a yearly basis: The following outliers are checked (visually)

2. Age and weight per length (individual measurements)

Data storage

National database: Provide the name of national database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

FiskeLine

International database: Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

Data are uploaded to international databases where requested in data calls:

ICES RDBES – disaggregated data

ICES InterCatch and STECF FDI hosted by JRC – resulting estimates

Quality checks and data validation documentation: Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.

FiskeLine: Some of the numeric fields in our national database have constraints, so only realistic values can be entered e.g. wind direction, but most of the numeric fields is only constrained by the length of the field in the database, which often is set unrealistically high e.g. mesh size is numeric (5,1). We have implemented a set-up, so it is possible to set realistic values for age, length and weight per species, but the set-up has only been used in a short period, since the technicians was tired of all the warnings. All categorical information have defined code lists in our national database, except skipper contact details. All forms has a free text field for remarks. Rectangles are constrained within areas in our national database. A mapping function allows for ad-hoc check of positions.

RDB: [ICES Regional Database](#)

RDBES: <https://github.com/ices-tools-dev/RDBES>

Sample storage

Storage description: Indicate the type of soft tissues and hard parts stored (e.g. age structures, stomach, plankton, genetics) and the location used for samples storage; how long the samples are stored; how conservation and maintenance as well as access to samples are organised; whether the samples are stored under the auspices/responsibility of an international organization; if yes, which one. Provide a link to information on quantities of sampled stored by species/stock, geographic sub-area and by year.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

DTU Aqua has an otolith archive where all otoliths are labelled and stored. Information with year, survey, haul, and fishID is printed on each otolith bag.

Pictures of otoliths are for selected species stored in a closed folder system with information including year, survey, haul, and fishID.

Genetics are stored with similar information and additional a QR code is printed on the label.

Data processing

Evaluation of data accuracy (bias and precision): Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the evaluation of data accuracy exists, provide some details in the textbox.

N

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DTU Aqua is actively involved in ICES expert groups developing estimators for commercial catches, e.g. WGRDBES-EST, WGCATCH and WKRATIO. Further, the RCG ISSG developing the regional sampling program 'Baltic SPF regional' will develop design based estimators, which can be adopted to similar sampling schemes like this one.

Editing and imputation methods: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the editing and imputation methods exists, provide some details in the textbox.

Editing:

Overall, if inconsistencies or discrepancies are found then data are checked e.g. against original papers, re-reading of ages, census data. If no error is found, then the value is accepted. In rare case, when an outlier is spotted just before submission of data and it has a strong influence on the result, then the sample is left out and checked afterwards.

Imputation:

Missing sampling of a domain: The domains (quarter, fleet) match the primary end-user, ICES AWG's, so according to guidance the gaps are left blank

Gaps in age length key: Imputed with average or model

Gaps in weight length key: Imputed with model

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

No DOI

The estimation process more or less follows procedure documented in ICES CM 2008/R:26

Validation of the final dataset: *How are datasets validated (quality checked) before providing to end-user?*

Comparison of estimated mean weight per length / age vs. total weight (SOP check on results). If extreme, this is often due to an outlier.

Related to table 2.5 and text box 2.5 (biological specific data collection)

Sampling scheme identifier 19: DNK small pelagic and Industrial sampling, small vessels

MS : DNK

Region: All regions

Sampling scheme identifier: DNK small pelagic and Industrial sampling, small vessels

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: 2025-2027

Description of the population

Population targeted: *Specify which are the primary sampling units (PSU), e.g. all national port*days (information present in former Table 4B). For research surveys: specify the main target species from a survey perspective (as opposed to Table 1 in the Annex to the Implementing Decision) and the main survey area.*

PSU: Fishing trip

Target population: All Danish fishing trip with vessels below 24 meters in total length conducting a fishery targeting Norway Pout, Herring or Sprat

Further, in case of refusals on vessels larger than 24 meters these trips are part of the target population as well.

For herring both human consumption and herring for industrial purpose are included

Population sampled: *Specify which part of the target population will be sampled and specify which part of the target population is unreachable for sampling or excluded for some reason to explain, e.g. major ports being listed as auctions excluding all minor ports and no sampling during the week-ends. For research surveys at sea describe target species in single-species surveys or ecosystem component (e.g. demersal, pelagic) in multispecies surveys.*

Not all 3 party companies or factories are participating in the sampling for biological variables for DTU Aqua. Presently the largest of the landing sites are participating, however this is also on a voluntary basis.

