Ministry of Agriculture, Nature and Food Quality of The Netherlands, The Hague

Wageningen Marine Research, IJmuiden

Wageningen Economic Research, The Hague

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 16 July 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 16 July 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) 2021/[pending]

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

The Netherlands Work Plan for data collection in the fisheries and aquaculture sectors

2022-2027

Version 4

[The Hague, November 23, 2021]

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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.

In the Netherlands, the data collection programme is conducted by Wageningen Marine Research (WMR, biological components) and Wageningen Economic Research (WEcR, social-economic components) under the statutory tasks of the Ministry of Agriculture, Nature and Food Quality (LNV). Both institutes provide an annual work plan to the Ministry for the statutory tasks of the next year in October. The national statutory tasks encompass more activities than for the EU data collection programme, e.g. data collection on fresh water fish and fisheries, shellfish and shellfish fisheries data collection.

The data collection methodologies are constant over time and no major changes in approach are foreseen compared to previous years.

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Text Box 1a: Test studies description

General comment: This text box fulfils Chapter II, section 1.2 of the EU MAP Delegated Decision annex. This text box applies to the work plan and the annual report.
1. Aim of the test study: No test studies scheduled for the Netherlands. 2. Duration of the test study: NA 3. Methodology and expected outcomes of the test study: NA

Text Box 1b: Other data collection activities

General comment: This text box applies to the work plan and the annual report. Use this text box to provide information on other data collection activities that relate to your EMFAF operational programme and need to be included in the work plan and the annual report. Describe activities that are funded by the DCF but fulfil objectives under other EMFAF priorities, like marine knowledge, or activities funded by the DCF, but without a direct link to the EU MAP specific requirements or WP template tables, like freshwater fisheries. You can also include one-off specific studies for a particular end-user need that do not enter the regular data collection.
I. <u>Support for regional coordination</u> Future progress in continued support for regional coordination depends on the SECWEB (Mare 2020-08) project outcomes and the selected route to proceed and fund the required work. As regional coordination is the cornerstone of the collective approach to data collection, the continuation of the work may be embedded in a regional work plan in the future based on national input and support. II. <u>Support for Regional Databases</u> In support of regional coordination, Regional databases form the basis for quality controlled storage of data collected under the DCF. Future progress in support for regional databases depends on the selected route to proceed and fund the required development and maintenance of the systems. From a national perspective, the Netherlands is contributing to a variety of groups in support of development and governance of databases (both for surveys and commercial data). In the future the continuation of the work may be embedded in a regional work plan based on national input and support. This input may be through effort and/or financial support through a regional contribution.

Text Box 2.3: Diadromous species data collection in freshwater

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

In the Netherlands, eel (*Anguilla anguilla*) is the only diadromous fish species that is fished commercially in freshwater. In 2010 the Ministry of Economic Affairs introduced an obligatory online catch registration for all freshwater waterbodies. In 2012 effort data (type and number of fishing gears) was added to the registration system. In the catch & effort registration system, yellow eel and silver eel catches are not separated. The existing market sampling programme consists of 36 samples (= fishing trip) collected between May and August, and in the province of Friesland also in autumn. In each sample length measurements of approximate 150 (max. 200) eels are taken from the unsorted catches. Maturity (Silver eel/yellow eel) is registered separately. In addition to collecting length data, eels are collected for biological sampling (life stage, length, weight, sex, age). Annually several hundred eels are dissected for biological samples (4 eels per 10cm class until 50 cm and 2 eels per 10 cm class for eel >50cm). From these eel, a subset of 50 otoliths are selected for ageing and the otoliths are sent to SLU (Swedish university of agricultural sciences). See also Annex 1.1 sampling scheme ELE-FRS-MIS-commercial.

In addition to the fisheries data, fisheries independent surveys take place:

1. Glass eel survey: Yearly survey with 9 glass eel detectors (elvi's). The glass eel monitoring with detectors started in 2019 and is continuous during the glass eel season. See also Annex 1.1 sampling scheme ELE-FRS-MPM.
2. Glass eel survey with a liftnet (1*1m) at Den Oever and at IJmuiden during March/May. The survey started in 1938 and is an important series in the ICES assessment for a European glass eel index. See also Annex 1.1 sampling scheme ELE-FRS-LNP.
3. Lake IJsselmeer and Markermeer are sampled yearly with electric gear (beam trawl in the open water, dipping net in the shore). See also Text box 2.6 (FYMA) and Annex 1.1 Type of sampling activity: trawl hauls.

For *Salmo salar* and *Salmo trutta* commercial fishery is banned, so no data from commercial catches are collected. One fisheries-independent survey takes place: sampling with a traditional salmon fyke on three locations in the Rhine & Meuse catchment area. In total, three locations are sampled in May-July and October-November. One location (river Waal) is sampled annually, the other two (river Maas, river IJssel) biennially. See Annex 1.1 sampling scheme SAL-FGRZ. This survey is funded by the Ministry of Infrastructure and Environment as part of the Water Framework Directive.

Text Box 2.4: Recreational Fisheries

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 for the data collected on marine and freshwater recreational catches.
The target population are the resident recreational fishers in The Netherlands. Recreational fishers are >95% anglers. The Netherlands carries out a biennial sampling programme covering all recreational fisheries in fresh and marine waters. The catches of all species are recorded. As there is no licence system in the Netherlands for marine fishing, the programme consists of a biennial screening survey covering about 25,000 – 60,000 households. These households are questioned on their participation in recreational fishery. Based on the results of this screening survey about 2500 recreational fishermen are selected to provide information on their recreational catches in a biennial logbook survey for one year (see also van der Hammen et al 2019).

Text Box 2.5: Sampling plan description for biological data

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 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.
The on-board sampling plan for commercial fisheries in the North Sea and Eastern Artic areas consists of sampling schemes from, in principle, three predefined sampling populations: passive demersal gears (DEMPAS), active demersal gears (DEMACT1, DEMACT2) and pelagic gears (PEL1, see section 2.5 All regions). The on-shore sampling schemes AUCTION_DEM and AUCTION_SHRIMP, cover respectively demersal landings and brown shrimp (*Crangon crangon)* landing in the main Dutch auctions. Market samples from pelagic trawlers active in the North Sea are covered under All regions (see section 2.5 all regions). Additional information on sampling schemes The sampling of passive demersal gears (DEMPAS) concerns a non-probabilistic vessel*trip sampling scheme, with a sampling intensity of 10 trips per year. In practice, probabilistic selection is hampered due to the highly variability of fishing activity throughout the year and the seasonal and weather dependent character of the fisheries. The sampling of active demersal gears (DEMACT1, DEMACT2) is based on a reference fleet. The sampling scheme is a probabilistic vessel*week scheme, with a sampling intensity of 10 observer trips (DEMACT1) and 160 self-sampling trips (DEMACT2) per year. Auction sampling (AUCTION_DEM and AUCTION_SHRIMP is carried out in the main auctions in the Netherlands, accounting for over 80% of the demersal and shrimp landings. The sampling scheme is based on auction*days stratified by quarter and samples are further stratified by size categories where relevant. Further details on the sampling schemes are provided in Annex 1.1. Additional description on sampling frames

The sampling frame descriptions as indicated in Table 2.5 includes information by sampling scheme on the fisheries and area.

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 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

Additional information on sampling schemes
The on-board sampling plan for pelagic trawlers (PEL1) concerns a probabilistic vessel*time sampling scheme, with a sampling intensity of one trip per month. Sampling is carried out by observers. The PEL2 sampling plan is based on self-sampling by instructed fishermen of a reference fleet and concerns a week*ICES division scheme for a predefined list of species. Both sampling scheme cover the pelagic freezer trawler fleet operating in EU waters. Details on the sampling schemes are provided in Annex 1.1.
The RCG InterSessional SubGroup "Case study on freezer trawler fleet exploiting pelagic fisheries in the NEA" of which NLD is participant is working towards a regional sampling plan for this fleet.

Text Box 2.6: Research surveys at sea

Region: North Sea and Eastern Arctic

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

International Bottom Trawl Survey (IBTS_Q1)
1. Objectives of the survey
The IBTS is carried out twice a year, one survey is conducted in the first quarter and a second survey in the third quarter. The Netherlands participates only in the first quarter (Q1) survey with RV Tridens (25 days at sea). The IBTS is a mandatory survey. The ICES SISP Manual for the International Bottom Trawl Surveys (revision IX) describes the current objectives:

a. To determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices;
b. To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
c. To monitor the distribution and relative abundance of all fish species and selected invertebrates;
d. To collect data for the determination of biological parameters for selected species;
e. To collect hydrographical and environmental information;
f. To determine the abundance and distribution of late herring larvae (February North Sea survey).

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During daytime, GOV trawl hauls are conducted. At night time, a Method Isaac Kidd (MIK) plankton trawl is deployed. Hydrographical data is collected with a CTD (downcast) at every trawl station. Since 2011, litter from the trawl catch is being sorted and registered. The complete sampling procedure and the level of precision are defined in the ICES SISP Manual for the

International Bottom Trawl Surveys (revision IX) and the Manual for the Midwater Ring Net sampling during IBTS Q1.
The ICES IBTS Working Group (IBTSWG) decides annually on the sampling areas for the contributing MSs.

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES IBTS Working Group (IBTSWG) and performed in collaboration with research vessels from France, Germany, Denmark, Sweden. Non-EU countries also participate: UK and Norway.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The IBTS Q1 survey is carried out by a number of EU MSs and non-EU countries, each contributing with its own vessel. No cost sharing applies.

North Sea Beam Trawl Survey (BTS)

1. Objectives of the survey
The BTS is carried out annually in August/September. The Netherlands participates with RV Tridens (35 days at sea), covering a large part of the North Sea. The BTS is a mandatory survey. The ICES Manual for the Offshore Beam Trawl Surveys (SISP14, April 2019) describes the current objectives:

a. Create fisheries-independent abundance indices by age group (1 year olds and older) for a number of fish species (i.a. plaice, sole, dab, lemon sole, flounder, turbot, brill, monk fish) for the sampled area
b. Collection of biological data on all fish species including elasmobranch species for ecosystem analysis purposes, including length measurements
c. Collection of data on at least a selection of epibenthos species for ecosystem analysis purposes
d. Collection of marine litter data

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During daytime, 30 minute beam trawl hauls are conducted. Hydrographical data is collected with a CTD (downcast) at every trawl station. Since 2011, litter from the trawl catch is sorted and registered on board Tridens. The complete sampling procedure is defined in the ICES Manual for the Offshore Beam Trawl Surveys (SISP14, April 2019).

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on Beam Trawl Surveys (WGBEAM). Other MSs carrying out beam trawl surveys in the region are Belgium and Germany. Non-EU participation also occurs in the North Sea, by UK.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The survey is carried out by four EU MSs, each contributing with its own vessel. No cost sharing applies.

Demersal Young Fish Survey (DYFS)

1. Objectives of the survey
The DYFS is carried out annually from end of August-early November. The Netherlands participates with RV Isis (25 days at sea), RV Luctor (15 days at sea), RV Stern (25 days at sea) covering different near shore areas and estuaries. The DYFS is a mandatory survey. The ICES Manual for the Inshore Beam Trawl Surveys (in prep., presumed finalisation Q2 2022) describes the current objectives:

a. Create fisheries-independent abundance indices by age group (0 year olds, 1 year olds, and older) for a number of fish species (plaice, sole, dab, flounder, turbot, brill) for the sampled area
b. Collection of biological data on all fish species including elasmobranch species for ecosystem analysis purposes, including length measurements
c. Collection of data on (a selection of) epibenthos species for ecosystem analysis purposes
d. Collection of abundance and length-frequency data of brown shrimp (*Crangon crangon*)

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During daytime, 15 minute beam trawl hauls are conducted. Hydrographical data is collected with a datalog CTD attached to the net. The complete sampling procedure is defined in the ICES Manual for the Inshore Beam Trawl Surveys (in prep.), and is largely in line with the sampling procedures for the Beam Trawl Survey (see above).

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on Beam Trawl Surveys (WGBEAM). Other MSs carrying out DYFS are Belgium and Germany.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The DYFS is carried out by three EU MSs, each contributing with its own vessel. No cost sharing applies.

Sole Net Survey (SNS_NLD)
1. Objectives of the survey
The SNS is carried out annually in September. The Netherlands participates with RV Isis (10 days at sea) in the Dutch, German and Danish coastal zone. The SNS is a mandatory survey. The ICES Manual for the Inshore Beam Trawl Surveys (in prep., presumed finalisation Q2 2022) describes the current objectives:

a. Create fisheries-independent abundance indices by age group (0 year olds, 1 year olds, and older) for a number of fish species (plaice, sole, dab, flounder, turbot, brill) for the sampled area
b. Collection of biological data on all fish species including elasmobranch species for ecosystem analysis purposes, including length measurements
c. Collection of data on (a selection of) epibenthos species for ecosystem analysis purposes

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During daytime, 15 minute beam trawl hauls are conducted. Hydrographical data is collected with a datalog CTD attached to the net. The complete sampling procedure is defined in the ICES Manual for the Inshore Beam Trawl Surveys (in prep.), and is largely in line with the sampling procedures for the Beam Trawl Survey (see above).

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on Beam Trawl Surveys (WGBEAM). The Netherlands is the only MS conducting this survey.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
No task sharing applies (NLD only MS carrying out this survey). No cost sharing applies.

Herring Larvae Survey (IHLS)

1. Objectives of the survey
The herring larvae survey in the North Sea is annually carried out in September (two weeks) and December (one week). The Netherlands participates with RV Tridens (total 15 days), covering the North Sea. The IHLS is a mandatory survey.

The aim of the survey is to estimate the adult population of autumn spawning herring based on the abundance of newly hatched herring larvae as this is a reliable index for spawning stock abundance. In particular, the survey gives information on the abundance of different spawning components. The Netherlands covers Buchan, central North Sea, southern North Sea and English Channel.

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
The main sampling type are plankton hauls using a Gulf VII plankton sampler, following a fixed station design. In addition to the plankton hauls, fish hauls (with a pelagic trawl) may be carried out for the collection of adult biological parameters. Hydrographical data are collected with a Seabird CTD attached to the plankton sampler. During the herring larvae surveys a standard grid is sampled. In each ICES rectangle 9 stations are sampled (0°30 N x 1°E/W; ca. 30 x 30 NM). The complete sampling procedure is defined in the ICES Manual for the International herring larvae surveys south of 62° North (Annex 7, January 2010).

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on Surveys on Ichthyoplankton in the North Sea and adjacent Seas (WGSINS). Other MS carrying out IHLS is Germany.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The IHLS is carried out by two EU MSs, each contributing with its own vessel. No cost sharing applies.

Downs recruitment survey (IHLS-DRS; Additional survey)

1. Objectives of the survey
The Downs recruitment survey in the North Sea is since 2018 annually carried out in April (one week). The Netherlands participates with RV Tridens (total 5 days), covering the relevant area in the North Sea (sampling area based on larval drift modelling). The survey is not mandatory under the DCF. The survey is part of the Dutch statutory task programme for fisheries.

The aim of the DRS is to provide a recruitment index for the winter spawning herring population in the Southern North Sea and English Channel. This index is intended to be added to the existing IBTS-MIK index for tuning of the North Sea herring assessment.

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
In order for the 'Downs' recruitment index to be similar to the already existing MIK-index, the survey is carried out as similar as possible as the IBTS-MIK. The major difference being that the IBTS-MIK is carried out at night, whereas the DRS is performed both day and night. Both IBTS-MIK and DRS target larger herring larvae. These larvae are able to swim and could avoid the MIK-net. Therefore, for the night sampling during the IBTS-MIK a black net is used. A black net will however be easily visible for herring larvae during daytime and invoke avoidance. For the DRS survey it was decided to use a blue MIK-net. A blue net will be less visible for the herring larvae both during day and night. Survey protocols of the IBTS-MIK are followed (Manual for the Midwater Ring Net sampling during IBTS Q1).

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on Surveys on Ichthyoplankton in the North Sea and adjacent Seas (WGSINS). The Netherlands is the only MS conducting the survey.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
No task sharing applies (NLD only MS carrying out this survey). No cost sharing applies.

NS Herring Acoustic Survey (NHAS)
1. Objectives of the survey
The NHAS is carried out annually in June/July in the North Sea. The Netherlands participates with RV Tridens (total 20 days). The NHAS is a mandatory survey.

The survey aims to provide an annual estimate of the distribution, abundance and population structure to inform the assessment of the following herring and sprat stocks: Western Baltic Spring-spawning herring (in ICES Divisions IV and IIIa), North Sea Autumn Spawning herring (in IV and IIIa), West of Scotland herring (in VIaN), Malin Shelf herring (west of Scotland/Ireland in VIaN-S and VIIb,c), North Sea sprat (in IV) and Sprat in IIIa (western Baltic).

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During the survey acoustic echosounder measurements are done, preferably in transects perpendicular to the coast. In addition, trawl hauls are made to identify the species composition of the acoustic recordings. Hydrographical data are collected on regular intervals. The complete sampling procedure is defined in the ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.5.

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

The survey is internationally coordinated by the ICES Working Group on International Pelagic Surveys (WGIPS) and performed in collaboration with research vessels from Denmark, Germany, Ireland. Non-EU countries also participate: UK and Norway.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The NHAS is carried out by four EU MSs and two non-EU countries, each contributing with its own vessel. No cost sharing applies.

International Ecosystem Survey in the Nordic Seas (ASH) –see for full description Workplan Denmark

1. Objectives of the survey
The ASH is carried out annually in the May/June and is carried out by RV Dana (Denmark). The ASH is a mandatory survey. The ICES Manual for International Pelagic Surveys (IPS) (version 1.00) describes the current objectives:

a. Carry out a predetermined survey cruise track
b. Determine an age stratified estimate of relative abundance of herring within the survey area
c. Determine an age stratified estimate of relative abundance of blue whiting within the survey area
d. Collect biological samples from directed trawling on insonified fish echotraces to determine age structure and maturity state of the herring stock
e. Collect physical oceanography data from vertical profiles (CTD)
f. Plankton sampling (WP2 and Dyedi)

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During the survey acoustic echosounder measurements are done. In addition, trawl hauls are made to identify the species composition of the acoustic recordings. Also hydrographical and plankton data are collected. The complete sampling procedure is defined in the ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.2.

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on International Pelagic Surveys (WGIPS). The Netherlands participates in the ASH as part of a consortium of EU MSs and let two scientists join the survey on-board RV Dana.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing (personnel) applies: the survey is carried out by RV Dana and the Netherlands let two scientists join the survey.
Cost sharing applies: the operational costs of the vessels are shared by EU MSs applying an allocation key proportional to national share of the EU TAC.

Dutch shellfish surveys (Additional surveys MOSKOK, ENSIS)

1. Objectives of the surveys
The Dutch shellfish surveys are carried out annually between February and October covering the Dutch coast and estuaries (Wadden Sea, Oosterschelde, Westerschelde, and since 2017 Veerse

Meer and Grevelingen). The surveys together form the basis for the national shellfish advice. The sampling design has been evaluated in 2015 and is a continuation of the previous design. The survey is not mandatory under the DCF. The survey is part of the Dutch statutory task programme for fisheries.
The survey aims to provide an annual estimate of:

a. the abundance of *Ensis* sp., *Spisula subtruncata*, *Mytilus edulis*, *Cerastoderma edule* and *Lutraria lutraria* in the Dutch coastal zone
b. the abundance of *Cerastoderma edule*, *Mytilus edulis* and *Crassostrea gigas* in the Wadden Sea and Oosterschelde and Westerschelde estuary
c. the abundance of non-commercial shellfish and infauna species in the Dutch coastal zone, Wadden Sea and Ooster- and Westerschelde estuary

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
The survey samples a number of commercial shellfish species in the littoral and sublittoral areas in the Dutch coastal zone and estuaries. All sub-surveys are stratified. The sampling device (box-corer, Van Veen grab, towed and suction dredges) depends on the sampling location and target species. The complete sampling procedure is defined in the Dutch manual 'Handboek schelpdierbestandsopnames' (available on request). Information in Dutch on the (results of) the surveys is available at http://www.wur.nl/schelpdiermonitor

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is not internationally coordinated.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Not applicable.