Further, several very small landing sites are present for human consumption on herring. Only the 2 largest landing sites for herring human consumption are included (Skagen and Gilleleje)

Stratification: *Explain the logic taken to stratify the population and the number of strata generated, e.g. population stratified in 3 geographical lots (from A to B, from B to C and from C to D). Each lot is then stratified by auction.*

The stratification is one sample per 14 days chosen randomly per fishery from the smaller vessels. From the larger vessels a sample is only chosen if there is a refusal (no self sampling). The quality of a self-sample is considered better as the fish is frozen immediately and there is a position on the sampled. The 3-party sample will be in worse condition and without an exact position the only information is the trip.

For the smallest herring stocks the few trips conducted are targeted directly to ensure samples.

Sampling design and protocols

Sampling design description: Describe how the sampling allocation is defined; how PSU and SSU are selected for sampling; indicate for which catch fraction the sampling scheme applies.

The sampling design aim to sample vessels below 24 meters and to cover the part of the larger vessels that has refused to conduct co-sampling.

When a sample is processed in the laboratory all species are identified and recorded by length and weight. Then 100 random fish of targeted species are selected, the first 10 are counted and weighted and then by weight around 100 fish selected. All fish are length measured and sorted in groups by scm. 50 fish (every second) are then selected for individual weight and age measurements.

Is the sampling design compliant with the 4S principle?: *Y/N/NA (NA for e.g. surveys and diadromous and recreational sampling schemes)*

Y

(for the smaller herring stocks all trips are targeted directly if possible)

The sampling design is developed with the same principles as for the RWP with small pelagic in the Baltic 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>)

Regional coordination: *Indicate if the sampling design and protocols were developed as part of a regional or multi-lateral agreement, and if yes, refer to the agreement (table 1.3) and list all MS participating.*

Y

For the Baltic part (Baltic SPF regional) this sampling program has been used as a case study. Denmark has decided to use the same program for all the small pelagic and industrial landings. The agreement for the Baltic SPF regional is binding for 2025.

Link to sampling design documentation: *Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, Member State shall provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, Member State shall provide some details in the textbox.*

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Design follows international recommendations: Indicate 'Y' (yes) if the sampling design is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling design should be shortly explained in the text, and should be available upon request for the evaluators.

Y

Link to sampling protocol documentation: *Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the sampling design exists, provide details on the sampling protocol in this textbox.*

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Protocol follows international recommendations: Member State shall state 'Y' (yes) if the sampling protocol is in line with international recommendations, and 'N' if not. If no relevant expert or coordination groups exist, the sampling protocol should be shortly explained in the text, and should be available upon request for the evaluators.

Y

Sampling implementation

Recording of refusal rate: Indicate with 'Y' (yes) or 'N' (no), or 'NA' (not applicable, in case of research surveys). If 'N' (no), indicate when (year) documentation will be available.

N

Monitoring of sampling progress within the sampling year: Indicate how sampling allocations are adjusted (if needed) and followed-up, what are the mechanisms in place to resolve issues and adopt mitigation measures during the sampling year?

As the program is conducted as sampling per trip and is therefore following the fisheries.

Data capture

Means of data capture: short description (+ photo optionally). Indicate what are the means for collecting the data, e.g. scales, measuring board, dedicated software,

Data capture documentation: Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on data capture (e.g. measuring protocols, maturity staging, manual for the data capture means etc.) exists, provide some details in the textbox.

www.dcf-denmark.dk (Manual til oparbejdning af industriprøver)

Presently, electronic weight and an analogue measuring board are used for data collection. Data are entered manually to the Fishline data base via a desktop application.

An age reading quality assurance manual can be found here: www.dcf-denmark.dk, [age-reading-quality-assurance-manual-2021](#)

Maturity manuals are available at www.dcf-denmark.dk

Quality checks documentation: Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the quality checks exists, provide some details in the text box.

N – documentation will be available in 2025

Routine check at a yearly basis: The following outliers are checked (visually)

3. Age and weight per length (individual measurements)

Data storage

National database: Provide the name of national database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

FiskeLine

International database: Provide the name of international database(s) and the organisation hosting the database, if applicable. Otherwise, insert 'NA' (not applicable). Provide a link if the database is accessible through a website.

Data are uploaded to international databases where requested in data calls:
ICES RDBES – disaggregated data
ICES InterCatch and STECF FDI hosted by JRC – resulting estimates

Quality checks and data validation documentation: *Provide link to webpage where the documentation can be found. Otherwise, provide some details in the text box.*

FiskeLine: Some of the numeric fields in our national database have constraints, so only realistic values can be entered e.g. wind direction, but most of the numeric fields is only constrained by the length of the field in the database, which often is set unrealistically high e.g. mesh size is numeric (5,1). We have implemented a set-up, so it is possible to set realistic values for age, length and weight per species, but the set-up has only been used in a short period, since the technicians were tired of all the warnings. All categorical information have defined code lists in our national database, except skipper contact details. All forms has a free text field for remarks. Rectangles are constrained within areas in our national database. A mapping function allows for ad-hoc check of positions.