Lakes IJsselmeer and Markermeer (FYOE)

1. Objectives of the survey
The Dutch shore survey on the lakes IJsselmeer and Markermeer is carried out annually in August/September, covering both lakes. The survey delivers data to the international advice on eel as well as to national advice on smelt, bream, roach, perch, pikeperch. The survey is not mandatory under the DCF. The survey is part of the Dutch statutory task programme for fisheries.
The survey aims to provide an annual estimate of:

a. the abundance of eel, smelt, bream, roach, perch and pikeperch in lakes IJsselmeer and Markermeer
b. the abundance of non-commercial fish species in both lakes
c. provide information to the national evaluation of the Water Framework Directive

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
The shore monitoring (approx. 100 stations) is conducted from a small boat with an electric fishing net. The survey has a fixed location design, selected to cover all habitat types and to represent the complete lakes.

The complete sampling procedure for both surveys is defined in the Dutch manual https://doi.org/10.18174/522029 (shore monitoring chapter 4.2)

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is not internationally coordinated.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Not applicable.

Lakes IJsselmeer and Markermeer (FYMA)

1. Objectives of the survey
The Dutch open water survey on the lakes IJsselmeer and Markermeer is carried out annually in October/November (open water monitoring, FYMA), covering both lakes. The survey delivers data to the international advice on eel as well as to national advice on smelt, bream, roach, perch, pikeperch. The survey is not mandatory under the DCF. The survey is part of the Dutch statutory task programme for fisheries.
The survey aims to provide an annual estimate of:

a. the abundance of eel, smelt, bream, roach, perch and pikeperch in lakes IJsselmeer and Markermeer
b. age composition of eel, bream, roach, perch and pikeperch in both lakes
c. the abundance of non-commercial fish species in both lakes
d. provide information to the national evaluation of the Water Framework Directive

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
The open water survey is carried out in October/November with an electric beam trawl (approx. 40 hauls) for eel sampling and with a 4 meter beam trawl (approx. 40 hauls) for the other species, and standardised since 1989. The survey has a fixed sampling design.

The complete sampling procedure for both surveys is defined in the Dutch manual https://doi.org/10.18174/522029 (open water monitoring chapter 4.1)

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is not internationally coordinated.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Not applicable.

Region: North-East Atlantic

Blue whiting survey (IBWSS)

1. Objectives of the survey
The IBWSS is carried out annually in March/April in the Atlantic (west of Ireland). The Netherlands participates with RV Tridens (approx. 18 days). The IBWSS is a mandatory survey.

The survey aims to determine the distribution and abundance at age and length of the Northeast Atlantic blue whiting stock during the spawning season to the west of Britain and Ireland.

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
During the survey transect-wise acoustic echosounder measurements are done. In addition, trawl hauls are made to identify the species composition of the acoustic recordings. Hydrographical data are collected on regular intervals. The complete sampling procedure is defined in the ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.1.
3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is internationally coordinated by the ICES Working Group on International Pelagic Surveys (WGIPS) and performed in collaboration with research vessels from Ireland and non-EU countries Faroe Islands, Russia, and Norway. UK is planning to also contribute with a research vessel, but there is no final decision taken at the time the NWP is written.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The IBWSS is carried out by two EU MSs, and three non-EU MSs, each contributing with its own vessel. Furthermore, scientists from Denmark and Germany participate in the survey on board of the Dutch vessel.

Cost sharing applies: the operational costs of the vessels are shared by EU MSs applying an allocation key proportional to national share of the EU TAC.

International Mackerel and Horse Mackerel Egg Survey (MEGS; Triennial)
1. Objectives of the survey
The international MEGS is carried out triennially from January until July (first survey in this WP period scheduled in 2022). The Netherlands participates with RV Tridens (approx. 30 days), mostly in May-June. The MEGS is a mandatory survey.

The aim of the survey is to provide abundance estimates of the western and southern component of Atlantic mackerel and horse mackerel by measuring the egg abundance. In combination with measurements of fecundity and atresia, which will be collected in the same year, the egg abundance can be converted into estimates of the spawning stock.

2. Description of the survey design and methods used in the survey for each type of data collection as listed in Table 2.6 for this specific survey.
The main sampling type are plankton hauls using a Gulf VII plankton sampler, following a fixed station design. The survey is split up into 6 or 7 periods, and in each period the spawning area is fully covered. In addition to the plankton hauls, fish hauls (with a pelagic trawl) are carried out for the collection of adult mackerel and horse mackerel biological parameters. Also hydrographical data are collected with a Seabird CTD attached to the plankton sampler. The complete sampling procedure is defined in the SISP Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea (version 2.2 2019). The methodology for atresia and fecundity estimates is defined in the SISP Manual for the mackerel and horse mackerel egg surveys (MEGS): SISP 5 - WGMEGS V12 Manual for AEPM and DEPM fecundity.

ICES Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS) decides on the sampling areas for the contributing MSs.

3. For internationally coordinated surveys, describe the participating Member States/vessels.
The survey is coordinated by ICES WGMEGS (WGMEGS). Germany, Ireland, Netherlands, Portugal, Spain, and non-EU countries UK, Iceland, the Faroe Islands participate in the survey.

4. Where applicable, provide more details on the type of participation and/or threshold agreement applied.
Task sharing applies. The MEGS is carried out by five EU MSs and three non-EU countries, each contributing with its own vessel. Fecundity and atresia samples are divided among the three analysing EU countries (Ireland, Netherlands, Spain), UK and Norway. No cost sharing applies.

Text Box 3.1: Fishing activity variables data collection strategy

General comment: This text box fulfils Article 5 (2)(c), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 3.1 of the EU MAP Delegated Decision annex. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under the Control Regulation (EC) No 1224/2009 or where data collected under Regulation (EC) No 1224/2009 are not at the right aggregation level for the intended scientific use. Text Box 3.1 should be filled only in case complementary data collection is planned
Data on capacity, effort, landings and prices is generally available data collected under Regulation (EC) No 1224/2009. For large pelagic trawlers and for dredgers price information is not available from sales notes. This is due to the fact that many of these vessels are part of integrated companies or sell their catches directly to processing companies. To overcome this problem price information from the large pelagic trawlers is obtained from the accounts of the companies (see also Annex 1.2). These prices are internal prices used to calculate crew wager. For the dredgers, price information is gathered by means of questionnaires in the survey on the economic information from small coastal fisheries (see also Annex 1.2).

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

General comment: This text box fulfils Article 5(2)(c), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 3.2 of the EU MAP Delegated Decision annex. It is intended to describe the methods and data sources used to estimate fishing capacity, effort and landings data.
Mandatory registration (census) and reporting by fishermen. Since 2010, all fresh water fishermen with a licence to land eel, monitor their catches and supply them online to the Ministry on a weekly basis by gear type Since 2012, the effort is also monitored through this system. This catch and effort monitoring system is obliged by the eel regulation (EC 1100/2007). Data is stored by the Ministry and provided to the research institute on a regular basis. No additional data collection is required as all variables are sufficiently covered.

Text Box 4.2: Incidental catches of sensitive species

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.

During the observer trips (DEMACT1, DEMPAS) the scientific observers record incidental bycatches of sensitive species and corresponding observation effort. Further details on the sampling schemes are provided in Annex 1.1. Sampling scheme PEL1 covers the North Sea area as well, but given the wider geographical scope, PEL1 is covered under 'All regions'.

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

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?
  The FishPi project (page 375, EU MARE/2014/19) 'analysed risk from various gears to seabirds and marine mammals and determined that observations were most needed in fisheries using set gillnets, trammelnets, drift nets, and bottom trawls'. DEMACT1 covers the bottom trawlers, DEMPAS covers the gillnet fisheries (trammel nets and drift nets are not relevant for NLD)
- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?
  See above on assessment.
- What are the methods to calculate the observation effort?
  For the active fisheries (DEMACT1) the observation effort is determined by the scientific observer through expressing the time observed of catch processing at the conveyer belt.
  For the passive fisheries (DEMPAS) the observation effort is expressed by the scientific observer, depending on the type of fisheries, through the observed metres nets (gillnet fisheries), number of fykes (fyke fisheries), number of fishing (handline fisheries).
- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.
  The sampling protocol follows recommendations from ICES Working Group on Bycatch of Protected Species (WGBYC).

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?
  The scientific observer registers whether the cod-end was checked in a haul for rare, incidental bycatches and the observer is instructed to indicate when the cod-end was not checked in a haul.
- In gill nets and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?
  In gillnet and hook-and-line fisheries the scientific observer registers how much of the hauling process has been observed for incidental bycatches which never came on board.

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

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.

During the observer trips (PEL1) the scientific observers record incidental bycatches of sensitive species and corresponding observation effort. Note that scheme PEL1 also encompasses North Sea and Eastern Arctic. Further details on the sampling schemes are provided in Annex 1.1.

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

- Has an assessment of the relative risk of bycatch for the different gear types/metiers taken place and been taken into account for the sampling design?
  The FishPi project (page 375, EU MARE/2014/19) 'analysed risk from various gears to seabirds and marine mammals and determined that observations were most needed in fisheries using set gillnets, trammelnets, drift nets, and bottom trawls'. The demersal gears are included under region 'North Sea and Eastern Arctic' while trammel nets and drift nets are not relevant for NLD. Sampling scheme PEL1 covers the pelagic trawlers in addition for EU waters under 'All regions'.
- What are the gear types/metiers that present the highest risk of bycatch per species/taxa of PETS in a given region?
  See above on assessment.
- What are the methods to calculate the observation effort?
  For the active fisheries under sampling scheme PEL1, the observation effort is determined by the scientific observer through expressing the time observed of catch processing at the conveyer belt.
- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.
  The sampling protocol follows recommendations from ICES Working Group on Bycatch of Protected Species (WGBYC).

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?
  The scientific observer registers whether the cod-end was checked in a haul for rare, incidental bycatches and the observer is instructed to indicate when the cod-end was not checked in a haul.
- In gill nets and hook-and-line fisheries: does the on-board observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches that slip out of the net?
  Not applicable to the Netherlands for this region.
- In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

In active fisheries the scientific observer indicates what percentage of the sorting or hauling process has been checked at haul level for rare, incidental bycatches.

Text Box 4.3: Fisheries impact on marine habitats

General comment: This text box fulfils Article 5 paragraph 2(a) and 2(b), Article 6 paragraph 3(a), 3(b) and 3(c) of Regulation (EU) 2017/1004 and Chapter 2, section 4.2 of the EU MAP Delegated Decision annex. It contains information on additional studies on the fisheries impact on marine habitats. This text box applies to the work plan and the annual report.
1. Aim of the study: No additional studies are planned at the moment. 2. Duration of the study: Not applicable 3. Methodology and expected outcomes of the study: Not applicable

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

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

1.Description of clustering

The Dutch fishing fleet consists of a large variety of vessel types, ranging from large pelagic trawlers to small scale vessels using handlines. As a result, the 2020 national fleet consisted of 34 segments of which only 7 included more than 10 active vessels (total 481 vessels). Besides, 21 segments included less than 10 vessels (total 65 vessels) and 6 segments included inactive vessels (total 189 vessels). The small segments provide an issue both from privacy and from sampling purposes. Almost all of the smaller segments included <5 vessels and contributed <3% to the total landings and revenues. Only the segment of the large pelagic trawlers contributed considerably to the total landings and value: 75% of total landings and 30% of landings value. Because of this, the segment of large pelagic trawlers is considered a separate segment. The other segments were considered as non-important segments and were clustered, taking into account the distinction in fishing patterns. Clusters of less important segments were constructed, based on the difference in cost structure of vessels with passive gears and active gears and based on length of the vessels and consistency of the clustering with previous data collection programmes. The resulting clustering is given in the table below.

segment	activity level	cluster	Numbe	% lande	% value	% sea d
Demersal trawlers and/or demersal seiners 0 < 10 m	NA	Beam trawlers 0 < 10 m	8	0.0%	0.0%	0.0%
Demersal trawlers and/or demersal seiners 10 < 12 m	NA	Beam trawlers 0 < 10 m	1	0.0%	0.0%	0.0%
Beam trawlers 0 < 10 m	NA	Beam trawlers 0 < 10 m	6	0.0%	0.0%	0.2%
Vessels using active and passive gears 0 < 10 m	NA	Beam trawlers 0 < 10 m	2	0.0%	0.0%	0.0%
Demersal trawlers and/or demersal seiners 24 < 40 m	NA	Demersal trawlers and/or demersal seiners 24 < 40 m	34	3.9%	10.3%	12.5%
Demersal trawlers and/or demersal seiners 40 m or larger	NA	Demersal trawlers and/or demersal seiners 24 < 40 m	1	0.1%	0.4%	0.4%
Drift and/or fixed netters 12 < 18 m	NA	Drift and/or fixed netters 18 < 24 m	1	0.0%	0.0%	0.0%
Drift and/or fixed netters 18 < 24 m	NA	Drift and/or fixed netters 18 < 24 m	1	0.0%	0.0%	0.1%
Vessels using Pots and/or traps 12 < 18 m	NA	Drift and/or fixed netters 18 < 24 m	3	0.0%	0.0%	0.1%
Vessels using Pots and/or traps 18 < 24 m	NA	Drift and/or fixed netters 18 < 24 m	3	0.0%	0.0%	0.1%
Vessels using Pots and/or traps 24 < 40 m	NA	Drift and/or fixed netters 18 < 24 m	1	0.2%	0.3%	0.6%
Vessels using hooks 12 < 18 m	NA	Drift and/or fixed netters 18 < 24 m	1	0.0%	0.0%	0.0%
Vessels using polyvalent passive gears only 12 < 18 m	NA	Drift and/or fixed netters 18 < 24 m	1	0.0%	0.0%	0.0%
Dredgers 24 < 40 m	NA	Vessel using other active gears 18 < 24 m	3	0.7%	0.8%	0.5%
Dredgers 40 m or larger	NA	Vessel using other active gears 18 < 24 m	4	3.0%	3.5%	0.6%
Demersal trawlers and/or demersal seiners 12 < 18 m	L	Vessel using other active gears 18 < 24 m	1	0.0%	0.0%	0.0%
Beam trawlers 12 < 18 m	L	Vessel using other active gears 18 < 24 m	2	0.0%	0.0%	0.0%
Beam trawlers 18 < 24 m	L	Vessel using other active gears 18 < 24 m	5	0.0%	0.0%	0.2%
Pelagic trawlers 12 < 18 m	NA	Vessel using other active gears 18 < 24 m	1	0.0%	0.0%	0.0%

Vessels with active gears of less than 12 meter were clustered in the one segment. Because of consistency with previous data collection program the cluster was named Beam trawlers 0<10 m.

One large demersal trawler >40 m was merged with the segment of demersal trawlers and seiners 24-<40 m. This vessel has a length of just over 40 m and has a similar fishing pattern and cost structure as many of the vessels in the other segment which are just under 40 m.

Vessels deploying passive gears larger than 12 m were clustered in the segment Drift and/or fixed netters 18-<24 m. Although most of the vessels in this segment mainly use pots, the naming was used for consistency reasons as this name was also used in previous programmes. All vessels using active gears from small segments were clustered in the segment Vessel using other active gears 18-<24 m.

Demersal trawlers and beam trawlers larger than 12 meters with a total revenue less than 50,000 euro were also included in this segment. These are vessels that have very little effort and are not regarded as normally active fishing enterprises. In order to prevent bias of the data for the active fleet segments, these vessels have been clustered with other small segments.

Pelagic trawlers larger than 40 meters operate both in EU en non EU waters. As this is a small group of vessels with similar cost structures, these vessels are clustered in one segement.

2. Description of activity indicator
In the segments of beam trawlers and demersal trawlers and seiners larger than 12 meters distinction is made between low and normally active vessels. Vessels using these gears with an overall estimated landings value of 50,000 euro are regarded as low active. This landings value translates into an income level comparable with the minimal wage, for the Netherlands (19,620 euro), the threshold for low active vessels according to the RCG Econ guidelines (PGEcon 2018). The value of landings is estimated based on the logbook and sales notes information. The low active vessels (8 in total) are clustered with other small segments with vessels using other active gears in the cluster "Vessel using other active gears 18-<24 m" in order to prevent bias in the fleet segments of active vessels. For all other segments no such distinction is made.

3. Deviation from the RCG ECON (ex. PGECON) definitions
For the large pelagic trawlers >40 m no information on financial data can be gathered. This information is regarded as privacy sensitive information and is not available.
For the other small coastal fisheries, the value of the physical capital was based on the insurance value (see Annex 1.2).

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

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

1. Description of the threshold application

The total Dutch aquaculture production in 2019 was 45,750 tonnes with a total value of 78 million euro (eurostat data). As a result, the 5% threshold is 2,288 tonnes and 3.9 million euro.

	Volume (tonnes)	value (euro)
Total	45,750	78,412,143
Treshold	2,288	3,920,607
Mussels	38,094	45,597,920
Oysters	2,545	6,744,197
Eel	2,200	18,700,000
African catfish	2,700	4,860,000
Other marine species	212	2,510,026
Other freshwater species	0	0

Production of mussels, oysters (combined flat and cupped oyster production) and eel are well above the threshold and are included in the data collection scheme. Production of African catfish consists of two different fish types (Clarias and so called Claresse) that are cultured by different companies (respectively four and one company. Because the production of both Claresse and Clarias is below the threshold and the number of companies involved is so small no data will be collected for this species. This species is reported in the table as other freshwater species. Other marine species are well below the threshold.

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

No deviations from the definitions.

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

General comment: This text box fulfils Article 5(2)(f), Article 6(3)(a), (b) and (c) of Regulation (EU) 2017/1004, and Chapter II point 7 of the EU MAP Delegated Decision annex. MS should provide justification for complementary data collection for fish processing.

No data will be collected on the fish processing sector.

The quality report fulfils Article 6(3)(d) of Regulation (EU) 2017/1004. This document is intended to specify data to be collected under Chapter II, point 2 of the EU MAP Delegated Decision annex: Biological data on exploited biological resources caught by Union commercial and recreational fisheries. Use this document to state whether documentation in the data collection process (design, sampling implementation, data capture, data storage, sample storage and data processing) exists and identify where this documentation can be found. Names of sampling schemes and strata shall be identical to those in Tables 2.2, 2.3, 2.4, 2.5, 2.6 and 4.1 of the WP/AR. In case of quality information on scientific surveys, use the survey acronym as a sampling scheme identifier. For mandatory surveys, refer to Table 1 of the EU MAP Implementing Decision annex, see also MasterCodeList 'Mandatory survey at sea'.

Related to Text box 2.3 and Table 2.3 (diadromous species data collection)

Sampling scheme identifier: ELE-FRS-MPM

MS : NLD
Region: All regions
Sampling scheme identifier: ELE-FRS-MPM
Sampling scheme type: Diadromous (scientific)
Observation type: EMAtSea
Time period of validity: 2022-2027
Short description (max 100 words): Every year at the main glass eel entrance points glass eel detectors are placed during the main glass eel migration period. Glass eel (*Anguilla anguilla* larvae) is attracted by the freshwater current and trapped in the detector. The detectors are emptied regularly and (a subsample of) glasseel are counted and weighted. In total 9 detectors are used in (March) April – May (June). Since 2019 a gradual shift from the original sampling method (1*1m lift net) to detectors is in progress.
Description of the population
Population targeted: glass eel (larval stage of *Anguilla anguilla*) migrating from sea to fresh water at the main fresh water entrance points in The Netherlands, during the main glass eel migration period. **Population sampled:** glass eel (larval stage of *Anguilla anguilla*) migrating from sea to fresh water at the main fresh water entrance points in The Netherlands, during the main glass eel migration period. **Stratification:** detectors are situated at all main entrance points (9) in The Netherlands (figure 6.2 in https://doi.org/10.18174/522029).
Sampling design and protocols
Sampling design description: the glass eel detectors are positioned on locations where the glass eel enters the fresh water bodies of The Netherlands, to estimate the glass eel abundance. Every year at the main glass eel entrance points glass eel detectors are placed during the main glass eel migration period. The detectors are emptied regularly and (a subsample of) glass eels are measured, counted and weighted (see also Data capture). **Is the sampling design compliant with the 4S principle?:** NA

Regional coordination: N

Link to sampling protocol documentation: Sampling protocol documentation for the relatively new method will become available in 2022.