RDB: [ICES Regional Database](#)

RDBES: <https://github.com/ices-tools-dev/RDBES>

Sample storage

Storage description: Indicate the type of soft tissues and hard parts stored (e.g. age structures, stomach, plankton, genetics) and the location used for samples storage; how long the samples are stored; how conservation and maintenance as well as access to samples are organised; whether the samples are stored under the auspices/responsibility of an international organization; if yes, which one. Provide a link to information on quantities of sampled stored by species/stock, geographic sub-area and by year.

Sample analysis: Provide a brief description or the references to documents, including link to webpages (e.g. age reading manuals, EGs reports and protocols) if adequate, where information on the processing of the samples is provided.

DTU Aqua has an otolith archive where all otoliths are labelled and stored. Information with year, survey, haul, and fishID is printed on each otolith bag.

Pictures of otoliths are for selected species stored in a closed folder system with information including year, survey, haul, and fishID.

Genetics are stored with similar information and additional a QR code is printed on the label.

Data processing

Evaluation of data accuracy (bias and precision): Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication - e.g. internal report). If no documentation on the evaluation of data accuracy exists, provide some details in the textbox.

N

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>)

DTU Aqua is actively involved in ICES expert groups developing estimators for commercial catches, e.g. WGRDBES-EST, WGCATCH and WKRATIO. Further, the RCG ISSG developing the regional sampling program 'Baltic SPF regional' will develop design based estimators, which can be adopted to similar sampling schemes like this one.

Editing and imputation methods: *Indicate with 'Y' (yes) or 'N' (no). If 'N' (no), indicate when (year) documentation will be available. Provide a link to a webpage where the documentation can be found. If no link is available, but documentation exists, provide a literature reference (author(s), year and type of publication -*

e.g. internal report). If no documentation on the editing and imputation methods exists, provide some details in the textbox.

Editing:

Overall, if inconsistencies or discrepancies are found then data are checked e.g. against original papers, re-reading of ages, census data. If no error is found, then the value is accepted. In rare case, when an outlier is spotted just before submission of data and it has a strong influence on the result, then the sample is left out and checked afterwards.

Imputation:

Missing sampling of a domain: The domains (quarter, fleet) match the primary end-user, ICES AWG's, so according to guidance the gaps are left blank

Gaps in age length key: Imputed with average or model

Gaps in weight length key: Imputed with model

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

No DOI

The estimation process more or less follows procedure documented in ICES CM 2008/R:26

Validation of the final dataset: *How are datasets validated (quality checked) before providing to end-user?*

Comparison of estimated mean weight per length / age vs. total weight (SOP check on results). If extreme, this is often due to an outlier.

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.

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

Sampling scheme identifier: RWP ECON

Survey Specifications
<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
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.

Related to table 3.1 and text box 3.1

Sampling scheme identifier: 3.1: Fishing Activity variables

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): Complementary data collection of fishing activity	
Sampling scheme: Indirect survey - IND	
Variables: Variables in table 6 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021): Length of nets (m) * soak time (days)	
Supra region(s): Baltic Sea; North Sea; Eastern Arctic; NAFO; extended North Western waters (ICES areas 5, 6 and 7) and extended South Western waters (ICES areas 10, 12 and 14)	
Survey planning	
Vessels using Drift and/or fixed netters	
Survey design and strategy	
5.	Data sources: AIS data
6.	Sample sizes: Number of vessels using Drift and/or fixed netters with AIS in 2024
7.	Survey methods: Access to AIS data through the Danish Maritime Agency
8.	Additional information used in the survey strategy: The AIS data will be filtered to fishing vessels and combined with data coming from the Control Regulation.
Estimation design	
4.	Calculation method for population estimate: The population of Vessels using Drift and/or fixed netters are estimated based on control regulation data (logbook, fleet register).
5.	Calculation method for derived data: The AIS data will be combined with data coming from the Control Regulation, and after métier allocation, to represent the positions from gillnet fishing trips. A Random Forest model will be trained using EM data on gillnet vessels to identify the activity related to hauling of gears. To assess the soaking time, a geo-computation method will be applied to find the previous occurrence of that vessel in the same area.
6.	Nonresponse handling: For gillnet vessels without AIS, the soaking time will be inferred based on vessels with AIS and soaking time calculation, with similar fisheries (target species, area, season).
Error checks	
The results are sense checked using EM data.	
Data storage and documentation	
3.	Data storage: AIS data and result files are stored in a file structure at DTU Aqua. The result files will be stored by trip, so it will be easy to merge with logbook/sales notes data and can be submitted in the RDBES effort format for ICES/RCG use.
4.	Documentation: Currently, no additional methodological documentation is available, but it will be made.
Revision	