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: the glass eel is collected in detectors. After emptying, the total glass eel is sorted from the rest of the catch. Wet weight of the total sample is taken using electronic scales, to the gram. Scales are maintained annually and calibrated at least daily.
All, or a representative subsample of the glass eel is measured to the mm below. Length measurements are done using an analogue measuring board, of which the set-off is checked before the start of the sampling. Length measurements and haul information are written down on specific measurement lists, and data is entered as soon as possible. Software used for data entry is in-house developed: Billie Turf. Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place.

Data capture documentation: N. Data capture documentation for this method will become available in 2022.

Quality checks documentation: N. Documentation is expected in 2022.
Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request). Essentially, the trawl haul data are checked for outliers on numerical values (either by plotting or by providing minimum, mean, and maximum values), consistency in text variables (e.g. station coding, crew members).

Data storage

National database: after processing, and a standardised quality check on outliers, the information for is stored in the database WMR database FRISBE (Oracle relational database). Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases below are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database: NA

Quality checks and data validation documentation: the database FRISBE also conducts data validation checks during the import. Documentation of those checks is available upon request.

Sample storage

Storage description: NA. The catch is after processing release to the environment. No samples are taken back to the institute.

Sample analysis: NA

Data processing

Evaluation of data accuracy (bias and precision): N, but foreseen as soon as the method is put completely in place.

Editing and imputation methods: Editing and imputation only takes place when odd values are encountered. Corrections then are done in the institute's data and a new dataset is submitted to the international database, mentioning the corrections done.

Quality document associated to a dataset: N, but foreseen as soon as the method is put completely in place.

Validation of the final dataset: N, although before submitting the data to the end-user the data has been reviewed to prevent erroneous incorrect information due to data entry mistakes.

Sampling scheme identifier: ELE-FRS-LNP

MS : NLD

Region: All regions

Sampling scheme identifier: ELE-FRS-LNP

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity: 2022-2027

Short description (max 100 words): Every year at two main glasseel entrance points (Den Oever, IJmuiden) sampling with lift net (1*1m) takes place in the glasseel migration period. The timeseries in Den Oever runs since 1938, IJmuiden since 1973. Data are used in the glass eel index and submitted to ICES WGEEL.

Description of the population

Population targeted: glass eel (larval stage of *Anguilla anguilla*) migrating from sea to fresh water at two fresh water entrance points in The Netherlands, during the main glass eel migration period.

Population sampled: glass eel (larval stage of *Anguilla anguilla*) migrating from sea to fresh water at two fresh water entrance points in The Netherlands, during the main glass eel migration period.

Stratification: samples are taken at the location with the longest glass eel monitoring (Den Oever, since 1938), and IJmuiden (since 1973). On both locations also glass eel detectors are placed (see Sampling scheme identifier ELE-FRS-MPM).

Sampling design and protocols

Sampling design description: From March till May glass eel abundance at the main entrance points for fresh water is determined by means of lift net catches. Sampling takes place at night time.

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

Regional coordination: N

Link to sampling protocol documentation: Sampling protocols are available in Dutch. A general description is available in https://doi.org/10.18174/522029, chapter 6.1.3. During night time (Den Oever: daily 22.00-05.00; IJmuiden approx. 2 times a week, 22.00-01.00), every hour a lift net is lowered to the bottom, and hauled after five minutes. The glass eel in the net is counted and released back into the environment. Hauls are replicated twice (three subsequent hauls).

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: After hauling the net, the total glass eel is sorted from the other catch. Number of glass eel in the catch is counted. Counts and haul information are written down on specific measurement lists, and data is entered as soon as possible. Software used for data entry is in-house developed: Billie Turf. Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place.

Data capture documentation: Y, in Dutch (available upon request). Annex 43 in
Keeken, O.A. van, K. Kwakman-Schilder, P. de Bruijn, J. de Leeuw, T. Leijzer, B. Griffioen, M. van Hoppe, E. van Os-Koomen, J.A.M. Wiegerinck. 2021. Handboek zoetwater vismonitoringen versie 2021 (CVO_h_008). Internal CVO report 21.005

Quality checks documentation: Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request). Essentially, the trawl haul data are checked for outliers on numerical values (either by plotting or by providing minimum, mean, and maximum values), consistency in text variables (e.g. station coding, crew members). References used follow from the Data capture documentation.

Data storage

National database: after processing, and a standardised quality check on outliers, the information for is stored in the WMR database FRISBE (Oracle relational database). WMR personnel have permanent access after signing a form with general instructions.
Access to databases with DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases below are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database: NA

Quality checks and data validation documentation: During import into the database FRISBE, data validation checks are conducted. Documentation of those checks is available upon request.

Sample storage

Storage description: NA. The catch released in the water after processing. In some years marking of glass eel takes place (mark recapture experiment). In that case, a subsample of glass eel are stored in water trays in the lab alive until release in the same water body.

Sample analysis: NA
Data processing
Evaluation of data accuracy (bias and precision): N, but glass eel index used by WGEEL for a long time. Den Oever index is used for the EU eel evaluation (obligatory by the eel regulation). **Editing and imputation methods:** Editing only takes place when odd values are encountered. Corrections then are done in the institute's database **Quality document associated to a dataset:** N. **Validation of the final dataset:** N, although before submitting the data to the end-user the data has been reviewed to prevent erroneous incorrect information due to data entry mistakes.

Sampling scheme identifier: ELE-FRS-MIS-commercial fishing

MS : NLD
Region: All regions
Sampling scheme identifier: ELE-FRS-MIS-commercial fishing
Sampling scheme type: Diadromous (scientific)
Observation type: SciObsOnShore
Time period of validity: 2022-2027
Short description (max 100 words): length measurements and biological information is collected from eel (mostly yellow eel, but also some silver eel) during three periods in the year: May-June, July-August, Sept-Nov. Sampling in the last period occurs only in the province of Frysland were there is a quota system and they are allowed to fish during the closed period for other area's (Sept-Nov). Eel (*Anguilla anguilla*) is collected from approx. 20 commercial eel fishers in The Netherlands.
Description of the population
Population targeted: Eel (*Anguilla anguilla*), mostly 'yellow eel' stage, but also some silver eel caught by fishers in the Netherlands. **Population sampled:** Eel (*Anguilla anguilla*), mostly 'yellow eel' stage, but also some silver eel, caught by fishers in The Netherlands. **Stratification:** Based on the annual catch recordings in the national fishery management units (VBCs) a selection of fishers is made. The number of fishers to be sampled in each VBC is based on the total catch per VBC. Within the VBC the fishers with the largest catches are selected. From each selected fisher, two samples are taken. Lakes IJsselmeer and Markermeer (combined VBC) are sampled every year, and selection of fishers is done based on annual landings per water body and fishing gear. The fishers with the largest catches are selected for sampling.
Sampling design and protocols
Sampling design description: Length measurements: 150 eel is randomly selected from the unsorted catch (or landings). In VBC IJsselmeer & Markermeer the catch is, if possible, measured on board, for the other VBCs the catch is sampled when the fisher has caught at least 150 eel. Length measurements are taken together with the fisher.

Biological information: per 10 cm length class a number of eel is selected for biological sampling (20-29, 30-39, 40-49: 4 per 10 cm class; from 50 cm onwards 2 per 10 cm class). Data on individual length, weight, eye diameter, liver weight, parasites, sex as well as otoliths are collected. 100 otoliths are sent to SLU (Sweden) to analyse the ages.

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

Regional coordination: N

Link to sampling protocol documentation: Sampling protocols are available in Dutch (available upon request). Chapter 7.2 in
Keeken, O.A. van, K. Kwakman-Schilder, P. de Bruijn, J. de Leeuw, T. Leijzer, B. Griffioen, M. van Hoppe, E. van Os-Koomen, J.A.M. Wiegerinck. 2021. Handboek zoetwater vismonitoringen versie 2021 (CVO_h_008). Internal CVO report 21.005

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: length measurements are done using an analogue measuring board, of which the set-off is checked before the start of the survey. Wet weights are taken using electronic scales, to the gram or 5 grammes (depending on the sample size). Scales are maintained annually and calibrated at least daily. measurements and haul information are written down on specific measurement lists, and data is entered as soon as possible. Software used for data entry is in-house developed: Billie Turf. Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place.

Data capture documentation: Y, in Dutch (available upon request). Annex 47 in
Keeken, O.A. van, K. Kwakman-Schilder, P. de Bruijn, J. de Leeuw, T. Leijzer, B. Griffioen, M. van Hoppe, E. van Os-Koomen, J.A.M. Wiegerinck. 2021. Handboek zoetwater vismonitoringen versie 2021 (CVO_h_008). Internal CVO report 21.005

Quality checks documentation: Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request). Essentially, the trawl haul data are checked for outliers on numerical values (either by plotting or by providing minimum, mean, and maximum values), consistency in text variables (e.g. station coding, crew members). References used follow from the Data capture documentation.

Data storage

National database: after processing, and a standardised quality check on outliers, the information is stored in the WMR database FRISBE (Oracle relational database). There is permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases below are relational Oracle databases. For data managers and database managers other access

permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database: NA

Quality checks and data validation documentation: the database FRISBE also conducts data validation checks during the import. Documentation of those checks is available upon request.

Sample storage

Storage description:
The fish for biological samples is kept frozen till processing, in -20° freezers at WMR.
Otoliths are archived at Wageningen Marine Research without time limitation.

Sample analysis: Eel otoliths are analysed in Sweden (SLU). Images are taken from the otolith coupes. Age reading takes place from those images.

Data processing

Evaluation of data accuracy (bias and precision): N.

Editing and imputation methods: Editing only takes place when odd values are encountered. Corrections then are done in the institute's data and a new dataset is submitted to the database, mentioning the corrections done.

Quality document associated to a dataset: N.

Validation of the final dataset: N, although before submitting the data to the end-user the data has been reviewed to prevent erroneous incorrect information due to data entry mistakes.

Sampling scheme identifier: SAL-FGRZ

MS : NLD

Region: All regions

Sampling scheme identifier: Sal-FGRZ

Sampling scheme type: Diadromous (scientific)

Observation type: SciObs water body

Time period of validity: 2022-2027

Short description (max 100 words): Every year at two locations in the Rhine & Meuse catchment area, migrating salmonids are sampled using traditional salmon fykes. Apart from *Salmo salar* and *Salmo trutta* also all other species in the catch are measured. Annual sampling takes place at sampling location Waal, alternating biennial sampling is conducted at locations Maas (even years) and IJssel (odd years).

Description of the population

Population targeted: migrating salmonids in the Rhine and Meuse catchment area.

Population sampled: migrating salmonids in the Rhine and Meuse catchment area.

Stratification: samples are taken at the location with the longest glass eel monitoring (Den Oever, since 1938), and IJmuiden (since 1973). On both locations also glass eel detectors are placed (see Sampling scheme identifier ELE-FRS-MPM).

Sampling design and protocols

Sampling design description: From March till May glass eel abundance at the main entrance points for fresh water is determined by means of lift net catches. Sampling takes place at night time.

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

Regional coordination: N

Link to sampling protocol documentation: Sampling protocols are available in Dutch. A general description is available in https://doi.org/10.18174/522029, chapter 6.1.3. During night time (Den Oever: daily 22.00-05.00; IJmuiden approx. 2 times a week, 22.00-01.00), every hour a lift net is lowered to the bottom, and hauled after five minutes. The glass eel in the net is counted and released back into the environment. Hauls are replicated twice (three subsequent hauls).

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: After hauling the net, the total glass eel is sorted from the other catch. Number of glass eel in the catch is counted. Counts and haul information are written down on specific measurement lists, and data is entered as soon as possible. Software used for data entry is in-house developed: Billie Turf. Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place.

Data capture documentation: Y, in Dutch (available upon request). Annex 43 in
Keeken, O.A. van, K. Kwakman-Schilder, P. de Bruijn, J. de Leeuw, T. Leijzer, B. Griffioen, M. van Hoppe, E. van Os-Koomen, J.A.M. Wiegerinck. 2021. Handboek zoetwater vismonitoringen versie 2021 (CVO_h_008). Internal CVO report 21.005

Quality checks documentation: Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request). Essentially, the trawl haul data are checked for outliers on numerical values (either by plotting or by providing minimum, mean, and maximum values), consistency in text variables (e.g. station coding, crew members). References used follow from the Data capture documentation.

Data storage

National database: after processing, and a standardised quality check on outliers, the information for is stored in the WMR database FRISBE (Oracle relational database). WMR personnel have permanent access after signing a form with general instructions.
Access to databases with DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases below are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database: NA

Quality checks and data validation documentation: During import into the database FRISBE, data validation checks are conducted. Documentation of those checks is available upon request.
Sample storage
Storage description: NA. The catch released in the water after processing. In some years marking of glass eel takes place (mark recapture experiment). In that case, a subsample of glass eel are stored in water trays in the lab alive until release in the same water body. Sample analysis: NA
Data processing
Evaluation of data accuracy (bias and precision): N, but glass eel index used by WGEEL for a long time. Den Oever index is used for the EU eel evaluation (obligatory by the eel regulation). **Editing and imputation methods:** Editing only takes place when odd values are encountered. Corrections then are done in the institute's database **Quality document associated to a dataset:** N. **Validation of the final dataset:** N, although before submitting the data to the end-user the data has been reviewed to prevent erroneous incorrect information due to data entry mistakes.

Related to Text box 2.4 and Table 2.4 (recreational fisheries)

MS : NLD
Region: All regions
Sampling scheme identifier: REC_Self
Sampling scheme type: Recreational (off site survey).
Observation type: SelfOnShore (SelfAtSea)
Time period of validity: 2022-2027
Short description (max 100 words): Sampling scheme REC_Self is aiming at collecting data on retained and returned catches by recreational fishers as well as length samples from recreational landings on-shore for seabass, cod, eel, salmon, pollock and elasmobranchs.
Description of the population
Population targeted: The target population is the catches of all resident fishers fishing in Dutch water bodies. PSU is (catches per fishermen per year) **Population sampled:** 30,000-50,000 households in the screening survey (biennial) and 2,500 marine and fresh water fishermen keep a logbook for a whole year (biennial). **Stratification:** Screening is stratified by several (demographical) characteristics (resident location, age, gender, education etc.) which is executed by research institute Kantar.
Sampling design and protocols
Sampling design description: Surveys are executed by market research company 'Kantar'. Kantar keeps a large database, stratified by demographic characteristics as well as resident location. Questions in the screening survey (in order to define the total number of fishermen in the population) are asked

online to everyone in Kantar database. Respondents who declare to be a recreational fisher are asked to join the logbook for a year and register all catches.

Is the sampling design compliant with the 4S principle?: NA
Regional coordination: N
Link to sampling design documentation: https://doi.org/10.1093/icesjms/fsv190
Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: 'Y' (yes)
Monitoring of sampling progress within the sampling year: Kantar sends reminders to those who are not responding.

Data capture

Means of data capture: The data is sampled by market research company Kantar, database (RECFISH).

Data capture documentation: https://doi.org/10.1093/icesjms/fsv190

Quality checks documentation: Y
Quality checks documentation is available at https://doi.org/10.1093/icesjms/fsv190
Additionally, the market research institute Kantar has its own quality checks.

Data storage

National database: RECFISH
International database: NA
Quality checks and data validation documentation:
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases below are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

Sample storage

Storage description: NA
Sample analysis: NA

Data processing

Evaluation of data accuracy (bias and precision):Y
https://doi.org/10.1093/icesjms/fsv190

Editing and imputation methods: Y
Editing and imputation methods are described in https://doi.org/10.1093/icesjms/fsv190

Quality document associated to a dataset: https://doi.org/10.1093/icesjms/fsv190

Validation of the final dataset: How are datasets validated (quality checked) before providing to end-user?
Data validation procedures are described in https://doi.org/10.1093/icesjms/fsv190

Related to Text box 2.5 and Table 2.5 (sampling biological data)

Sampling scheme identifier: PEL1

MS : NLD
Region: All regions
Sampling scheme identifier: PEL1
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: All NWP years
Short description (max 100 words): Sampling scheme aiming to collect length frequency from commercial catches for all species listed in Table 1 of the EU MAP. Furthermore, quantity data for rare, incidental bycatches for all species listed in Table 2 of the EU MAP is collected. The sampling scheme covers the Pelagic freezer trawler fleet operating in EU water. Both Dutch and foreign (except German) flagged vessels. Unsorted catch samples and rare, incidental bycatches are collected and processed by scientific observers on board.
Description of the population
Population targeted: The pelagic freezer trawler fleet (>40 m) targeting specific pelagic species and operating in EU water. The sampling population is defined through vessel lists made available through the VISSTAT data base (national catch and effort registration database). The population is dynamic rather than static, as trip duration differs between vessels throughout the year and a number of vessels are also partly active outside European waters. **Population sampled:** Annually 12 trips of the pelagic freezer trawler fleet operating in EU water are sampled. **Stratification:** Not applicable.
Sampling design and protocols
Sampling design description: Every year 12 observer trips are carried out on board of pelagic freezer trawlers. The pelagic freezer trawlers are owned by a limited number of fishing companies. At the beginning of the year a sampling schedule is produced through a random weighted selection of fishing companies, where the weight is based on the number of freezer trawlers owned by each company. Selected companies are divided, according to the order generated by the random selection, over year with a sampling intensity of 1 trip per month. At the end of the month the selected company (for the next month) is contacted and requested for a scientific observer to board their next departing vessel. A scientific observer boards a selected trip where he/she samples the unsorted catch on haul basis. Next to sampling the catch, the scientific observer records on a haul basis rare, incidental bycatches, corresponding observation effort (expressed in the time observed of catch processing at the conveyer belt), whether an excluder was used in the net and if positive whether the scientific observer checked the excluder on rare, incidental bycatches. Furthermore, operational- and catch data (i.e. vessel position (at start and end); haul duration; depth; weather conditions; and the volume of catches) each time the fishing gear is deployed (each 'haul') is collected. **Is the sampling design compliant with the 4S principle?:** Y. **Regional coordination:** Sampling design and protocols are not part of a regional or multi-lateral agreement. The RCG InterSessional SubGroup "Case study on freezer trawler fleet exploiting pelagic

fisheries in the NEA" of which NLD is participant is working towards a regional sampling plan for this fleet.

Link to sampling design documentation: The table and text below provides insight on the sampling design of PEL1.

Sampling scheme	Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Length sampling	Sampled trip[1)]	Vessel x time	-	Probabilistic (SRSWOR)	12 trips
	Hauls[2)]	All hauls in sampled trip	-	Opportunistic	All hauls
	Catch sample[3)]	Sampled haul	-	Systematic	30-150 kg
	All species[4)]	Catch sample	All species	Census when nr <50	All individuals
Monitoring rare, incidental bycatch	Rare, incidental bycatch[5)]	Sampled haul	Protected sea birds, mammals, reptiles and fish species	Census	All individuals

[1)]Annually 12 trips, evenly divided over the months, are randomly selected (SRSWOR) through the fishing companies.
[2)]The scientific observer is instructed to sample all hauls. However, in practice it incidentally occurs that a haul is not sampled due to resting hours.
[3)]The unsorted catch sample is taken of 30-150 kg (size of the sample depends on the target species) is taken prior to the sorting process from the different cooling tanks where the catch is temporarily stored.
[4)]From each catch sample all species are identified. Numbers at length (cm or 0.5 cm) are recorded for all fish species. For the abundant species a pseudo-random sub-sample of at least 50 individuals is taken.
[5)]Scientific observer records rare, incidental bycatches and corresponding observation effort (expressed in the time observed of catch processing at the conveyer belt).