The method is under development, and will be revised if issues are found during data checks.	
Confidentiality	
5.	Are procedures for confidential data handling in place and documented? Data confidentiality are described in an agreement between DTU Aqua and the Danish Fisheries Agency
6.	Are protocols to enforce confidentiality between DCF partners in place and documented? Data confidentiality are described in an agreement between DTU Aqua and the Danish Fisheries Agency
7.	Are protocols to enforce confidentiality with external users in place and documented? Data confidentiality are described in an agreement between DTU Aqua and the Danish Fisheries Agency that also include data sharing procedures with external users. DTU Aqua will upload the results to RDBES database, and publication of data will depend on the agreement of RDBES data license.
8.	Are there any issues with publication of data due to confidentiality reasons? DTU Aqua will upload the results to RDBES database, and publication of data will depend on the agreement of RDBES data license.

Related to table 5.1 and text box 5.1

Sampling scheme identifier: 1.2.1

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 implementing years 2025-2027 Socioeconomic data on fisheries
Sampling scheme: NPS - Non-probability sample survey
Variables: Economic variables from Table 7 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021). Consumption of fixed capital, Energy consumption, Energy costs, Full-time equivalent (FTE), Gross debt, Gross value of landings, Income from leasing out quota or other fishing rights, Investments in tangible assets (net purchase of assets), Lease/rental payments for quota or other fishing rights, Operating subsidies, Other income, Other non-variable costs, Other variable costs, Paid labour, Personnel costs, Repair and maintenance costs, Subsidies on investments, Total hours worked per year (optional), Total value of assets, Unpaid labour, Value of physical capital, Value of quota and other fishing rights, Value of unpaid labour.
Supra region(s): Baltic Sea; North Sea; Eastern Arctic; NAFO; extended North Western waters (ICES areas 5, 6 and 7) and extended South Western waters (ICES areas 10, 12 and 14)

Survey planning

The Danish fishing fleet is defined by the *Danish Fleet Register* from the *Danish Fisheries Agency*, covering all active and inactive vessels. The population is derived from the *Danish Fleet Register* and split up into the segments described in Table 5.1 and Table 5.2.

The non-probability sample survey is applied to economic data for the population with a gross value of landings over a yearly calculated threshold. The threshold is calculated, so that the part of the population included in the sample survey covers 98 % of the national total gross value of landings. For 2023 data the threshold was DKK 446.504 or approximately EUR 60.000. Variables included are those that can be derived from the financial accounts.

Survey design and strategy

1. Data sources:
2. Sample sizes:
3. Survey methods:
4. Additional information used in the survey strategy:

Economic data are collected from financial accounts.

The sample sizes of the segments are determined by the accessibility of data. It is not possible to collect data on a probability sample survey for all segments; hence a non-probability sample survey is the survey method chosen.

Financial accounts are collected from the accountants on a voluntary basis. All fishery companies that participate have to accept the use of their financial accounts.

Financial accounts are collected from the accountants in a balanced account form in a spread sheet. Statistics Denmark distributes the spread sheets by encrypted E-mail. Statistics Denmark provides a secure data upload facility, to ensure the confidentiality of the collected accounts, and to fulfil the national GDPR legislation.

5.

Estimation design

1. Calculation method for population estimate:
2. Calculation method for derived data:
3. Nonresponse handling:

Corrected and finalized accounts are merged with register data. Individual accounts are then simulated for all units which are not included in the sample. That is done using a massimputation methodology derived from the SAS program Proc MassImputation from the BANFF package. The program finds the nearest donor using a standardized relative measurement based on selected criteria parameters. That is repeated three times with selection of criteria parameters (for instance different species composition). The resulting three donors

are used to calculate an average account. Finally, the economic variables in the average account are scaled by a factor to ensure that the gross output (value of catch) in the resulting balanced account match registered gross output for the simulated unit.

Statistics Denmark aims to avoid non-responses by having a strong relationship and communication with all responders. However, it is not always possible to collect all selected accounts from the accountants. In this case Statistics Denmark aims to select an alternate account covering the same segment.

Error checks

Statistics Denmark uses a database to keep track of the individual units in the fleet. Rules are established to ensure, that vessels do not occur more than one time. Respondent errors are eliminated by validating all accounts in a specially developed application containing multiple validation checks. Possible errors are discussed with the accountants by E-mail or by phone and corrected if possible. Statistics Denmark aims to obtain a large degree of automation in the processing of data, minimizing the factor of human error.

Data storage and documentation

1. Data storage: Data are stored in a MS SQL database.

Documentation: Documentation on the used methodology can be found here:

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/account-statistics-for-fishery>

2.

Revision

Statistics Denmark reviews the methodologies each year during compilation of the statistics, to determine whether the methodologies used are still appropriate. The method used to collect data, validate data and calculate imputed values has been reviewed and accepted by Statistics Denmark's methodology team.

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.

Statistics Denmark meets the Code of Practice for European Statistics including principle 5

on Statistical Confidentiality and Data protection.

<https://www.dst.dk/Site/Dst/SingleFiles/GetArchiveFile.aspx?fi=6380868453&fo=0&ext=kvaldel>

Reported data to JRC (DCF partner) and external users are only aggregated data.

Related to table 5.1 and text box 5.1

Sampling scheme identifier: 1.2.2

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 implementing years 2025-2027 Socioeconomic data on fisheries
Sampling scheme: C - Census
Variables: Economic variables from Table 7 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021): Days at sea, Mean age of vessels, Mean LOA of vessels, Number of fishing enterprises/units, Number of vessels, Total vessel power, Total vessel tonnage. Social Variables from Table 9 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021): Employment by age, Employment by employment status, Employment by gender, Employment by level of education, Employment by nationality, FTEs by gender, Unpaid labour by gender.
Supra region(s): Baltic Sea; North Sea; Eastern Arctic; NAFO; extended North Western waters (ICES areas 5, 6 and 7) and extended South Western waters (ICES areas 10, 12 and 14)
Survey planning
The Danish fishing fleet is defined by the <i>Danish Fleet Register</i> from the <i>Danish Fisheries Agency</i>, covering all active and inactive vessels. The population is derived from the <i>Danish Fleet Register</i> and split up into the segments described in Table 5.1 and Table 5.2. All census data are register data.

Survey design and strategy
Data sources : <i>Danish Fleet Register</i> (logbooks, sales notes and other) and <i>Register-Based Labour Force Statistics</i> and <i>Labour Market Account Statistics</i>. Sample size for census data are all registered vessels in the <i>Danish Fleet Register</i>. Survey methods: The <i>Danish Fleet Register</i> is transferred from the <i>Danish Fisheries Agency</i> through secure upload facilities provided by Statistics Denmark. Additional information used in the survey strategy: <i>Register-Based Labour Force Statistics</i> and <i>Labour Market Account Statistics</i> are national statistics developed by Statistics Denmark, and available through internal channels.
Estimation design
1. Calculation method for population estimate: 2. Calculation method for derived data: 3. Nonresponse handling: No estimations occur on census data. However, census data are used in the estimation of individual accounts which are not included in the sample.
Error checks
Statistics Denmark uses a database to keep track of the individual units in the fleet. Rules are established to ensure, that vessels do not occur more than one time. Respondent errors are eliminated by validating all accounts in a specially developed application containing multiple validation checks. Possible errors are discussed with those responsible for the relevant national register. Statistics Denmark aims to obtain a large degree of automation in the processing of data, minimizing the factor of human error.
Data storage and documentation
1. Data storage: Data are stored in a MS SQL database. 2. Documentation: Documentation on the used methodology can be found here: https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/account-statistics-for-fishery
Revision
Statistics Denmark reviews the methodologies each year during compilation of the

statistics, to determine whether the methodologies used are still appropriate. The method used to collect data, validate data and calculate imputed values has been reviewed and accepted by Statistics Denmark's methodology team.
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. Statistics Denmark meets the Code of Practice for European Statistics including principle 5 on Statistical Confidentiality and Data protection. https://www.dst.dk/Site/Dst/SingleFiles/GetArchiveFile.aspx?fi=6380868453&fo=0&ext=kvaldel Reported data to JRC (DCF partner) and external users are only aggregated data.

Related to table 5.1 and text box 5.1

Sampling scheme identifier: 1.2.3

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 implementing years 2025-2027 Socioeconomic data on fisheries
Sampling scheme: IND - Indirect survey
Variables: : Economic variables from Table 7 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021): Consumption of fixed capital, Energy consumption, Energy costs, Full-time equivalent (FTE), Gross debt, Gross value of landings, Income from leasing out quota or other fishing rights, Investments in tangible assets (net purchase of assets), Lease/rental payments for quota or other