Compliance with international recommendations: No relevant expert or coordination groups exists. However, ICES WGCATCH discussions have guided WMR on how to develop probabilistic sampling in this fisheries. See section 'Link to sampling design documentation' for sampling design.

Link to sampling protocol documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016 (in Dutch). Upon request, this handbook can be discussed. Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm. The annual data report for sampling scheme PEL1 broadly describes the methods used for data collection (most recent report: van Overzee et al., 2020).
See sections 'Sampling design description' and 'Link to sampling design documentation' for further details on sampling protocol.

Sampling implementation

Recording of refusal rate: Y.

Monitoring of sampling progress within the sampling year: Sampling progress is monitored throughout the year on trip by trip basis. If needed the pelagic freezer trawler companies are contacted to discuss cooperation.

Data capture

Means of data capture: Length measurements are done using an analogue measuring board, of which the set-off is checked annually. Quantity measurements are done by counting individuals. Data is noted down on specific measurement lists. Data is entered in in-house developed software (Billie Turf) as soon as possible.

Species identification workshops for demersal and pelagic marine species as well as freshwater species are organised on an annual to triennial basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the research surveys, frequent participation is mandatory to keep a view on species identification quality.

Data capture documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication. Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm. Wageningen Marine Research is ISO9001:2015 certified.

Quality checks documentation: Data from any field sampling (at sea, on shore), are entered using in-house developed software (Billie Turf). Data is noted down on specific measurement lists. Data is entered Billie Turf as soon as possible. Measurement lists of collected data are archived at Wageningen Marine Research and inputted data are stored as plain text files at a centralised location for which daily back-up routine is in place. When all data of a sampled trip has been inputted checks for outliers take place. The checks are conducted using standardised scripts (R, SAS) and involve outlier checks for numerical values, consistency checks for text variables, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe).

Data storage

National database: Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl. Data collected within PEL1 is stored in the Frisbe database.

Database	Contains	User access
Frisbe	Data from surveys, commercial on-shore and commercial at-sea sampling (including diadromous fish and stomach samples), as well as other WMR projects.	Permanent access after signing a form with general use instructions

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation: During the import of the samples in the national database build-in validation rules check the structure, type and consistency of the data input. Additionally, cross-reference checks between various fields (for string variables) and range checks (for numeric variables) are performed. See section 'Quality check documentation' for description of data quality checks from data collection to storage in the database.

Sample storage

Storage description: From the unsorted catch sample all species are identified. Numbers at length (cm or 0.5 cm) are recorded for all fish species. After processing on board, catch is returned to the fishing crew and no biological tissues/structures are stored.

Sample analysis: No biological sampling is conducted, only length measurements onboard the vessel.

Data processing

Evaluation of data accuracy (bias and precision): N.
Documentation will be available in 2022. The evaluation of precision will be based on the variance of the estimated catch weight. The evaluation of potential sampling bias will be based on the recorded responses and non-responses.

Editing and imputation methods: Y.
The editing methods followed during the data processing are described and documented in internal documents and scripts. Gaps in sampling strata are left (not imputed). The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections.

Quality document associated to a dataset:
There is no publication digital object identifier associated to a dataset. However, quality checks of the final output are stored in internal documents.

Validation of the final dataset: See section 'Quality checks and data validation documentation'.

Sampling scheme identifier: PEL2

MS : NLD

Region: All Regions

Sampling scheme identifier: PEL2

Sampling scheme type: Commercial fishing trip

Observation type: SelfAtSea

Time period of validity: 2022-2027

Short description (max 100 words): Sampling scheme aiming to collect length frequency and biological data from commercial catches of a selection of pelagic species on board pelagic freezer trawlers through self-sampling. The scheme covers European waters of the North-East Atlantic (including North Sea). Unsorted samples are collected by fishermen on board and analysed on shore by the research institute.

Description of the population

Population targeted: Vessels (pelagic freezer trawlers >40m) targetting specific pelagic species and operating in EU waters.

Population sampled: An estimated 1/3 of the fleet is sampled, though coverage depends on fleet activity in EU waters (reference fleet). The selected vessels are expected to remain in EU waters thus

considered to be representative for the EU activities. Since the fisheries are highly seasonal in general, all vessels are usually engaged in similar fisheries and the selected vessels are expected to be representative of the entire fleet engaged in the respective fishery at that same time.

Stratification: Census approach for the vessels to cover each trip during the year. Samples are stratified by species*ICES division*week

Sampling design and protocols

Sampling design description: Vessels are selected for sampling based on presumed continued presence in EU waters. A vessel contracted for sampling must follow the guidelines of data collection as described by the research institute. At the beginning of the year the research institute provides a species list and trains the crew of each vessel. Throughout the span of the trip the crew is obliged to collect samples of the species included in the species list every week*ICES division. A haul is selected, and individual fish are collected at the pre-sorting stage (unsorted) until the sample reaches 23kg. The samples are then collected upon arrival to port and analysed in the laboratory. All fish are length measured, stratified by length and 25 fish are randomly selected for the collection of biological data (age, maturity, sex) from each sample.

Is the sampling design compliant with the 4S principle?: N
Regional coordination: No regional coordination.

Link to sampling design documentation:

Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Vessel	Reference Fleet	-	FIXED, NPJS[1)]	All vessels
Trip	All trips in EU waters	-	Census	All trips
Haul	All hauls	Week* ICES division	NPCS	One haul
Sample	All individuals in a haul (from the species list)	-	NPCS	Box of ~23 kg
Fish[2)]	All fish	-	Census	All fish

[1)] The selection method for vessels that are sampled continuously for multiple years is FIXED. When a new vessel is contracted for sampling the selection method is NPJS.
[2)] All fish are length measured, length stratified and 25 fish are randomly selected (without replacement) to take the age measurements.
Compliance with international recommendations: N

Link to sampling protocol documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021 (in Dutch). Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm

Compliance with international recommendations: N

Sampling implementation

Recording of refusal rate: NA, due to reference vessel list and census at the trip level.

Monitoring of sampling progress within the sampling year: Sampling progress is monitored throughout the year on species by species basis while accounting for the seasonality of the fisheries.

Based on expert judgement; when an unexpected fishery for a certain species emerges, additional samples are taken. Should a risk of undersampling be identified, additional samples will be requested from the vessels already sampled or additional vessels will be asked. The additional vessels can also replace vessels usually sampled while in port for e.g. extended maintenance.

Data capture

Means of data capture: Standard traditional measuring boards, calibrated scales, Direct entry of data into in-house developed software (Billie Turf). On-site SmartDots for fish ageing based on images.

Data capture documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication.
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm
Wageningen Marine Research is ISO9001:2015 certified.

Quality checks documentation: Data from any field sampling (at sea, on shore), are entered using in-house developed software (Billie Turf). Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place. When a batch of samples has been completely processed and entered in the files ('batch' may be a fishing trip, a survey, a quarter), checks for outliers take place. The checks are conducted using standardised scripts (R, SAS, PL/SQL) and involve outlier checks for numerical values, relational checks such as length-weight, length-age relationships, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe).

Data storage

National database: FRISBE. Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases.

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation: During the import of the samples in the national database build-in validation rules check the structure, type and consistency of the data input. Additionally, cross-reference checks between various fields (for string variables) and range checks (for numeric variables) are performed. The quality checks involve outlier detection with standardized scripts, relational checks such as length-weight, length-age relationships, and maps with the sampling positions **(**See section 'Quality check documentation' for description of data quality checks from data collection to storage in the database).

Sample storage

Storage description: Calcified structures like otoliths and scales are stored in a dedicated storage at the research institute without time limitation. Access can be requested through the age reading coordinator. Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of samples by species/stock, geographic sub-area by year exist.

SmartDots images are stored in the local SmartDots data structure protected by access protocols and other safe guards concerning back-up, redundancy and version control.

Sample analysis: Age reading and maturity stageing according to the species specific ICES protocols. Detailed documentation on otolith processing and age reading (in Dutch,available upon request): Bolle, L.J., R. Hoek, I. Pennock, U. Beier, A. Dijkman, B. van Os, B. Snaar, M. de Vries, Th. Pasterkamp, E. Koelemij, J. Beintema, A. Bakker, T. Huijer, A. Sneekes, N. van der Meeren, H. Wiegerinck, 2020. Handboek leeftijdsbepalingen (versie 3.0). CVO rapport: 20.012

Age reading based on images through on-site SmartDots application. https://www.ices.dk/data/tools/Pages/smartdots.aspx

Maturity staging follows international standards Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

Data processing

Evaluation of data accuracy (bias and precision): N.
Documentation will be available in 2022. However, considering that currently the sampling scheme is non-probabilistic quantitative metrics of data accuracy that do not provide misleading results would be difficult to produce.

Editing and imputation methods: Y.
The editing and imputation methods followed during the data processing are described and documented in internal documents and scripts.
Imputation: missing values are imputed first from averages, then from surveys, then from models.
Editing: The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections. If an error is found in the sample data the following mandatory fields need to be filled in the documentation template:

- SampleID
- Species
- DateChecked
- ErrorDescription
- ActionsTaken (e.g. excluded, corrected)
- Reason
- DateProcessed
- Re-imported (Yes/No)
- Person

Quality document associated to a dataset: Is there a publication digital object identifier (DOI) created? Is there a document summarising the estimation process followed?
There is no publication digital object identifier associated to a dataset. However, after each estimation process an internal document is created. This document includes details of the estimation (assumptions, type of estimator, auxiliary variables used for ratio estimator etc.) as well as quality checks of the final output.

Validation of the final dataset: See section 'Quality document associate to a dataset documentation'.

Sampling scheme identifier: DEMACT1

MS : NLD

Region: North Sea and Eastern Arctic

Sampling scheme identifier: DEMACT1

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: 2022-2027

Short description: Sampling scheme aiming to collect length frequency from commercial discards for all species listed in Table 1 of the EU MAP and age data from commercial discards for five species (*Pleuronectes platessa*, *Solea solea*, *Limanda limanda*, *Scophthalmus maximus*, *Scophthalmus rhombus*). Furthermore, quantity data for rare, incidental bycatches for all species listed in Table 2 of the EU MAP and all benthic species is collected. The sampling scheme covers the Dutch demersal trawlers fishing with active gear in ICES area 4. Unsorted discards samples and rare, incidental bycatches are collected and processed by scientific observers on board.

Description of the population

Population targeted: Reference fleet of vessels fishing with active demersal gear.

Population sampled: Population sampled is a representative selection of 20-25 vessels (reference fleet) from the sampling population (i.e. all demersal trawlers fishing with active gear in ICES area IV). Annually 10 trips of the reference fleet are sampled. Generally, demersal active vessels execute a fishing trip each week of the year.

Stratification: Not applicable.

Sampling design and protocols

Sampling design description: To verify the accuracy and objectivity of the demersal self-sampling programme (DEMACT2), every year 10 observer trips are carried out on board of demersal fishing vessels. At the beginning of the year a sampling schedule is produced through a random selection of the vessels that are participating in the demersal self-sampling programme, i.e. the reference fleet. Selected vessels are divided, according to the order generated by the random selection, over the year with a sampling intensity of 2-3 trips per quarter. Approx. two week before planned sampling, the selected vessel is contacted with the request to observe the selected trip. The scientific observer boards the selected trip where he/she samples discards on haul basis. During these observer trips the fishermen also execute self-sampling (DEMACT2). Next to sampling the discards, the scientific observer records rare, incidental bycatches and corresponding observation effort (expressed in the time observed of catch processing at the conveyer belt) on a haul level. Furthermore, operational- and catch data (i.e. vessel position (at start and end); haul duration; depth; weather conditions; and the volume of catches and landings) each time the fishing gear is deployed (each 'haul') is collected.

No length measurements of landings are collected during the observer trips as this fraction is sufficiently covered by the on-shore sampling programme (see also AUCTION_DEM).

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

Regional coordination: Sampling design and protocols are not part of a regional or multi-lateral agreement.

Link to sampling design documentation: The table and text below provide insight on the sampling design of different data collection activities under sampling scheme DEMACT1.

Activity under sampling scheme	Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Length & quantity sampling	Sampled trip[1)]	Vessel x week	-	Probabilistic (SRSWOR)	10 trips
	Hauls[2)]	All hauls in sampled trip	Day, Night	Opportunistic	All hauls
	Discards sample[3)]	Sampled haul	-	Systematic	Approx. 40 kg
	All species[4)]	Discards sample	All species	Census when nr <50	All individuals
Monitoring rare, incidental bycatch	Rare, incidental bycatch[5)]	Sampled haul	Protected sea birds, mammals, reptiles and fish species	Census	All individuals
Age sampling	Age sampled trip[6)]	Sampled trip	-	Quota sampling	Reach quota age sampling
	Fish[7)]	Age sample from discards sample	Sol, ple, dab, tur, bll	Quota sampling	5 indiv. per length class per sampled trip

[1)]Annually 10 trips, evenly divided over the quarters, are randomly selected (SRSWOR) from the reference fleet for Demact1.

[2)]The scientific observer is instructed to sample all hauls. However, in practice it often happens that some hauls are not sampled due to resting hours, weather conditions etc.

[3)]The discards sample is taken at regular intervals throughout processing of the entire haul at the end of the conveyer belt. A discards sample consists of 1 fish basket (approx. 40 kg).

[4)]From each discards sample all species are identified. Numbers at length (cm) are recorded for all fish species, Norway lobster and edible crab. Numbers without length measurements are recorded for all the remaining (benthos) species. For the abundant species a pseudo-random sub-sample of at least 50 individuals is taken.

[5)]Scientific observer records rare, incidental bycatches and corresponding observation effort (expressed in the time observed of catch processing at the conveyer belt) on a haul level.

[6)]Age samples are taken according to a pre-defined quota for age sampling. Age samples are taken for all observer trips.

[7)]Age samples are taken for 5 fish species from the discards sample. Five individuals per cm length class are collected for age sampling for the selected sampled trips. Length (mm), weight (grams), sex and age reading are conducted for all individuals in an age sample.

Compliance with international recommendations: No relevant expert or coordination groups exists. However, ICES WGCATCH discussions have guided WMR on how to develop probabilistic sampling in this fisheries. See section 'Link to sampling design documentation' for sampling design.

Link to sampling protocol documentation:
Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016 (in Dutch). Upon request, this handbook can be discussed.

Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm. See sections 'Sampling design description' and 'Link to sampling design documentation' for further details on sampling protocol.

Sampling implementation

Recording of refusal rate: Y.

Monitoring of sampling progress within the sampling year: Sampling progress is monitored throughout the year on trip by trip basis. If needed new vessels are recruited and added to the reference fleet ensuring a sufficient pool of vessels for sampling.

Data capture

Means of data capture: Length measurements are done using an analogue measuring board, of which the set-off is checked annually. Quantity measurements are done by counting individuals. Data is noted down on specific measurement lists. Data is entered in in-house developed software (Billie Turf) as soon as possible.

Individual length measurements for fish used for biological data collection are done using an analogue measuring board, of which the set-off is checked annually. Individual wet weights are taken using electronic scales, to the gram. Scales are maintained annually and calibrated when used. Data is noted down on specific measurement lists. Data is entered in in-house developed software (Billie Turf) as soon as possible. After the fish selected for biological sampling has been treated following national animal welfare conditions, the otoliths are collected, and sex and maturity is registered by opening the body cavity.

Species identification workshops for demersal and pelagic marine species as well as freshwater species are organised on an annual to triennial basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the research surveys, frequent participation is mandatory to keep a view on species identification quality.

Maturity staging follows international standards Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

Otoliths are embedded and sliced. Images are taken from the otolith coupes. Age reading takes place from those images using the institute's (in-house further developed) version of SmartDots. Age readers are qualified based on international age reading exchange results. For species outside the international age reading exchanges (non-commercial species), a national age reading qualification procedure is in place.

Data capture documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication. Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm. Wageningen Marine Research is ISO9001:2015 certified.

Quality checks documentation: Date from any field sampling (at sea, on shore), are entered using in-house developed software (Billie Turf). Data is noted down on specific measurement lists. Data is entered Billie Turf as soon as possible. Measurement lists of collected data are archived at Wageningen Marine Research and inputted data are stored as plain text files at a centralised location for which daily back-up routine is in place. When all data of a sampled trip has been inputted checks for outliers take place. The checks are conducted using standardised scripts (R, SAS) and involve outlier checks for

numerical values, consistency checks for text variables, relational checks such as length-weight, length-age relationships, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe).

Data storage

National database: Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl. Data collected within DEMACT1 is stored in the Frisbe database.

Database	Contains	User access
Frisbe	Data from surveys, commercial on-shore and commercial at-sea sampling (including diadromous fish and stomach samples), as well as other WMR projects.	Permanent access after signing a form with general use instructions

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Sample storage

Storage description: From each sampled haul, a representative subsample of the discards is taken from the conveyer belt by the scientific observer. For each discard sample numbers at length are recorded for all fish species, Norway lobster and edible crab and numbers are recorded for all remaining (benthos) species. In addition, fish are taken back to the lab for ageing (i.e. *Pleuronectes platessa*, *Solea solea*, *Limanda limanda*, *Scophthalmus maximus*, *Scophthalmus rhombus*). Otoliths are taken from the fish back at the lab. Calcified structures like otoliths are stored in a dedicated storage at the research institute without time limitation. Access can be requested through the age reading coordinator. Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of samples by species/stock, geographic sub-area by year exist.

SmartDots images are stored in the local SmartDots data structure protected by access protocols and other safe guards concerning back-up, redundancy and version control.

After processing on board, the sample is discarded in sea. After processing in the lab, fish are collected by a rendering company and destructed accordingly.

Sample analysis: Age reading and maturity staging according to the species specific ICES protocols. Detailed information on otolith processing and age reading (in Dutch available upon request: Bolle, L.J., R. Hoek, I. Pennock, U. Beier, A. Dijkman, B. van Os, B. Snaar, M. de Vries, Th. Pasterkamp, E. Koelemij, J. Beintema, A. Bakker, T. Huijer, A. Sneekes, N. van der Meeren, H. Wiegerinck. Handboek leetijdsbepalingen (versie 3.0). CVO rapport: 20.012.
Age reading based on images through on-site SmartDots application: https://www.ices.dk/data/tools/Pages/smartdots.aspx

Maturity staging follows international standards; Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk).

Data processing
Evaluation of data accuracy (bias and precision): N. Documentation will be available in 2022. The evaluation of precision will be based on the variance of the estimated catch weight. The evaluation of potential sampling bias will be based on the recorded responses and non-responses. **Editing and imputation methods:** Y. The editing methods followed during the data processing are described and documented in internal documents and scripts. ALK missing values are imputed first from averages from DEMACT1 and DEMACT2, then from surveys, then from models. Gaps in sampling strata are left (not imputed). The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections. **Quality document associated to a dataset:** There is no publication digital object identifier associated to a dataset. However, quality checks of the final output are stored in internal documents. **Validation of the final dataset:** See section 'Quality checks and data validation documentation'.