fishing rights, Operating subsidies, Other income, Other non-variable costs, Other variable costs, Paid labour, Personnel costs, Repair and maintenance costs, Subsidies on investments, Total hours worked per year (optional), Total value of assets, Unpaid labour, Value of physical capital, Value of quota and other fishing rights, Value of unpaid labour.
Supra region(s): Baltic Sea; North Sea; Eastern Arctic; NAFO; extended North Western waters (ICES areas 5, 6 and 7) and extended South Western waters (ICES areas 10, 12 and 14)
Survey planning
The Danish fishing fleet is defined by the <i>Danish Fleet Register</i> from the <i>Danish Fisheries Agency</i>, covering all active and inactive vessels. The population is derived from the <i>Danish Fleet Register</i> and split up into the segments described in Table 5.1 and Table 5.2. Indirect survey is applied to economic data for the population with a gross value of landings under a yearly calculated threshold. The threshold is calculated, so that the part of the population included in the sample survey covers 98 % of the national total gross value of landings. For 2023 data the threshold was DKK 446.504 or approximately EUR 60.000. Variables included are those that can be derived from the financial accounts.
Survey design and strategy
6. Data sources: Data sources are: <i>Danish Fleet Register</i> (logbooks, sales notes and other) and financial accounts from the part of the population over the threshold. 7. Sample sizes: 8. Survey methods: Part of the population under the threshold are not obliged to keep accountancy therefore a method to impute the economic variables of the segments is used and described under ‘Estimation design’. 9. Additional information used in the survey strategy:
Estimation design
1. Calculation method for population estimate: 2. Calculation method for derived data: 3. Nonresponse handling:

Economic variables for the part of the population under the threshold are imputed using a calculated scaling factor to ensure that the gross output for the imputed segment match registered gross output for the part of the segment over the threshold. Data on production and on vessel characteristics are derived from the *Danish Fleet Register* and available for all vessels. Hence, it is possible to calculate the scaling factor between the average gross output of the part of the population over the threshold and the average gross output of the part of the population under the threshold. The scaling factor is used to scale the economic values of an average account for the part of the population over the threshold to create the economic values of an average account for the part of the population under the threshold.

Error checks

Statistics Denmark uses a database to keep track of the individual units in the fleet. Rules are established to ensure, that vessels do not occur more than one time. Statistics Denmark aims to obtain a large degree of automation in the processing of data, minimizing the factor of human error.

Data storage and documentation

1. Data storage: Data are stored in a MS SQL database.
2. Documentation: Documentation on the used methodology can be found here: <https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/account-statistics-for-fishery>

Revision

Statistics Denmark reviews the methodologies each year during compilation of the statistics, to determine whether the methodologies used are still appropriate. The method used to collect data, validate data and calculate imputed values has been reviewed and accepted by Statistics Denmark's methodology team.

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.

Statistics Denmark meets the Code of Practice for European Statistics including principle 5 on Statistical Confidentiality and Data protection. <https://www.dst.dk/Site/Dst/SingleFiles/GetArchiveFile.aspx?fi=6380868453&fo=0&ext=kvaldel>

Reported data to JRC (DCF partner) and external users are only aggregated data.

Related to table 6.1 and text box 6.1

Sampling scheme identifier: 1.2.4

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 implementing years 2025-2027 Socioeconomic data on aquaculture
Sampling scheme: NPS - Non-probability sample survey
Variables: Economic variables from Table 7 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021). Other income, Personnel costs, Energy costs, Raw material: livestock costs, Raw material: feed costs, Repair and maintenance costs, Other operating costs, Operating subsidies, Subsidies on investments, Consumption of fixed capital, Total value of assets, Financial income, Financial expenditures, Investments in tangible, assets (net purchase of assets), Gross debt, Livestock used, Fish feed used, Paid labour, Number of enterprises by size category
Supra region(s): All regions
Survey planning
The Danish Aquaculture Register from the Danish Fisheries Agency defines the overall population of aquaculture farms. Statistics Denmark selects the commercially active farms to form the population for the data collection of socioeconomic and environmental data.
Survey design and strategy
1. Data sources: 2. Sample sizes: 3. Survey methods:

Additional information used in the survey strategy:

Economic data are collected from financial accounts.

All economic variables collected from financial accounts are based on a non-probability sample survey.

Financial accounts are collected from the aquaculture company's accountants on a voluntary basis. All aquaculture companies that participate have to accept the use of their financial accounts.

Financial accounts are collected from the accountants in a balanced account form in a spread sheet. Statistics Denmark distributes the spread sheets by encrypted E-mail. Statistics Denmark provides a secure data upload facility, to ensure the confidentiality of the collected accounts, and to fulfill the national GDPR legislation.

Estimation design

1. Calculation method for population estimate:
2. Calculation method for derived data:

Nonresponse handling:

The part of the population not represented in the sample is estimated using a simulation model where every item of the account is calculated on the basis of production information from the Aquaculture Register from the Danish Fisheries Agency and the submitted accounts divided in representative segments. Subsequently, all results are aggregated in the relevant segments. Furthermore, accounts for some companies have been collected from the Danish Business Authority in order to get a more accurate estimate of gross output, assets and liabilities.

Statistics Denmark aims to avoid non-responses by having a strong relationship and communication with all responders. However, it is not always possible to collect all selected accounts from the accountants. In this case Statistics Denmark aims to select an alternate account covering the same segment.

Error checks

Statistics Denmark uses a database to keep track of the individual units in the fleet. Rules are established to ensure, that vessels do not occur more than one time. Respondent errors are eliminated by validating all accounts in a specially developed application containing multiple validation checks. Possible errors are discussed with the accountants by E-mail or by phone and corrected if possible. Statistics Denmark aims to obtain a large degree of automation in the processing of data, minimizing the factor of human error.

Data storage and documentation

Data storage Data are stored in a MS SQL database.

Documentation on the used methodology can be found here:

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/accounts-statistics-for-aquaculture>

Revision

Statistics Denmark reviews the methodologies each year during compilation of the statistics, to determine whether the methodologies used are still appropriate. The method used to collect data, validate data and calculate imputed values has been reviewed and accepted by Statistics Denmark's methodology team.

Confidentiality

Statistics Denmark meets the Code of Practice for European Statistics including principle 5 on Statistical Confidentiality and Data protection:

Reported data to JRC (DCF partner) and external users are only aggregated data.

Related to table 6.1 and text box 6.1

Survey Specifications

'Sector name' refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex.

'Sampling scheme' refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling, then outline sampling design.

'Variables' refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex.

'Supra region' refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All supra regions'.

Sector name(s): RWP ECON implementing years 2025-2027

Socioeconomic data on aquaculture

Sampling scheme: C - Census

Variables:

Economic variables from Table 10 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021):

Gross sales per species, Value of unpaid labour, Weight of sales per species, Unpaid labour, Number of hours worked by employees and unpaid workers (optional)

Social variables as listed in Table 9 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021): Employment by gender, FTEs by gender, Unpaid labour by gender, Employment by age, Employment by level of education, Employment by nationality, Employment by employment status, Full-time equivalent (FTE).
Supra region(s): All regions
Survey planning
The <i>Danish Aquaculture Register</i> from the <i>Danish Fisheries Agency</i> defines the overall population of aquaculture farms. Statistics Denmark selects the commercially active farms to form the population for the data collection of socioeconomic and environmental data. To combine economic and social variables, the enterprises identified above are matched with Statistics Denmark's <i>Register-Based Labour Force Statistics</i> and <i>Labour Market Account Statistics</i>.
Survey design and strategy
Data sources are: <i>Danish Aquaculture Register</i> from the <i>Danish Fisheries Agency</i>, <i>Register-Based Labour Force Statistics</i> and <i>Labour Market Account Statistics</i>, Environmental data from the <i>Danish Veterinary and Food Administration</i>. All data from the <i>Danish Aquaculture Register</i> are census data. Social data are register data which are census. Environmental data are census.
Estimation design
All data are census data. No estimation occur.
Error checks
Statistics Denmark uses a database to keep track of the individual aquaculture farms. Statistics Denmark aims to obtain a large degree of automation in processing data, minimising the factor of human error.
Data storage and documentation
Data are stored in a MS SQL database. Documentation on the used methodology can be found here:
Revision
Statistics Denmark reviews the methodologies each year during compilation of the statistics, to determine whether the methodologies used are still appropriate. The method used to collect data, validate data and calculate imputed values has been reviewed and

accepted by Statistics Denmark's methodology team.
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? Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. Statistics Denmark meets the Code of Practice for European Statistics including principle 5 on Statistical Confidentiality and Data protection: https://www.dst.dk/Site/Dst/SingleFiles/GetArchiveFile.aspx?fi=6380868453&fo=0&ext=kvaldel Reported data to JRC (DCF partner) and external users are only aggregated data.

Related to table 7.1 and text box 7.1

Sampling scheme identifier: 1.2.6

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 implementing years 2025-2027. Fish processing industry
Sampling scheme: Census - C
Variables: Social variables listed in Table 9 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021) and economic variables listed in Annex V to PGECON 2020 (excluding raw material)
Supra region(s): All regions (DNK)
Survey planning:

The Danish fish processing industry is defined by the Business Register using NACE code 10.20. The Danish data collection is based on data from the Account Statistics and the Industry Commodity Statistics collected by Statistics Denmark. In a close collaboration between the Department of Food and Resource Economics (IFRO) and Statistics Denmark, data from the Industrial Commodity- and Account Statistics are combined to make sure that all enterprises processing fish are covered by this data collection and to comply with the economic data variables listed in Annex V to PGECON 2020. Enterprises, which have other activities than fish processing, are split up into work place units and only units with fish processing are included to get the most accurate data for the fish processing sector activities. The combination of the two statistics allows for a segmentation of enterprises based on their production of commodities. This way more information in relation to species dependencies can be deducted from the established data set for the processing industry.