Sampling scheme identifier: DEMACT2

MS : NLD
Region: North Sea and Eastern Arctic
Sampling scheme identifier: DEMACT2
Sampling scheme type: Commercial fishing trip
Observation type: SelfAtSea
Time period of validity: 2022-2027
Short description (max 100 words): Sampling scheme aiming to collect length frequency from commercial discards for all species listed in Table 1 of the EU MAP and age data from commercial discards for five species (*Pleuronectes platessa*, *Solea solea*, *Limanda limanda*, *Scophthalmus maximus*, *Scophthalmus rhombus*). Furthermore, quantity data for all benthic species is collected. The sampling scheme covers the Dutch demersal trawlers fishing with active gear in ICES area 4. Unsorted discards samples are collected by fishermen on board and analysed on shore by the research institute.
Description of the population
Population targeted: Reference fleet of vessels fishing with active demersal gear. **Population sampled:** Population sampled is a representative selection of 20-25 vessels (reference fleet) from the sampling population (i.e. all demersal trawlers fishing with active gear in ICES area IV). Generally, demersal active trawlers execute a fishing trip each week of the year. **Stratification:** Due to practical reasons the selection of trips is stratified in a North and South division.
Sampling design and protocols
Sampling design description: The reference fleet collects discards samples (self-sampling) following a pre-defined annual sampling schedule that is produced at the beginning of the year through a random selection of 160 vessel*week combinations. According to this schedule a selected vessel takes a

representative discard sample, including BMS, for two hauls, during the selected week. The collected discard samples are landed by the vessel at port where they are collected by Wageningen Marine Research and returned back to the laboratory for analysis. Next to the collected discards samples fishermen record operational- and catch data (i.e. vessel position (at start and end); haul duration; depth; weather conditions; volume of catches and landings) each time the fishing gear is deployed (each 'haul') during the selected week.

The vessel crew conducts this self-sampling after a training by Wageningen Marine Research. To check for sampling bias, the self-sampling programme is validated by a separate discard programme by scientific observers at sea (see also DEMACT1). This programme is limited to 10 trips per year on board vessels of the reference fleet.

No length measurements of landings are collected during the self-sampling trips as this fraction is sufficiently covered by the on-shore sampling programme (see also AUCTION_DEM).

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

Regional coordination: Sampling design and protocols are not part of a regional or multi-lateral agreement.

Link to sampling design documentation: The table and text below provide insight on the sampling design of different data collection activities under sampling scheme DEMACT2.

Activity under sampling scheme	Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Length & quantity sampling	Sampled trip[1)]	Vessel x week	Region (North, South)	Probabilistic (SRSWOR)	South:40-60 trips North:80-130 trips
	Hauls[2)]	All hauls in sampled trip	Day, Night	Opportunistic	Day: 1 haul Night: 1 haul
	Discards sample[3)]	Sampled haul	-	Systematic	Approx. 80 kg
	All species[4)]	Discards sample	All species	Census when nr <50	All individuals
Age sampling	Age sampled trip[5)]	Sampled trip	-	Quota sampling	Reach quota age sampling
	Fish[6)]	Age sample from discards sample	*Pleuronectes platessa, Solea solea, Limanda limanda, Scophthalmus maximus, Scophthalmus rhombus*	Quota sampling	5 indiv. Per length class per sampled trip

[1)]Annually 160 trips, evenly divided over the quarters, are randomly selected (SRSWOR) from the reference fleet for DEMACT2. Due to practical reasons the selection of trips is stratified in a North and South division.

[2)]The vessel crew is instructed to retain a discard sample of two hauls set on different days; 1 haul during the day and 1 haul during the night.

[3)]The discards sample is taken at regular intervals throughout processing of the entire haul at the end of the conveyer belt. A discards sample consists of two fish boxes of discards (one box equals approx. 40 kg).

[4)]From each discards sample all species are identified. Numbers at length (cm) are recorded for all fish species, Norway lobster and edible crab. Numbers without length measurements are recorded for all the remaining (benthos) species. For the abundant species a pseudo-random sub-sample of at least 50 individuals is taken.
[5)]Age samples are taken according to a pre-defined quota for age sampling. A number of trips are selected for age sampling.
[6)]Age samples are taken for 5 fish species from the discards sample. Five individuals per cm length class are collected for age sampling for the selected sampled trips. Length (mm), weight (grams), sex and age reading are conducted for all individuals in an age sample.

Compliance with international recommendations: No relevant expert or coordination groups exists. However, ICES WGCATCH discussions have guided WMR on how to develop probabilistic sampling in this fisheries. See section 'Link to sampling design documentation' for sampling design.

Link to sampling protocol documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016 (in Dutch). Upon request, this handbook can be discussed.
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm.

The annual data report for sampling scheme DEMACT2 broadly describes the methods used for data collection (most recent report: van Overzee *et al*., 2021). See sections 'Sampling design description' and 'Link to sampling design documentation' for further details on sampling protocol.

Sampling implementation

Recording of refusal rate: Y

Monitoring of sampling progress within the sampling year: Sampling progress is monitored throughout the year. If needed new vessels are recruited and added to the reference fleet ensuring a sufficient pool of vessels for sampling.

Data capture

Means of data capture:
Length measurements are done using an analogue measuring board, of which the set-off is checked annually. Quantity measurements are done by counting individuals. Data is noted down on specific measurement lists. Data is entered in in-house developed software (Billie Turf) as soon as possible.

Individual length measurements for fish used for biological data collection are done using an analogue measuring board, of which the set-off is checked annually. Individual wet weights are taken using electronic scales, to the gram. Scales are maintained annually and calibrated when used. Data is noted down on specific measurement lists. Data is entered in in-house developed software (Billie Turf) as soon as possible. After the fish selected for biological sampling has been treated following national animal welfare conditions, the otoliths are collected, and sex and maturity is registered by opening the body cavity.

Species identification workshops for demersal and pelagic marine species as well as freshwater species are organised on an annual to triennial basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the research surveys, frequent participation is mandatory to keep a view on species identification quality.

Maturity staging follows international standards Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

Otoliths are embedded and sliced. Images are taken from the otolith coupes. Age reading takes place from those images using the institute's (in-house further developed) version of SmartDots. Age readers are qualified based on international age reading exchange results. For species outside the international age reading exchanges (non-commercial species), a national age reading qualification procedure is in place.

Data capture documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication. Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm. Wageningen Marine Research is ISO9001:2015 certified.

Quality checks documentation: Data from any field sampling (at sea, on shore), are entered using in-house developed software (Billie Turf). Data is noted down on specific measurement lists. Data is entered Billie Turf as soon as possible. Measurement lists of collected data are archived at Wageningen Marine Research and inputted data are stored as plain text files at a centralised location for which daily back-up routine is in place. When all data of a sampled trip has been inputted checks for outliers take place. The checks are conducted using standardised scripts (R, SAS) and involve outlier checks for numerical values, consistency checks for text variables, relational checks such as length-weight, length-age relationships, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe).

Data storage

National database: Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl. Data collected within DEMACT2 is stored in the Frisbe database.

Database	Contains	User access
Frisbe	Data from surveys, commercial on-shore and commercial at-sea sampling (including diadromous fish and stomach samples), as well as other WMR projects.	Permanent access after signing a form with general use instructions

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Sample storage

Storage description: The discard samples are collected in large plastic bags, which are sealed off using a cable tie, labelled and cool-stored until the vessel returns to port. Back at port, the discards samples are collected and returned back to the laboratory by staff from Wageningen Marine Research. At the laboratory the discard samples (of approx. 80 kg each) are either directly processed or cool-stored for a few days after which they are processed. For each discard sample numbers at length are recorded for all fish species, Norway lobster and edible crab and numbers are recorded for all remaining (benthos) species. In addition, for a number of sampled trips otoliths are taken for five fish species (i.e. sol, ple, dab, tur, bll) for ageing. Otoliths are taken from the fish back at the lab. Otoliths are stored in a dedicated storage at the research institute without time limitation. Access can be requested through the age reading coordinator. Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of samples by species/stock, geographic sub-area by year exist. SmartDots images are stored in the local SmartDots data structure protected by access protocols and other safe guards concerning back-up, redundancy and version control.

After processing the discards samples are collected by a rendering company and destructed accordingly.

Sample analysis: Age reading and maturity staging according to the species specific ICES protocols. Detailed information on otolith processing and age reading (in Dutch available upon request: Bolle, L.J., R. Hoek, I. Pennock, U. Beier, A. Dijkman, B. van Os, B. Snaar, M. de Vries, Th. Pasterkamp, E. Koelemij, J. Beintema, A. Bakker, T. Huijer, A. Sneekes, N. van der Meeren, H. Wiegerinck. Handboek leetijdsbepalingen (versie 3.0). CVO rapport: 20.012.
Age reading based on images through on-site SmartDots application. https://www.ices.dk/data/tools/Pages/smartdots.aspx

Maturity staging follows international standards; Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk).
Data processing
Evaluation of data accuracy (bias and precision): N. Documentation will be available in 2022. The evaluation of precision will be based on the variance of the estimated catch weight. The evaluation of potential sampling bias will be based on the recorded responses and non-responses. **Editing and imputation methods:** Y. The editing methods followed during the data processing are described and documented in internal documents and scripts. ALK missing values are imputed first from averages from DEMACT1 and DEMACT2, then from surveys, then from models. Gaps in sampling strata are left (not imputed). The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections. **Quality document associated to a dataset:** There is no publication digital object identifier associated to a dataset. However, quality checks of the final output are stored in internal documents. **Validation of the final dataset:** See section 'Quality checks and data validation documentation'.

Sampling scheme identifier: DEMPAS

MS : NLD
Region: North Sea and Eastern Arctic
Sampling scheme identifier: DEMPAS
Sampling scheme type: Commercial fishing trip
Observation type: SciObsAtSea
Time period of validity: 2022-2027
Short description (max 100 words): Sampling scheme aiming to collect length frequency from commercial discards for all species listed in Table 1 of the EU MAP. Furthermore, quantity data for rare, incidental bycatches for all species listed in Table 2 of the EU MAP and all benthic species is collected. The sampling scheme covers the Dutch demersal fisheries fishing with passive gear in ICES area IV. Unsorted discards samples and rare, incidental bycatches are collected and processed by scientific observers on board.
Description of the population
Population targeted: List of vessels fishing with demersal passive gear. The sampling population is defined through vessel lists made available through the VISSTAT data base (national catch and effort registration database). **Population sampled:** Annually 10 trips of the demersal passive fishing fleet are sampled. Timing of the trips depends on the activity of the demersal passive fisheries which has a strong seasonal and weather dependent character. **Stratification:** Not applicable.

Sampling design and protocols

Sampling design description: Every year 10 observer trips are carried out on board of vessels fishing with demersal passive gear. The 10 trips are divided over the different passive fisheries (i.e. gillnet, fyke and handline fisheries) based on the total number of trips of the demersal passive fishing fleet by gear conducted the year before.

A trial testing a probabilistic method to select vessels has indicated that such a selection method is not workable for the demersal passive fishing fleet as the activity of the vessels throughout the year is extremely unpredictable and this fishery has a strong seasonal and weather dependent character. Therefore, there is regular contact with a variety of vessels to discuss when they will go out fishing and if a scientific observer can board the vessel. Once a trip is selected the scientific observer boards boards the vessel and samples in general all discards. Within the gillnet fisheries it may occur in the case of high discards, that a subsample of discards is taken by the scientific observer at the beginning, mid and end of the net. Next to sampling the discards, the scientific observer records rare, incidental bycatches and corresponding observation effort (expressed in observed metres nets, number of fykes, number of fishing rods). Furthermore, operational- and catch data (e.g. position, depth, weather conditions, volume of landings) are collected.

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

Regional coordination: Sampling design and protocols are not part of a regional or multi-lateral agreement.

Link to sampling design documentation: The table and text below provide insight on the sampling design of different data collection activities under sampling scheme DEMPAS.

Activity under sampling scheme	Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Length & quantity sampling	Sampled trip[1)]	Vessel x trip	-	Non-probabilistic (NPJS)	10 trips
	Net or location[2)]	Nets or locations in sampled trip	-	Opportunistic	All nets or locations
	Discards[3)]	Sampled net or location	-	Census	All discards
	All species[4)]	All discards	All species	Census when nr <50	All individuals
Monitoring rare, incidental bycatch	Rare, incidental bycatch[5)]	Sampled net or location	Protected sea birds, mammals, reptiles and fish species	Census	All individuals

[1)]Annually 10 trips are executed onboard vessels fishing with demersal passive gear (gillnet, fyke and handline). As it has proven to be extremely difficult to implement random sampling since the activity of vessels within this sampling population is unpredictable and this fishery has a strong seasonal and weather dependent character, a non-probabilistic selection method is used for vessel selection.

[2)]The scientific observer is instructed to sample all nets (gillnet fisheries) or locations (fyke and handline fisheries). However, in practice it may happen that due to time constraint not all nets, locations are sampled.

[3)]Generally, all discards are sampled. Within the gillnet fisheries it may occur that in the case of high discards, a subsample of discards is taken at the beginning, mid and end of the net.

[4)]From discards all species are identified. Numbers at length (cm) are recorded for all fish species, Norway lobster and edible crab. Numbers without length measurements are recorded for all the remaining (benthos) species. For the abundant species a pseudo-random sub-sample of at least 50 individuals is taken.
[5)]Scientific observer records rare, incidental bycatches and corresponding observation effort (expressed in observed metres nets, number of fykes, number of fishing rods).

Compliance with international recommendations: No relevant expert or coordination groups exists. However, ICES WGCATCH discussions have guided WMR on how to develop probabilistic sampling in this fisheries. See section 'Link to sampling design documentation' for sampling design.

Link to sampling protocol documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016 (in Dutch). Upon request, this handbook can be discussed.
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm.
See sections 'Sampling design description' and 'Link to sampling design documentation' for further details on sampling protocol.

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year:
Sampling progress is monitored throughout the year, on a trip by trip basis. During the year efforts are made to get acquainted with 'new' vessels and recruiting them for sampling.

Data capture

Means of data capture:
Length measurements are done using an analogue measuring board, of which the set-off is checked annually. Quantity measurements are done by counting individuals. Data is noted down on specific measurement lists. Data is entered in in-house developed software (Billie Turf) as soon as possible.

Species identification workshops for demersal and pelagic marine species as well as freshwater species are organised on an annual to triennial basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the research surveys, frequent participation is mandatory to keep a view on species identification quality.

Data capture documentation: Internal document 'CVO Handboek Discardsbemonstering en Bijvangstregistratie' CVO 20.016. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication.
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm.
Wageningen Marine Research is ISO9001:2015 certified.

Quality checks documentation: Data from any field sampling (at sea, on shore), are entered using in-house developed software (Billie Turf). Data is noted down on specific measurement lists. Data is entered Billie Turf as soon as possible. Measurement lists of collected data are archived at Wageningen Marine Research and inputted data are stored as plain text files at a centralised location for which daily

back-up routine is in place. When all data of a sampled trip has been inputted checks for outliers take place. The checks are conducted using standardised scripts (R, SAS) and involve outlier checks for numerical values, consistency checks for text variables, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe).

Data storage

National database: Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl. Data collected within DEMPAS is stored in the Frisbe database.

Database	Contains	User access
Frisbe	Data from surveys, commercial on-shore and commercial at-sea sampling (including diadromous fish and stomach samples), as well as other WMR projects.	Permanent access after signing a form with general use instructions

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation: During the import of the samples in the national database build-in validation rules check the structure, type and consistency of the data input. Additionally, cross-reference checks between various fields (for string variables) and range checks (for numeric variables) are performed. See section 'Quality check documentation' for description of data quality checks from data collection to storage in the database.

Sample storage

Storage description: From discards all species are identified. Numbers at length (cm) are recorded for all fish species, Norway lobster and edible crab. Numbers without length measurements are recorded for all the remaining (benthos) species. After processing on board, discards are discarded in sea and no samples are stored.

Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of samples by species/stock, geographic sub-area by year exist.

Sample analysis: No biological sampling is conducted, only length measurements onboard the vessel.

Data processing

Evaluation of data accuracy (bias and precision): N.
Documentation will be available in 2022. The evaluation of precision will be based on the variance of the estimated catch weight. As this concerns a non-probabilistic sampling scheme, logbook information will be analysed in determining potential sampling bias.
Editing and imputation methods: Y.
The editing methods followed during the data processing are described and documented in internal documents and scripts. Gaps in sampling strata are left (not imputed). The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections

Quality document associated to a dataset:

There is no publication digital object identifier associated to a dataset. However, quality checks of the final output are stored in internal documents.

Validation of the final dataset: See section 'Quality checks and data validation documentation'.

Sampling scheme identifier: AUCTION_DEM

MS : NLD

Region: North Sea and Eastern Arctic

Sampling scheme identifier: AUCTION_DEM

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: 2022-2027

Short description (max 100 words): Auction sampling scheme aiming at the on-shore collection of length samples and samples for biological variables for a selection of demersal species based on table 2.1 from the North Sea region. This scheme covers both Dutch and foreign vessels landing into the Netherlands at various auctions.

Description of the population

Population targeted: Annual landings sold at major Dutch auctions (>80% of annual landings) of demersal fleet vessels (>12 m) using active gears and targeting specific demersal species.

Population sampled: In NLD, landings in auctions are predominantly from demersal vessels. Pelagic landings are not sold through auctions. Major auctions (covering>80% of demersal landings) are included in the sampling population. Minor auctions are excluded from the auction list as these auctions may have limited operation during some parts of the year. Dedicated auctions for *Crangon crangon* are excluded as well as these form the sampling population of sampling scheme AUCTION_SHRIMP.

Stratification: The sampling scheme follows a quarterly stratification at the auction X days sampling unit. In each stratum (quarter) a predetermined number of auction days is selected. The sample collected is further stratified by the size categories of the respective species.

Sampling design and protocols

Sampling design description:

2022

This sampling scheme is onshore sampling where the PSU is auction X time (days) stratified by quarter and the SSU the vessels. A species list is created each year based on the DCF guidelines indicating the species that will be targeted for sampling. The sampling effort is allocated in each quarter based on expert knowledge regarding the fleets and the expected landings of the species of interest covering the main auctions. When a day and an auction is selected the observer visits the auction and selects a fraction of the vessels that contain the landings of the species in the species list. The vessel non-responses are recorded at this stage. A sample is then collected from the sorted by size category landings contained in boxes. The observer records the total weight of the boxes, the weight of each size category, the length frequency as well as biological data (the type of sample collected depends on the species). The otoliths are then delivered to the lab for age determination. In few cases, when it's not logistically feasible for the observer to visit the auction (distance from the research institute, time constrains) an external person is contracted and instructed based on the sampling protocol to collect samples for the

research institute for the selected auction day and vessel. These samples are then sent to the laboratory and processed there.

2023-2027
The sampling scheme will remain the same, however, the intention is for the PSU and SSU to be selected using probabilistic selection methods.

Is the sampling design compliant with the 4S principle?:
2022: N
2023-2027: Y

Regional coordination: No regional coordination applies.

Link to sampling design documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021 (in Dutch, available upon request).
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm

2022

Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Auction*time	Auction days of major Dutch auctions	Quarter	NPJS	18 auction days (average per quarter)
Vessel	Vessels > 12m landing at the auction	-	NPJS	5 vessels (average per auction day)
Landings	All landings of the species included in the species list		NPJS	Landings of selected species from the species list
Sample	All boxes	Size category	SRSWOR[1)]	1 box per size category
Fish	All fish in the box		SRSWOR	10-15 fish

[1)] The selection method depends on the number of boxes available for each size category

2023-2027

Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Auction*time	Auction days of major Dutch auctions	Quarter	SRSWOR/UPS WOR[1)]	18 auction days (average per quarter) [4)]
Vessel	Vessels > 12m landing at the auction	-	SRSWOR	5 vessels (average per auction day) [5)]
Landings	All landings of the species included in the species list		NPJS	Landings of selected species from the species list
Sample	All boxes	Size category	SRSWOR[2)]	1 box per size category
Fish[3)]	All fish in the box		SRSWOR	10-15 fish (species dependent)

[1)] Dependent on the feasibility of the practical implementation.
[2)] The selection method depends on the number of boxes available for each size category
[3)] Length and age samples.
[4,5)] Indicative.

Compliance with international recommendations: N

Link to sampling protocol documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021 (in Dutch).
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm

Compliance with international recommendations: ' N. However, the practical implementation of the upcoming probabilistic design is based on ICES guidelines (WKPRECISE, WKPCIS1, WKPICS2, WKPICS3 and WGCATCH).

Sampling implementation

Recording of refusal rate: Y (vessel). From 2023 the refusal rate is going to be recorded for the auction day as well.

Monitoring of sampling progress within the sampling year: Sampling progress and performance is monitored throughout the year on species by species basis while accounting for the seasonality of the fisheries. The sampling scheme is evaluated quarterly considering the non-response rates (vessel) and thorough documentation of the characteristics of the sampling units. Furthermore, other possible sources of bias are recorded by the observers when possible and measures to minimize it are put in place. Should a risk of under sampling be identified, additional auction visits will be carried out to ensure the sampling intensity is optimized. In exceptional cases, specific fisheries may be closed or limited by the authorities, hence access to sampling material is then limited as well or even impossible. Deviations from the sampling protocols/scheme are documented on a quarterly, annual or ad-hoc basis (when an exceptional event takes place e.g., pandemic) and stored internally. Lastly, the out-of-frame sampling units (minor auctions) are recorded each year.

Data capture

Means of data capture: Standard traditional measuring boards, calibrated scales, Direct entry of data into in-house developed software (Billie Turf). On-site SmartDots for fish ageing based on images.

Data capture documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication.
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm.
Wageningen Marine Research is ISO9001:2015 certified.

Quality checks documentation: Y
Data are entered using in-house developed software (Billie Turf). If data are entered directly during sampling, prints are made to keep a hard copy, at least until backup has taken place. Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place. When a batch

of samples has been completely processed and entered in the files ('batch' may be a fishing trip, a quarter), checks for outliers take place. The checks are conducted using standardised scripts (R, SAS, PL/SQL) and involve outlier checks for numerical values, consistency checks for text variables, and relational checks such as length-weight, length-age relationships, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe). Checks are not yet publicly available.
Publication of the summary of the above mentioned Handbook CVO 21.021 will describe the specific quality checks for this sampling scheme.

Data storage

National database: Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl. Data collected within DEMACT2 is stored in the Frisbe database.

Database	Contains	User access
Frisbe	Data from surveys, commercial on-shore and commercial at-sea sampling (including diadromous fish and stomach samples), as well as other WMR projects.	Permanent access after signing a form with general use instructions

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation: During the import of the samples in the national database build-in validation rules check the structure, type and consistency of the data input. Additionally, cross-reference checks between various fields (for string variables) and range checks (for numeric variables) are performed. The quality checks involve outlier detection with standardized scripts, relational checks such as length-weight, length-age relationships, and maps with the sampling positions (See section 'Quality check documentation' for description of data quality checks from data collection to storage in the database).

Sample storage

Storage description: Calcified structures like otoliths and scales are stored in a dedicated storage at the research institute without time limitation. Access can be requested through the age reading coordinator. Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of samples by species/stock, geographic sub-area by year exist.

SmartDots images are stored in the local SmartDots data structure protected by access protocols and other safe guards concerning back-up, redundancy and version control.

Sample analysis: Age reading and maturity stageing according to the species specific ICES protocols. Detailed documentation on otolith processing and age reading (in Dutch,available upon request): Bolle, L.J., R. Hoek, I. Pennock, U. Beier, A. Dijkman, B. van Os, B. Snaar, M. de Vries, Th. Pasterkamp, E. Koelemij, J. Beintema, A. Bakker, T. Huijer, A. Sneekes, N. van der Meeren, H. Wiegerinck, 2020. Handboek leeftijdsbepalingen (versie 3.0). CVO rapport: 20.012
Age reading based on images through on-site SmartDots application. https://www.ices.dk/data/tools/Pages/smartdots.aspxMaturity staging follows international standards Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

Data processing

Evaluation of data accuracy (bias and precision):

2022

N.

Documentation will be available in 2022. However, considering that the sampling scheme is currently non-probabilistic quantitative metrics of data accuracy that do not provide misleading results would be difficult to produce.

2023-2027

Y. Documentation will be available in 2023.

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.

The editing and imputation methods followed during the data processing are described and documented in internal documents and scripts.

Imputation: missing values are imputed first from averages, then from surveys, then from models.

Editing: The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections. If an error is found in the sample data the following mandatory fields need to be filled in in the documentation template:

- SampleID
- Species
- DateChecked
- ErrorDescription
- ActionsTaken (e.g. excluded, corrected)
- Reason
- DateProcessed
- Re-imported (Yes/No)
- Person

Quality document associated to a dataset:

There is no publication digital object identifier associated to a dataset. However, after each estimation process an internal document is created. This document includes details of the estimation (assumptions, type of estimator, auxiliary variables used for ratio estimator etc.) as well as quality checks of the final output.

Validation of the final dataset: During the import of the samples in the national database build-in validation rules check the structure, type and consistency of the data input. Additionally, cross-reference checks between various fields (for string variables) and range checks (for numeric variables) are performed prior to submission to end users.

Sampling scheme identifier: AUCTION_SHRIMP

MS : NLD

Region: North Sea and Eastern Arctic

Sampling scheme identifier: AUCTION_SHRIMP

Sampling scheme type: Commercial fishing trip

Observation type: SciObsOnShore

Time period of validity: 2022-2027

Short description (max 100 words): Auction sampling scheme aiming at the on-shore collection of length and biological samples of *Crangon crangon* (brown shrimp, CSH) from the North Sea region. This scheme covers both Dutch and foreign specialised vessels fishing for brown shrimp and landing into the Netherlands at dedicated auctions. Samples are bought directly from the vessels while the shrimp is being processed at the auction. The auction ensures that samples can be collected.

Description of the population

Population targeted: Annual landings of *Crangon crangon* sold at major Dutch auctions specialized in processing shrimp (>80% of annual landings) of demersal fleet vessels (>12 m, fishing with 16-32mm shrimp trawl) .

Population sampled: In NLD, shrimp landings in auctions are originating from specialised vessels fishing with a dedicated gear. Major shrimp auctions (covering>80% of shrimp landings) are included in the sampling population. Minor auctions are excluded from the auction list as these auctions may have limited operation during some parts of the year. Dedicated fish auctions are excluded as well as these form the sampling population of sampling scheme AUCTION_DEM and these auctions don't have the facilities to process brown shrimp.

Stratification: The sampling scheme follows a quarterly stratification at the auction X days sampling unit. In each stratum (quarter) a predetermined number of auction days is selected. The sample collected is further stratified by the size categories.

Sampling design and protocols

Sampling design description: In 2022, This sampling scheme is onshore sampling where the PSU is auction*time (days) stratified by quarter and the SSU the vessels. From 2023, the sampling scheme will remain the same, however, the intention is for the PSU and SSU to be selected using probabilistic selection methods.

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

Regional coordination: N

Link to sampling design documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021 (in Dutch).
Early 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm

2022

Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Auction*time	Auction days of major Dutch shrimp auctions	Quarter	NPJS	8 auction days (average per quarter)
Vessel	Vessels > 12m landing at the auction	-	NP~~C~~JS	1-2 vessels (average per auction day)

Landings	All landings of *Crangon crangon*		NPJS	Fraction of landings of *Crangon crangon*
Sample	All boxes	Size category	SRSWOR[1)]	1 bag (~500gr) per size category
Individuals	All individuals in the bag		SRSWOR	100 individuals

[1)] The selection method depends on the number of boxes available for each size category

2023-2027

Sampling unit	Sampling frame	Stratification	Selection method	Sampling effort
Auction*time	Auction days of major shrimp Dutch auctions	Quarter	SRSWOR/UPSWOR[1)]	18 auction days (average per quarter)[4)]
Vessel	Vessels > 12m landing at the auction	-	SRSWOR	1-2 vessels (average per auction day)[5)]
Landings	All landings of *Crangon crangon*		NPJS	Fraction of landings of *Crangon crangon*
Sample	All boxes	Size category	SRSWOR[2)]	1 bag (~500gr) per size category
Indiviuals[3)]	All individuals in the box		SRSWOR	100 individuals

[1)] Dependent on the feasibility of the practical implementation.
[2)] The selection method depends on the number of boxes available for each size category
[3)] Length samples.
[4,5)] Indicative

Compliance with international recommendations: N. However, the practical implementation of the upcoming probabilistic design is based on ICES guidelines (WKPRECISE, WKPCIS1, WKPICS2, WKPICS3 and WGCATCH).

Link to sampling protocol documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021 (in Dutch). In 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm

Compliance with international recommendations: 'N' However, the practical implementation of the upcoming probabilistic design is based on ICES guidelines (WKPRECISE, WKPCIS1, WKPICS2, WKPICS3 and WGCATCH).

Sampling implementation

Recording of refusal rate: N
No added value to record refusals as these do not occur for this sampling due to the limited amount of shrimp needed to complete a sample and the samples are taken by the auctions while processing the shrimp.

Monitoring of sampling progress within the sampling year: Sampling progress and performance is monitored throughout the year while accounting for the seasonality of the fisheries. Possible sources of bias are recorded by the observers when possible and measures to minimize it are put in place. Should

a risk of under sampling be identified, additional auction visits will be carried out to ensure the collection of sufficient samples the sampling intensity is optimized. Deviations from the sampling protocols/scheme are documented on a quarterly, annual or ad-hoc basis (when an exceptional event takes place e.g., pandemic) and stored internally. Lastly, the out-of-frame sampling units (minor auctions) are recorded each year.

Data capture

Means of data capture: Standard traditional measuring boards, calibrated scales, Direct entry of data into in-house developed software (Billie Turf).

Data capture documentation: Internal document 'Handboek marktbemonstering zeevisserij' CVO 21.021. Handbook is in Dutch and is for internal use only. The handbook is not considered suitable for publication in the public domain at it contains internal procedures and sensitive business information. Upon request, this handbook can be discussed. Future publications of handbook will contain a dedicated section for broad publication. In 2022, an English summary will be published on https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/Wettelijke-onderzoekstaken/Visserij.htm. Wageningen Marine Research is ISO9001:2015 certified

Quality checks documentation: N.
Data from any field sampling (at sea, on shore), are entered using in-house developed software (Billie Turf) following a data entry protocol. If data are entered directly during sampling, prints are made to keep a hard copy, at least until backup has taken place. Data are stored as plain text files at a centralised location for which a daily back-up routine is put in place. When a batch of samples has been completely processed and entered in the files ('batch' may be a fishing trip, a survey, a quarter), checks for outliers take place. The checks are conducted using standardised scripts (R, SAS, PL/SQL) and involve outlier checks for numerical values, consistency checks for text variables, and relational checks such as length-weight, length-age relationships, and maps with the sampling positions. After file corrections, the data are stored in one of the centralised databases (Frisbe). Checks are not yet publicly available. Publication of the summary of the above mentioned Handbook CVO 21.021 will describe the quality checks

Data storage

National database Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

Database	Contains	User access
Frisbe	Data from surveys, commercial on-shore and commercial at-sea sampling (including diadromous fish and stomach samples), as well as other WMR projects.	Permanent access after signing a form with general use instructions

International database: ICES RDB(ES) https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation: See section 'Quality check documentation' for description of data quality checks from data collection tot storage in the database.

Sample storage

Storage description: Not relevant for this sampling scheme as no biological material is collected and stored.

Sample analysis: Samples are collected according to the procedures as described in the relevant Handbook (see data capture documentation). Sample analysis is straightforward as this is only based on length measurements (to mm below) by maturity stage. No international documentation exists.

Data processing

Evaluation of data accuracy (bias and precision):
2022: N.
Documentation will be available in 2022. However, considering that currently the sampling scheme is currently non-probabilistic quantitative metrics of data accuracy that do not provide misleading results would be difficult to produce.

2023-2027
Y. Documentation will be available in 2023.

Editing and imputation methods: The editing and imputation methods followed during the data processing are described and documented in internal documents and scripts.
Imputation: missing values are imputed from averages.
Editing: The samples are not edited during the data processing. Possible data errors, inconsistencies and/or discrepancies are recorded in dedicated documents and the respective records usually follow the process of data storage after the corrections. If an error is found in the sample data the following mandatory fields need to be filled in the documentation template:

- SampleID
- Species
- DateChecked
- ErrorDescription
- ActionsTaken (e.g. excluded, corrected)
- Reason
- DateProcessed
- Re-imported (Yes/No)
- Person

Quality document associated to a dataset: There is no publication digital object identifier associated to a dataset. However, after each estimation process an internal document is created. This document includes details of the estimation (assumptions, type of estimator, auxiliary variables used for ratio estimator etc.) as well as quality checks of the final output.

Validation of the final dataset: During the import of the samples in the national database build-in validation rules check the structure, type and consistency of the data input. Additionally, cross-reference checks between various fields (for string variables) and range checks (for numeric variables) are performed prior to submission to end users.

Related to Text box 2.6 and Table 2.6 (research surveys at sea)

Type of sampling activity: Acoustic profiles

MS : NLD
Region: North Sea & Eastern Arctic; North-East Atlantic
Sampling scheme identifier: IBWSS, NHAS
Sampling scheme type: Research survey at sea
Type of sampling activity (Observation type): acoustic profiles
Time period of validity: 2022-2027
Short description: see Text box 2.6 for survey-specific descriptions. Acoustic profiles are collected for pelagic species, preferably with a swim bladder, to quantify the amount of fish at the transects covered. Acoustic profiles can be collected on multiple frequencies. Depending on the target species the optimal frequency may vary (survey-specific).
Description of the population
Population targeted: See survey-specific issues Text box 2.6 **Population sampled:** The target species vary per survey, see Text box 2.6 **Stratification:** Survey stratification is defined in the survey-specific protocols: IBWSS: ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.1 NHAS: ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.5
Sampling design and protocols
Sampling design description: Sampling design is available in survey-specific protocols: IBWSS: ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.1 NHAS: ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.5 **Is the sampling design compliant with the 4S principle?:** NA **Regional coordination:** all research surveys collecting acoustic profiles are internationally coordinated. See survey-specific coordination and collaboration details in Text box 2.6 **Link to sampling design documentation:** See above **Compliance with international recommendations:** Y **Link to sampling protocol documentation:** Sampling protocols are available in survey-specific protocols: IBWSS: ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.1 NHAS: ICES Manual for International Pelagic Surveys (IPS) chapter 2.1.5 **Compliance with international recommendations:** Y
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year:** sampling progress is internationally monitored, under responsibility of the coordinating ICES survey working group. In case of delays of one of the countries, the sampling may be readjusted.
Data capture
Means of data capture: data capture and settings for acoustic instruments are described in ICES Manual for International Pelagic Surveys (IPS) chapter 3 **Data capture documentation:** See above.

Quality checks documentation: Y. Acoustic profiles are scrutinised by the post-cruise group, meeting soon after the survey. The scrutinisation process is described in ICES Manual for International Pelagic Surveys (IPS) chapter 6.
Data storage
National database: There is no national database for acoustic data. On board the vessel there is a NAS drive staying permanently, powered through UPS (uninterrupted power supply). Additionally there is a portable NAS drive that synchronises itself to the ship's NAS. After the survey the portable NAS is taken back to the institute, where the data is also copied to a local NAS at the institute. This local NAS also contains final postprocessed files (i.e. LSSS). Ultimately, the data is stored at a storage server that has a back-up scheme. The ultimate outputs are stored in the ICES database. There is a copy of the data uploaded to the international database at the institute's network drive. **International database:** The processed acoustic data is transferred to the ICES data portal https://www.ices.dk/data/data-portals/Pages/acoustic.aspx **Quality checks and data validation documentation:** acoustic profiles are scrutinised and processed by the post-cruise group, meeting soon after the survey. The scrutinisation process is described in ICES Manual for International Pelagic Surveys (IPS) chapter 6. The post-cruise meetings report to ICES Working Group of International Pelagic Surveys (WGIPS), and the reports are part of the WGIPS report as Annexes, e.g. in https://doi.org/10.17895/ices.pub.8055
Sample storage
Storage description: not applicable Sample analysis: not applicable
Data processing
Acoustic profiles are scrutinised and processed by the post-cruise group, meeting soon after the survey. The post-processing procedures are described in ICES Manual for International Pelagic Surveys (IPS) chapter 6. The post-cruise meetings report to ICES Working Group of International Pelagic Surveys (WGIPS), and the reports (survey summary table) are part of the WGIPS report as Annexes, e.g. in https://doi.org/10.17895/ices.pub.8055. The report also includes error evaluations and measures of uncertainty (CV). The survey summary table also allows for feedback by the end-user, as it contains the following questions to be answered by the assessment group: • Were any concerns raised during the meeting regarding the fitness of the survey for use in the assessment either for the whole times series or for individual years? • Did the Survey Summary Table contain adequate information to allow for evaluation of the quality of the survey for use in assessment? Please identify shortfalls

Type of sampling activity: Hydrography

MS : NLD
Region: North Sea & Eastern Arctic; North-East Atlantic
Sampling scheme identifier: BTS, IBTS_Q1, IBWSS, NHAS
Sampling scheme type: Research survey at sea
Type of sampling activity (Observation type): hydrography (downcast)

Time period of validity: 2022-2027

Short description: hydrography samples are taken with a Seabird SBE 911plus CTD to collect information on the temperature and salinity profiles of the water column. The vertical downcasts are taken when the ship is not moving.

Description of the population

Population targeted: NA
Population sampled: NA
Stratification: NA

Sampling design and protocols

Sampling design description: For the acoustic surveys (IBWSS, NHAS) the sampling locations are pre-defined, for the fish surveys (BTS, IBTS_Q1) the vertical downcasts are taken at the starting or end position of a fish trawl.

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

Regional coordination: sampling protocols follow international standards, e.g. defined in https://www.ices.dk/sites/pub/Publication%20Reports/Data%20Guidelines/Data_Guidelines_CTD_%20v7_revised_2006.pdf

Link to sampling design documentation:
BTS: Manual for the Offshore Beam Trawl Surveys version 3.4 chapter 5.1
IBTS_Q1: Manual for the International Bottom Trawl Surveys Revision IX chapter 5
IBWSS: ICES Manual for International Pelagic Surveys (IPS) chapter 5.1
NHAS: ICES Manual for International Pelagic Surveys (IPS) chapter 5.1

Compliance with international recommendations: Y

Link to sampling protocol documentation: Apart from the protocols mentioned above, a Dutch protocol is available describing the exact way to collect hydrography data with the Seabird CTD.
Dutch detailed documentation (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: data is automatically captured by the instrument while moving through the water column. Data is stored on board on a computer, powered through UPS (uninterrupted power supply), and a back-up of the files is made frequently during the survey. Files are taken to the institute for further processing.

Data capture documentation: Y
https://www.seabird.com/sbe-911plus-ctd/product-downloads?id=60761421595

Quality checks documentation: Y
https://www.ices.dk/sites/pub/Publication%20Reports/Data%20Guidelines/Data_Guidelines_CTD_%20v7_revised_2006.pdf

Data storage

National database: after processing, and a standardised quality check on outliers, the CTD downcast information is stored in the database WMR database FRISBE (Oracle relational database). Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database: the vertical profiles are stored in https://www.ices.dk/data/data-portals/Pages/ocean.aspx
For BTS and IBTS_Q1 surface and bottom temperature and surface and bottom salinity are stored in the haul information in the international database https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx.

Quality checks and data validation documentation:
https://www.ices.dk/data/data-portals/Pages/ocean.aspx

Sample storage

Storage description: NA

Sample analysis: NA

Data processing

Evaluation of data accuracy (bias and precision): NA
Editing and imputation methods: NA
Quality document associated to a dataset: NA
Validation of the final dataset: CTD downcast data are evaluated upon processing at the institute, before entry into the national database FRISBE, and by the end-user before acceptance in the international database.