To combine economic and social data variables, the enterprises identified as fish processors above are matched with Statistics Denmark's "Register-Based Workforce Statistic" and "Labour Market Account Statistic". Merging these information's the social variables listed in table 9 (Commission Delegated Decision (EU) 2021/1167 of 27 April 2021) can be provided. Data for the processing industry concerning the year 2023 will be available in September 2025 (1½ years of time lag). Data for 2024 and 2025 will be available in September 2026 and September 2027.

Survey design and strategy

1. Data sources:

Data collected by Statistics Denmark are a combination of register data, financial accounts and questionnaires. The Account Statistic collected by Statistics Denmark are essentially aggregations of items of the annual accounts of business enterprises, notably items of the profit and loss account, the balance sheet and the statement of fixed assets. The accounts statistics are a reliable indicator of the activity level and of the structure of the Danish business sector. The highest data quality is achieved at the enterprise level, primarily because the enterprises prepare their annual accounts at that level. The Statistics are based on questionnaires, the Central Customs and Tax Administration (SLS-E data), and the business register.

2. Sample sizes:

The population is defined on the basis of Statistics Denmark's Central Business Register covering all businesses in Denmark (ESR).

3. Survey methods:

The data collected from all sources are combined in such a way that a complete set of accounting items is obtained for each business enterprise. In Denmark, enterprises are legally obliged to answer questionnaires from Statistics Denmark. Thus, the combination of register data and mandatory questionnaires make a solid foundation for the collection of data for the fish processing industry.

4. Additional information used in the survey strategy:

See the above description.

Estimation design

1. Calculation method for population estimate:

The Account Statistics covers the whole population defined by the Business Register NACE 10.20. Data for the Account Statistics is collected from different sources and combined in such a way that a complete set of accounting items is computed for each business enterprise.

2. Calculation method for derived data:

No estimation is therefore necessary because data are based on census and a full set of account for all business enterprises are created.

3. Nonresponse handling:

In Denmark, enterprises are legally obliged to answer questionnaires from Statistics Denmark. Thus, non-responses is not an issue.

Error checks

The data collected for the processing industry give a complete coverage of all enterprises covered by NACE 10.20. The accounts statistics are a reliable indicator of the activity level and of the structure of the Danish processing industry sector. The highest data quality is achieved at the enterprise level, primarily because the enterprises prepare their annual accounts at that level. Quality reports are available on the website of Statistics Denmark. (See below)

Data storage and documentation

1. Data storage:

Micro data is stored at Statistics Denmark databases and are confidential.

Aggregated data for the fish processing industry, and data distributed on employment and species segments are stored at IFRO.

2. Documentation:

Statistics Denmark:

Statistics Denmark, Commodity statistics:

<https://www.dst.dk/da/Statistik/dokumentation/statistikdokumentation/industriens-koeb-af-varer-og-tjenester>

Statistics Denmark, Account Statistics:

<https://www.dst.dk/da/Statistik/dokumentation/statistikdokumentation/regnskabsstatistik-for-private-byerhverv>

Statistics Denmark: Labour Market Account (register data):

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/labour-market-account>

Department of Food and Resource Economics (IFRO):

For a presentation of the basic data collection and analysis of the processing industry - Economic Situation of the Danish Fishery 2005: Data collection and validation. Segmentation and analysis of the industry. http://ifro.ku.dk/publikationer/ifro_serier/fiskeriets_okonomi/

Revision

The data documentation provided by Statistics Denmark contains a describe the frequency of the methodology review etc.

Confidentiality

1. Are procedures for confidential data handling in place and documented?

Yes, documentation by Statistics Denmark. All micro data are confidential and handled and stored by Statistic Denmark in accordance with rules and regulation of data handling.

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

Yes, reported data to DCF partner are only aggregated data that have been controlled by Statistics Denmark in accordance with rules and regulation of data handling and storage.

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

Yes, reported data to external users are only aggregated data that have been controlled by Statistics Denmark in accordance with rules and regulation of data handling and storage.

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

Only aggregated data that have been controlled by Statistics Denmark in accordance with rules and regulation of confidentiality can be published.