MS : NLD

Region: North Sea & Eastern Arctic

Sampling scheme identifier: DYFS, IBTS_Q1, IHLS, IHLS-DRS, MEGS, SNS_NLD

Sampling scheme type: Research survey at sea

Type of sampling activity (Observation type): hydrography (attached to net)

Time period of validity: 2022-2027

Short description: hydrography samples are taken with a Seabird SBE 911plus CTD, Valeport or Hydrolab sonde to collect information on the temperature and salinity profiles of the water column.

Description of the population

Population targeted: NA
Population sampled: NA
Stratification: NA

Sampling design and protocols

Sampling design description: The instrument is attached to the net and provides temperature and salinity information at the depths of the fishing gear.

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

Regional coordination: there is no regional coordination on CTD sampling with instruments attached to the net. The sampling however follows directly the survey sampling design, as the data recording takes place during the plankton hauls or trawl hauls (see respective sampling design references).

Link to sampling design documentation: see Text box 2.6 bullet 2
Compliance with international recommendations: NA
Link to sampling protocol documentation: A Dutch protocol (CVO_h003; available upon request) is available describing the exact way to collect hydrography data with instruments attached to the net.
Compliance with international recommendations: NA

Sampling implementation

Recording of refusal rate: NA
Monitoring of sampling progress within the sampling year: NA

Data capture

Means of data capture: data is automatically captured by the instrument while moving through the water column. Data is stored on board on a computer, powered through UPS (uninterrupted power supply), and a back-up of the files is made frequently during the survey. Files are taken to the institute for further processing.

Data capture documentation: Y
https://www.seabird.com/sbe-911plus-ctd/product-downloads?id=60761421595,
https://www.ott.com/en-uk/products/water-quality-2/hydrolab-ds5-multiparameter-data-sonde-56/,
https://www.valeport.co.uk/products/minictd-profiler/

Quality checks documentation: Y. Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request).
Dutch detailed documentation (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Data storage

National database: after processing, and a standardised quality check on outliers, the CTD information is stored in the database WMR database FRISBE (Oracle relational database). Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database: surface and bottom temperature and surface and bottom salinity are stored in the haul information in the international databases https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx (IBTS_Q1, IHLS, IHLS-DRS, MEGS) and https://www.ices.dk/data/data-

portals/Pages/DATRAS.aspx (DYFS, SNS_NLD). Storage in the Oceanographic database is not allowed, as the methodology does not comply with accepted hydrographic methodologies.

Quality checks and data validation documentation:
Dutch detailed documentation (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Sample storage

Storage description: NA

Sample analysis: NA

Data processing

Evaluation of data accuracy (bias and precision): NA
Editing and imputation methods: NA
Quality document associated to a dataset: NA
Validation of the final dataset: CTD data are evaluated upon processing at the institute, before entry into the national database FRISBE.

Type of sampling activity: Trawl hauls

MS : NLD

Region: North Sea & Eastern Arctic; North-East Atlantic

Sampling scheme identifier: BTS, DYFS, FYMA, FYOE, IBTS_Q1, IBWSS, MEGS, NHAS, SNS_NLD

Sampling scheme type: Research survey at sea

Type of sampling activity (Observation type): trawl hauls

Time period of validity: 2022-2027

Short description: the trawl hauls are processed in a similar manner: after the haul comes on board, the catch is sorted. Species are identified to the lowest taxonomic level possible or relevant for the survey. Length measurements are done for all fish species (finfish and elasmobranchs), Cephalopods, *Cancer pagurus*, *Nephrops norvegicus*, *Homarus gammarus, Crangon crangon* (DYFS only). Other species are counted and, depending on the survey, weighed. For a selection of species biological information is collected. Individual length, weight, sex and maturity information is collected and otoliths are taken from species listed in the (inter)national protocols (see text box 2.6 for the respective surveys).

Description of the population

Population targeted: Target population follows the survey design.
BTS: Manual for the Offshore Beam Trawl Surveys version 3.4
DYFS: see Text box 2.6
FYMA, FYOE: https://doi.org/10.18174/522029 (in Dutch)
IBTS_Q1: Manual for the International Bottom Trawl Surveys Revision IX
IBWSS: ICES Manual for International Pelagic Surveys (IPS)
MEGS: WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel version 11.0, chapter 3
NHAS: ICES Manual for International Pelagic Surveys (IPS)
SNS_NLD: see text box 2.6

Population sampled:
BTS, DYFS, IBTS_Q1, SNS_NLD sample demersal marine species;
IBWSS samples pelagic marine species, primarily focussing on *Micromesistius poutassou*, but sorting and measuring is done for all species from the trawl catches, including deep sea species;
MEGS samples *Scomber scombrus* and *Trachurus trachurus*, trawl hauls only are done to collect biological data;
NHAS samples pelagic marine species, primarily focussing on clupeid (*Clupea harengus*, *Sprattus sprattus*) sprcies and also taking into account gadoid (*Trisopterus minutus*, *Melanogrammus aeglefinus*) species visible at the acoustic profiles. From trawl catches all species are sorted and measured;
FYMA and FYOE sample demersal freshwater species.

Stratification: Stratification follows the (inter)national survey protocols, see Text box 2.6.

Sampling design and protocols

Sampling design description: Sampling design is described in the (inter)national survey protocols, see text box 2.6 bullet 2.
Is the sampling design compliant with the 4S principle?: NA
Regional coordination: see Text box 2.6, bullet 3.
Link to sampling design documentation: see Text box 2.6 bullet 2
Compliance with international recommendations: Y
Link to sampling protocol documentation: see Text box 2.6 bullet 2.
General procedure:
After the haul comes on board, the catch is sorted. Species are identified to the lowest taxonomic level possible or relevant for the survey. Detailed identification is sometimes time-consuming, and there needs to be a balance between added value of the more detailed identification and the time (i.e. costs) needed more detailed identification. In general, species are identified to the species level. Length measurements are done for all fish species (finfish and elasmobranchs), Cephalopods, *Cancer pagurus*, *Nephrops norvegicus*, *Homarus gammarus*; measurement accuracy in line with (inter)national standards. During DYFS also length measurements of *Crangon crangon* are taken. Other species (e.g. decapods, bivalves, gastropods) are counted and, depending on the personnel available, weighed. If subsampling takes place, the minimum subsample size for length measurements is 50 specimens if measured to the cm or 0.5 cm below, and 100 if measured to the mm below.
For a selection of species biological information is collected. Elasmobranchs, *Cancer pagurus*, *Nephrops norvegicus*, *Homarus gammarus* are measured by sex. Individual length, weight, sex and sexual maturity information is collected and otoliths are taken from species listed in the (inter)national protocols (see text box 2.6 for the respective surveys).

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Normally, the survey time should fit to the number of samples planned. If, due to weather conditions or other unforeseen circumstances the planned schedule cannot be carried out, the scientist in charge contacts the responsible person at the institute to decide upon a change of schedule. If needed, the international survey coordination group is contacted. For acoustic surveys (IBWSS, NHAS), MEGS and IBTS_Q1 frequent international feedback on the progress takes place, and international planning is re-arranged when needed.

Data capture

Means of data capture: length measurements are done using an analogue measuring board, of which the set-off is checked before the start of the survey. Wet weights are taken using electronic scales, to the gram or 5 grammes (depending on the sample size). Scales are maintained annually and calibrated at least daily. Data is mostly entered in the computer directly, using a head-set if the distance is too far to directly speak to each other. Software used for data entry is in-house developed: Billie Turf. If data cannot be entered directly (FYOE, FYMA), measurements are written down on specific measurement lists, and data is entered as soon as possible (FYMA: at least on the same day, FYOE: at least weekly). For most surveys (exception: FYOE) the majority of the trawl information (date, time, position, haul duration) is registered automatically, using an external GPS or the vessel's system information. This information is transformed by in-house developed software (TRIHIP/IHIP) to the exchange format needed by Billie Turf, so redundancy in data entry is minimised.

Individual length measurements for fish used for biological data collection are done using an analogue measuring board, of which the set-off is checked before the start of the survey. Individual wet weights are taken using electronic scales, to the gram. Scales are maintained annually and calibrated at least daily. Data is noted down on paper and entered in the computer directly after processing the fish. After the fish selected for biological sampling has been treated following national animal welfare conditions, the otoliths are collected, and sex and -if relevant- maturity is registered by opening the body cavity.

Species identification workshops for demersal and pelagic marine species as well as freshwater species are organised on an annual to triennial basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the research surveys, frequent participation is mandatory to keep a view on species identification quality.

Maturity staging follows international standards Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

Otoliths are embedded in resin and sliced. Images are taken from the otolith coupes. Age reading takes place from those images using the institute's (in-house further developed) version of SmartDots. Age readers are qualified based on international age reading exchange results. For species outside the international age reading exchanges (non-commercial species), a national age reading qualification procedure is in place.

Gonad samples for histology (MEGS only) are stored on 3.6% buffered formaldehyde and processed upon arrival ashore, following the international protocol: WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel (ices.dk).

Data capture documentation:
Dutch detailed documentation on survey protocols BTS, DYFS, IBTS_Q1, IBWSS, MEGS, NHAS, SNS_NLD (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).
Dutch detailed documentation on survey protocols FYMA, FYOE: https://doi.org/10.18174/522029
Dutch detailed documentation on otolith processing and age reading (available upon request): Bolle, L.J., R. Hoek, I. Pennock, U. Beier, A. Dijkman, B. van Os, B. Snaar, M. de Vries, Th. Pasterkamp, E.

Koelemij, J. Beintema, A. Bakker, T. Huijer, A. Sneekes, N. van der Meeren, H. Wiegerinck, 2020. Handboek leeftijdsbepalingen (versie 3.0). CVO rapport: 20.012
International documentation on histological data capture (MEGS only): WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel (ices.dk).

Quality checks documentation: Y
Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request). Essentially, the trawl haul data are checked for outliers on numerical values (either by plotting or by providing minimum, mean, and maximum values), consistency in text variables (e.g. station coding, crew members), and a visual check of the species list by the scientist in charge.

Dutch detailed documentation on quality checks BTS, DYFS, IBTS_Q1, IBWSS, MEGS, NHAS, SNS_NLD (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Data storage

National database: after processing, and a standardised quality check on outliers, the trawl haul information for all surveys is stored in the database WMR database FRISBE (Oracle relational database). Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

Histological data is stored on network drives as .csv files, as it is not yet possible to store the information in one of the WMR databases.

International database:
BTS, DYFS, IBTS_Q1, SNS trawl haul (trawl, catch and biological information) data are stored in https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx
IBWSS and NHAS trawl haul data are stored in https://www.ices.dk/data/data-portals/Pages/acoustic.aspx

Quality checks and data validation documentation: the database Frisbe also conducts data validation checks during the import. Documentation of those checks is available upon request.

Sample storage

Storage description:
Otoliths are archived at Wageningen Marine Research without time limitation. SmartDots images are stored in the local SmartDots data structure. Access can be requested through the age reading coordinator. Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of samples by species/stock, geographic sub-area by year exist.

SmartDots images are stored in the local SmartDots data structure protected by access protocols and other safe guards concerning back-up, redundancy and version control.

Gonad samples for histological analysis are stored at Wageningen Marine Research, in a container suitable for formaldehyde sample storage. Samples are stored for at least five years.

If specimens are brought to the institute for species identification, then those are stored in the freezer.

Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) no specific overview of the quantities of (otolith or gonad) samples by species/stock, geographic sub-area by year exist.

Sample analysis:
Otoliths are embedded in resin and sliced. Images are taken from the otolith coupes. Age reading takes place from those pictures using the institute's (in-house further developed) version of SmartDots. Age readers are qualified based on international age reading exchange results. For species outside the international age reading exchanges (non-commercial species), a national age reading qualification is in place.

MEGS: Gonad samples for histology are stored on 3.6% buffered formaldehyde and processed upon arrival ashore, following the international protocol: WGMEGS Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel (ices.dk). Fecundity images are stored on a network drive protected by access protocols and other safe guards concerning back-up.

Data processing

Evaluation of data accuracy (bias and precision):
Y For IBWSS and NHAS data evaluation takes place in the post-cruise meetings (report in the WGIPS report)
N/Y For BTS, DYFS, IBTS_Q1, MEGS, SNS there is no direct evaluation of data accuracy of the trawl hauls. Coordinating survey groups conduct some analyses for the international data set, not only on e.g. the year classes, but also on species identification consistency. The assessment groups evaluate the survey series as a whole.

Editing and imputation methods:
Y For IBWSS and NHAS editing and imputation may be done during or as a result of the post-cruise meetings (report in the WGIPS report)
N For BTS, DYFS, IBTS_Q1, MEGS, SNS editing and imputation only takes place when odd values are encountered. Corrections then are done in the institute's data and a new dataset is submitted to the international database, mentioning the corrections done.

Quality document associated to a dataset: N

Validation of the final dataset: The international data portals conduct consistency checks on the trawl data, next to the national checks before entry in the national database. The coordinating survey groups analyse last year's survey data before the stock assessments take place. However, as soon as the dataset has been submitted to the international database, the information is available to everyone.

Type of sampling activity: Plankton hauls

MS : NLD

Region: North Sea & Eastern Arctic; North-East Atlantic
Sampling scheme identifier: IBTS_Q1, IHLS, IHLS_DRS, MEGS
Sampling scheme type: Research survey at sea
Type of sampling activity (Observation type): plankton hauls
Time period of validity: 2022-2027
Short description: Plankton hauls are taken with a MIK net (IBTS_Q1, IHLS_DRS) or with a Gulf plankton torpedo (IHLS, MEGS). Double oblique hauls are conducted, where the gear is lowered at constant speed till 5 m above the bottom, and hauled in at constant speed as well. This leads to a V-shaped haul profile.
Description of the population
Population targeted: Target population follows the survey design. For IBTS_Q1, IHLS and IHLS_DRS target population is primarily Clupeid larvae, for MEGS primary focus is *Scomber scombrus* and *Trachurus trachurus* eggs. Despite the focus on a selection of species, samples from plankton hauls contain the complete catch and may be sorted to get information on early life stages of other species in the sample area. **Population sampled:** the early life stages are sampled in or near spawning regions. **Stratification:** Stratification follows the (inter)national survey protocols, see Text box 2.6.
Sampling design and protocols
Sampling design description: Sampling design is described in the (inter)national survey protocols, see text box 2.6 bullet 2. **Is the sampling design compliant with the 4S principle?:** NA **Regional coordination:** see Text box 2.6, bullet 3. **Link to sampling design documentation:** see Text box 2.6 bullet 2 **Compliance with international recommendations:** Y **Link to sampling protocol documentation:** see Text box 2.6 bullet 2 **Compliance with international recommendations:** Y
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year:** Normally, the survey time should fit to the number of samples planned. If, due to weather conditions or other unforeseen circumstances the planned schedule cannot be carried out, the scientist in charge contacts the responsible person at the institute to decide upon a change of schedule. If needed, the international survey coordination group is contacted. For MEGS and IBTS_Q1 frequent international feedback on the progress takes place, and international planning is re-arranged when needed.
Data capture
Means of data capture: The majority of the trawl information (date, time, position, haul duration) is registered automatically, using the vessel's system information. This information is transformed by in-house developed software (TRIHIP/Gulf) to the exchange format needed by Billie Turf, so redundancy in data entry is minimised. After the plankton haul comes on board, the sample is sieved over a fine mesh (size depends on component targeted), and stored in jars with 4% buffered formaldehyde. IBTS_Q1, IHLS, IHLS_DRS: Upon arrival ashore, the samples are processed in the lab. All fish larvae are sorted from the sample, Clupeid larvae are identified to the species and per species the sample, or a

representative subsample of a pre-defined minimum size (50 for samples with > 100 larvae, 25 for samples with 50-100 larvae) is measured to the mm below using an analogue measuring board.
MEGS: after 12-24 fixation all eggs are sorted from the sample, using the spray method (Eltink, 2007). The leftover is checked visually on remaining eggs. All eggs are photographed, measured digitally in ObjectJ/ImageJ, identified to the species and development stage. A minimum of 100 mackerel and horse mackerel have to be identified. If a sample contains more than 200 eggs of the species, then a subsample can be taken using a 'Folsom splitter' (Griffiths *et al*. 1984). Upon arrival ashore the samples are again checked visually for remaining eggs.

Data capture documentation:
Dutch detailed documentation on survey protocols (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).
Detailed information on spray method: Eltink, A.T.G.W. 2007. The spray technique: A new method for an efficient separation of fish eggs from plankton. Journal of Plankton Research 29(10): 871-880. https://doi.org/10.1093/plankt/fbm065.
Documentation on folsom splitter: Griffiths, F. B., Brown, G. H., Reid, D. D., and Parker, R. R. 1984. Estimation of sample zooplankton abundance from Folsom splitter sub-samples. Journal of Plankton Research 6(5): 721-731.

Quality checks documentation: Y
Quality checks are conducted upon processing at the institute, and before entry into the national database FRISBE. Standardised SAS scripts are used for the data quality checks (available upon request). Essentially, the trawl haul data are checked for outliers on numerical values (either by plotting or by providing minimum, mean, and maximum values), consistency in text variables (e.g. station coding, crew members), and a visual check of the species list by the scientist in charge.

Dutch detailed documentation on quality checks (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Data storage

National database: after processing, and a standardised quality check on outliers, the trawl haul information for all surveys is stored in the database WMR database FRISBE (Oracle relational database). Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

International database:
Plankton haul data are stored in https://www.ices.dk/data/data-portals/Pages/Eggs-and-larvae.aspx

Quality checks and data validation documentation: Y. The database Frisbe also conducts data validation checks during the import. Documentation of those checks is available upon request.

Sample storage

Storage description: plankton samples are stored at Wageningen Marine Research, in a container suitable for formaldehyde sample storage. Samples are stored for at least five years.

Other than the Dutch DCF annual reports (https://datacollection.jrc.ec.europa.eu/ars) where the number of plankton samples is registered, no specific overview of the quantities of (otolith or gonad) samples by species/stock, geographic sub-area by year exist.

Sample analysis:
IBTS_Q1, IHLS, IHLS_DRS: Upon arrival ashore, the samples are processed in the lab. All fish larvae are sorted from the sample, Clupeid larvae are identified to the species and per species the sample, or a representative subsample of a pre-defined minimum size (50 for samples with > 100 larvae, 25 for samples with 50-100 larvae) is measured to the mm below using an analogue measuring board.
MEGS: after 12-24 fixation all eggs are sorted from the sample, using the spray method (Eltink, 2007). The leftover is checked visually on remaining eggs. All eggs are photographed, measured digitally in ObjectJ/ImageJ, identified to the species and development stage. A minimum of 100 mackerel and horse mackerel have to be identified. If a sample contains more than 200 eggs of the species, then a subsample can be taken using a 'Folsom splitter' (Griffiths *et al*. 1984). Upon arrival ashore the samples are again checked visually for remaining eggs.

National calibration workshops for sample sorting and species identification are organised and reported upon in internal reports (available upon request) annually for Clupeid larvae, and for egg identification related to the survey year. Participation is mandatory for personnel sorting and identifying ichthyoplankton.

Data processing

Evaluation of data accuracy (bias and precision): Coordinating survey groups conduct some analyses for the international data set. The assessment groups evaluate the survey series as a whole.
Editing and imputation methods: editing and imputation only takes place when odd values are encountered. Corrections then are done in the institute's data and a new dataset is submitted to the international database, mentioning the corrections done.
Quality document associated to a dataset: N

Validation of the final dataset: The international data portal conducts consistency checks on the trawl data, next to the national checks before entry in the national database. The coordinating survey groups analyse last year's survey data before the stock assessments take place. However, as soon as the dataset has been submitted to the international database, the information is available to everyone.

Type of sampling activity: Litter hauls

MS : NLD

Region: North Sea & Eastern Arctic; North-East Atlantic

Sampling scheme identifier: IBTS_Q1, BTS

Sampling scheme type: Research survey at sea

Type of sampling activity (Observation type): litter hauls

Time period of validity: 2022-2027

Short description (max 100 words):): the litter hauls are processed in a similar manner: after the haul comes on board, the catch is sorted and litter is taken out. Litter items are identified, counted, weighed, size category is defined. For each litter item is registered if and, if yes, what species are attached to the item. Detailed identification of attached species is sometimes time-consuming, and there needs to be a

balance between added value of the more detailed identification and the time (i.e. costs) needed more detailed identification. In general, species are identified to the species level.

Description of the population

Population targeted: NA
Population sampled: NA

Sampling design and protocols

Sampling design description: Sampling design is described in the (inter)national survey protocols, see text box 2.6 bullet 2 for generic sampling design.

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

Regional coordination: See Text box 2.6 bullet 3.
Link to sampling design documentation: See Text box 2.6 bullet 2
Compliance with international recommendations: Y
Link to sampling protocol documentation: The data collection procedure is in line with the at that time actual guidelines described by the ICES working group on Marine Litter (WGML; current version ICES, 2018b Annex 9c: http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/HAPISG/2018/01%20WGML%20-%20Report%20of%20the%20Working%20Group%20on%20Marine%20Litter.pdf)

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA
Monitoring of sampling progress within the sampling year: follows trawl survey sampling progress (see Type of activities: 'Trawl hauls').

Data capture

Means of data capture: Wet weights are taken using electronic scales, to the gram. Scales are maintained annually and calibrated at least daily. Data is directly entered in the computer in an Excel sheet.

Data capture documentation:
Dutch detailed documentation on survey protocols BTS, DYFS, IBTS_Q1, IBWSS, MEGS, NHAS, SNS_NLD (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Quality checks documentation: N

Data storage

National database: currently, the data cannot be stored in a national database. Excel files are kept on a server location with a daily back-up scheme.

International database:
Litter data is stored in https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx

Quality checks and data validation documentation: NA

Sample storage

Storage description: NA Sample analysis: Litter items are identified, counted, weighed, size category is defined. For each litter item is registered if and, if yes, what species are attached to the item.
Data processing
Evaluation of data accuracy (bias and precision): Unknown **Editing and imputation methods:** Unknown **Quality document associated to a dataset:** NA **Validation of the final dataset:** Unknown

Type of sampling activity: Grabs, towed dredge and suction dredge

MS : NLD
Region: North Sea & Eastern Arctic; North-East Atlantic
Sampling scheme identifier: ENSIS, MOSKOK
Sampling scheme type: Research survey at sea
Type of sampling activity (Observation type): grabs, towed dredge and suction dredge
Time period of validity: 2022-2027
Short description: the grabs and dredge samples are processed in a similar manner: after the sample comes on board, the catch is sorted. Species are identified to the lowest taxonomic level possible or relevant for the survey. Length measurements or length classification are done for a selection of shellfish species. Target species are counted and weighed.
Description of the population
Population targeted: commercial shellfish species, see Text Box 2.6 **Population sampled:** commercial species in the Dutch coastal zone (ENSIS) and in the Dutch estuaries (MOSKOK) **Stratification:** Stratification follows the national survey protocols, see Text box 2.6.
Sampling design and protocols
Sampling design description: Sampling design is described in the national survey protocols, see text box 2.6 bullet 2. **Is the sampling design compliant with the 4S principle?:** NA **Regional coordination:** see Text box 2.6, bullet 3. **Link to sampling design documentation:** see Text box 2.6 bullet 2 **Compliance with international recommendations:** NA **Link to sampling protocol documentation:** see Text box 2.6 bullet 2. General procedure: After the haul comes on board, the catch is sorted. Species are identified to the lowest taxonomic level possible or relevant for the survey. Detailed identification is sometimes time-consuming, and there needs to be a balance between added value of the more detailed identification and the time (i.e. costs) needed more detailed identification. In general, species are identified to the species level. Other species (e.g. decapods, gastropods) are counted. Subsampling may take place. **Compliance with international recommendations:** NA
Sampling implementation
Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: Normally, the survey time should fit to the number of samples planned. If, due to weather conditions or other unforeseen circumstances the planned schedule cannot be carried out, the scientist in charge contacts the responsible person at the institute to decide upon a change of schedule.

Data capture

Means of data capture: length measurements are done using a digital calliper. Wet weights are taken using electronic scales, to the 0.5 gram. Scales are maintained annually and calibrated at least daily. Data is entered in the computer directly, in an Access data entry sheet.

A species identification workshop for shellfish is organised on an annual basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the shellfish research surveys, frequent participation is mandatory to keep a view on species identification quality.

Data capture documentation:
Dutch detailed documentation on survey protocols (available upon request, updated annually or biennial):
Troost, K., M. van Asch, E. Brummelhuis, D. van den Ende, J. Perdon, C. van Zweeden, J. van Zwol & J. van der Pool, 2019. Handboek bestandsopnames schelpdieren WOT Versie 3, december 2019. Internal CVO report: 18.013 (CVO_h002).

Quality checks documentation: N
Quality checks are conducted upon processing at the institute, and before entry into the national shellfish database (Access). Standardised Access queries are used for the data quality checks (available upon request).

Data storage

National database: after processing, and a standardised quality check on outliers, the information is stored in the database WMR shellfish database. Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request).

International database: NA

Quality checks and data validation documentation: the shellfish database conducts data validation checks during the import. Documentation of those checks is available upon request.

Sample storage

Storage description:
If specimens are brought to the institute for species identification, then those are stored in the freezer.
Sample analysis: After the haul comes on board, the catch is sorted. Species are identified to the lowest taxonomic level possible or relevant for the survey. Detailed identification is sometimes time-consuming, and there needs to be a balance between added value of the more detailed identification and the time (i.e. costs) needed more detailed identification. In general, species are identified to the species level. Other species (e.g. decapods, gastropods) are counted. Subsampling may take place.

Data processing

Evaluation of data accuracy (bias and precision): N

Editing and imputation methods: editing and imputation only takes place when odd values are encountered. Corrections then are done in the institute's data and a new dataset is submitted to the international database, mentioning the corrections done. **Quality document associated to a dataset:** N **Validation of the final dataset:** Last year's survey data are analysed during reporting, and corrected if needed before provided to the end-user (Ministry of Agriculture, Nature and Food Quality).

Related to Table 4.1 (stomach)

MS : NLD
Region: North Sea & Eastern Arctic; North-East Atlantic
Sampling scheme identifier: IBTS_Q1
Sampling scheme type: Research survey at sea
Type of sampling activity (Observation type): stomach sampling
Time period of validity: 2022-2027
Short description (max 100 words): For processing trawl hauls: see Type of sampling activity 'Trawl hauls'. After the fish selected for stomach sampling has been treated following national animal welfare conditions, the stomach is collected and stored following the international protocol in Annex 5 of https://www.ices.dk/sites/pub/CM%20Doccuments/CM-2010/SSGSUE/wgsam10.pdf The 2021 RCG NANSEA&BAL decided to start collecting stomach samples during the IBTS Q1&Q3 surveys. No international decision has yet been taken on the stomach samples processing. The Netherlands however only collects stomachs sampled during the IBTS Q1 as the Netherlands is not participating to IBTS Q3.
Description of the population
Population targeted: NA **Population sampled:** NA
Sampling design and protocols
Sampling design description: Sampling design is described in the (inter)national survey protocols, see text box 2.6 bullet 2. Stomach sampling design and its background is described in Chapter 15 of https://datacollection.jrc.ec.europa.eu/documents/10213/1239599/2021_RCG-NA-NSEA+and+RCG+Baltic+TM_partIII_decisions+recommendations.pdf/78ec9959-9176-4f7c-bda2-54e4f1891786 **Is the sampling design compliant with the 4S principle?:** NA **Regional coordination:** by RCG ISSG on stomach sampling under the RCG NANSEABAL. **Link to sampling design documentation:** https://datacollection.jrc.ec.europa.eu/documents/10213/1239599/2021_RCG-NA-NSEA+and+RCG+Baltic+TM_partIII_decisions+recommendations.pdf/78ec9959-9176-4f7c-bda2-54e4f1891786 **Compliance with international recommendations:** Y

Link to sampling protocol documentation: Annex 5 in Report of the Working Group on Multispecies Assessment Methods (WGSAM) (ices.dk)

Compliance with international recommendations: Y

Sampling implementation

Recording of refusal rate: NA

Monitoring of sampling progress within the sampling year: follows IBTS_Q1 trawl survey sampling progress (see Type of activities: trawl hauls).

Data capture

Means of data capture: individual length measurements are done using an analogue measuring board, of which the set-off is checked before the start of the survey. Individual wet weights are taken using electronic scales, to the gram. Scales are maintained annually and calibrated at least daily. Data is noted down on paper and entered in the computer directly after processing the fish.

Species identification workshops for demersal and pelagic marine species are organised on an annual to triennial basis, and reported upon in internal reports (available upon request). All personnel at WMR is allowed to participate, for personnel directly contributing to the research surveys, frequent participation is mandatory to keep a view on species identification quality.

Data capture documentation:
Dutch detailed documentation on survey protocols BTS, DYFS, IBTS_Q1, IBWSS, MEGS, NHAS, SNS_NLD (available upon request, updated annually): Damme C.J.G. van, Beier, U., Bolle L., Boois I. de, Burggraaf D., Couperus B., Hal R. van, & Pasterkamp T. 2021. CVO Handboek en protocollen voor bestandsopnamen en routinematige bemonsteringen op zee en in estuaria. Versie 15, maart 2021. CVO report: 21.008 (CVO_h003).

Quality checks documentation: Y
Quality checks on the individual fish follow the same route as described in Type of sampling activities 'Trawl hauls'.

Data storage

National database: after processing, and a standardised quality check on outliers, the individual fish information for is stored in the WMR database FRISBE (in line with Type of sampling activities 'Trawl hauls'). Permanent access for WMR personnel after signing a form with general use instructions.
Access to databases containing data collected DCF related data is described in the 'Protocol databases WMR' (in Dutch, available upon request). Different user access rights and restrictions apply for the databases. All databases below are relational Oracle databases. For data managers and database managers other access permissions apply, also described in the protocol. Database description is internally available for personnel at vinvis.wurnet.nl.

If stomach content information comes available, this can be stored in the WMR database FRISBE as well.

International database:
Individual fish data is stored in https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx
International storage of stomach content data will follow international recommendations.

Quality checks and data validation documentation: the database Frisbe also conducts data validation checks during the import. Documentation of those checks is available upon request.

Sample storage

Storage description: Stomachs are stored in a labelled box in one of the freezers (-20°C) at Wageningen Marine Research.

Sample analysis: to be decided upon

Data processing

Evaluation of data accuracy (bias and precision): Unknown, will become available when further international decisions on stomach analyses and data processing have been taken.

Editing and imputation methods: Unknown, will become available when further international decisions on stomach analyses and data processing have been taken.

Quality document associated to a dataset: NA

Validation of the final dataset: Unknown, will become available when further international decisions on stomach analyses and data processing have been taken.

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.

Sector name(s): Cutter sector

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): Cutter sector

Sampling scheme: stratified random sampling

Variables: All economic variables

Supra region(s): All Supra regions

Survey planning

The population for this sampling scheme consists of vessels using active gears (beam trawls and other trawls and seines) with a length of 12 meter or more, which are included in the following segments/clusters:

- Beam trawlers 12-< 18 m
- Beam trawlers 18-< 24 m
- Beam trawlers 24-< 40 m
- Beam trawlers 40 m or larger
- Demersal trawlers and/or demersal seiners 18-< 24 m
- Demersal trawlers and/or demersal seiners 24-< 40*

In addition to this only vessels with an overall estimated landings value of 50,000 euro are included in the population. This ladings value translates in an income which is comparable with the minimal wage, for the Netherlands (19,620 euro), the threshold for low active vessels according to the RCG Econ guidelines (PGEcon 2018). The value of landings is estimated based on the logbook and sales notes information. The low active vessels (8 in total) are clustered with other small segments with vessels using other active gears in the cluster Vessel using other active gears 18-< 24 m in order to prevent bias in the fleet segments of active vessels.

Survey design and strategy

Data are retrieved directly from the ledger and fiscal annual reports of a panel of 90 vessels. The data collection takes place either on site (accountants office of fishermen's home) or at the office. Auxiliary information on technical characteristics of the fleet and logbook data is available via access to the official data bases.

In order to prevent long-term bias in the panel around 5%-10% of the panel members are renewed annually.
Detailed data on costs and earnings is obtained from the company accounts at the lowest level of detail. For cost items such as crew costs or fuel costs the level of data collection is the fishing trip. In combination with the independent data from logbooks on fishing activities of all vessels, this enables the estimation of the cost structure for each of the main fishing techniques in this part of the fleet (see also estimation design). In order to do so, sampling rates for each of the fishing techniques should be sufficiently high.
Sample size was determined based on an overall sampling proportion of 30% of the population in order to allow for high quality estimates of the economic performance of the sector and all subsectors and fishing methods. In addition to the EU stratification, the cutters in the Dutch national program are also stratified according to the engine power classes. For these vessels using active gears, this stratification is more meaningful as the fishing opportunities (e.g., possibility to fish in the 12-mile zone) is managed according to engine power. Within the fleet 5 engine power classes are distinguished:

- 0-260 hp (small shrimp vessels): sampling rate 20%
- 261-300 hp (euro cutters using various fishing techniques): sampling rage 25%
- 301-800 hp (cutters with intermediate engine powers using various fishing techniques): sampling rate 50%
- 801-1500 hp (cutters with intermediate engine powers using various fishing techniques): sampling rate 58%
- 1500-2000 hp (cutters with large engine power using predominantly various beam trawls): sampling rate 40%

Especially in case of vessel of 24=<40 m, this stratification results in much more homogeneous strata than the EU stratification in which vessels of 24 m, having and engine power of 300 hp are combined with engines of 40 m and an engine power of almost 2000 hp.
The sampling proportion for each of the segments is adjusted based on the characteristics of the fleet segment using the following rules of thumb:

- Contribution to the total fleet economics (based on landings value). Fleet segments with vessels that contribute more to total landings value are sampled more intensely (Sampling with probability proportional to size).
- Diversity of the fishing activities (based on logbook information), to ensure sufficient coverage of all fishing techniques
- Size of the fleet segment (minimum number of vessels in order to prevent the risk of too low sampling rate in case one of the panel members drops out).

This allocation of sampling units resembles multivariate allocation.
Based on the overlap of the hp-classes with the EU segments the resulting sampling rates of the fleet segments are:

- Beam trawlers 12-< 18 m: 40%
- Beam trawlers 18-< 24 m: 25%
- Beam trawlers 24-< 40 m: 25%
- Beam trawlers 40 m-<: 45%
- Demersal trawlers and/or demersal seiners 18-< 24 m: 25%
- Demersal trawlers and/or demersal seiners 24-< 40 m: 50%.

As the total costs are estimated using various methods among which regression analyses (see section on estimation design), for each of the segments sampling units cover the range of independent variables (e.g., effort) is within each of the segments

Logbook data and data from annual tax accounts are used to cross reference the accounts data.

Estimation design

Based on the detail of the data collection and the availability of auxiliary information from all population units in the cutter sector (data on fishing activities, landing value and volume and technical characteristics of the vessels) the population estimates are calculated using different methods. The national stratification is used as the basis for the estimation procedure as the segmentation in Hp-classes results in more homogeneous groups than the segmentation in length classes (see above). Based on the estimation procedure the costs and earnings are estimated for each vessel in the population, after which the totals can be added up for each of the EU strata.

The table below gives an overview of the cost items underlying the EU costs and the applied methodology for estimation of the values for each of the vessels in the stratum.

EU cost item	Basic variable	Method/indepen	Aggregation Level
Consumption of fixed capital	DepreciationHullCost	PIM method	Vessel
Consumption of fixed capital	DepreciationEngineCost	PIM method	Vessel
Days at sea	DaysAtSea	calculation	Fishing method
Energy consumption	GasoilAmount	Hpday	Fishing method
Energy consumption	GasoilAmountBoilingShrimp	landings volume	Fishing method
Energy costs	GasoilCost	Hpday	Fishing method
Energy costs	GasoilCostBoilingShrimp	landings volume	Fishing method
Full-time Equivalent (FTE), unpaid labour, paid labour	CrewDaysSea	calculation	Fishing method
Full-time Equivalent (FTE), unpaid labour, paid labour	CrewDaysAshore	GrTday	Vessel
Gross debt	Gross debt	average	Vessel
Income from leasing out quota or other fishing rights	LeaseQuotumRevenue	average	Vessel
Investments in tangible assets (net purchase of assets)	Investments in tangible assets (ne	average	Vessel
Lease/rental payments for quota or other fishing rights	LeaseQuotumCost	average	Vessel
Other income	OtherRevenue	average	Vessel
Other non-variable costs	GeneralCost	average	Vessel
Other non-variable costs	InsuranceCost	average	Vessel
Other non-variable costs	NavigationCost	average	Vessel
Other variable costs	TravelExpenseCost	average	Vessel
Other variable costs	FactorCost	GrT	Vessel
Other variable costs	FreightCost	GrT	Vessel
Other variable costs	DeckNeedsCost	GrTday	Vessel
Other variable costs	FishingGearCost	GrTday	Fishing method
Other variable costs	ProcessingShrimpCost	GrTday	Fishing method
Other variable costs	ArrangementWithdrawCost	landings volume	Vessel
Other variable costs	SaltPackageCost	landings volume	Fishing method
Other variable costs	ProvisionCost	man days	Vessel
Other variable costs	AuctionClaimsCost	landings value	Fishing type
Other variable costs	CommodityBoardCost	landings value	Vessel
Other variable costs	SortLandingCost	landings volume	Vessel
Personnel costs	WagesCrewExtraWorkCost	average	Vessel
Personnel costs	SocialSecurityCost	crew	Vessel
Personnel costs	WagesCrewCost	landings value	Vessel
Repair and maintenance costs	MaintenanceEngineCost	GrT	Vessel
Repair and maintenance costs	MaintenanceHullCost	GrT	Vessel
Repair and maintenance costs	IceCoolingCost	GrTday	Vessel
Repair and maintenance costs	LubricatingOilCost	Hpday	Vessel
Total value of assets	Total value of assets	average	Vessel
Value of physical capital	ReplacementValueHullEngine	age	Vessel
Value of unpaid labour	WagesSailedOwnerExtraWorkCos	average	Vessel
Value of unpaid labour	WagesSailedOwnerCost	landings value	Vessel

Some items such as days at sea can be calculated based on logbook information. Other items which are not related to auxiliary information, (e.g.) other income, general costs of travel expenses) are

based on Horvitz-Thompson (HT) estimations. For items that are related to auxiliary information (e.g. the effort expressed as GrTdays), linear fixed-effects regression models are used for the estimation. The choice of the auxiliary variable that is used is based on expert knowledge and regression analyses. For some variables costs items, the costs may vary by fishing technique (e.g. energy costs, fishing gear costs). For these cost items the regression estimation procedure is based on the effort in the specific fishing technique. Value of unpaid labour is imputed on a trip basis based on information whether the owner(s) have joined the vessel and the highest wage paid for that trip.
The value of quota and other fishing rights is based on market information on prices of fishing rights and information on the amount of quota per species obtained from the authorities. In case of transactions of ITQ's are observed in the accounts both the amount and the total value of the ITQs are registered. Average price estimates of the value/kg are estimated based for all species based on weighted averages of all known transactions. Only transferable rights are taken into account in the data collection.
Consumption of fixed capital is based on the PIM method implemented both for the hull (including main equipment) and the engine of the vessel.
Because of the fact that the data are derived directly from the accounts there are no issues with nonresponse.

Error checks

During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors.
The economic data is stored in an object-oriented database which includes a large number of internal consistency checks for the data of each vessel and cross-checks with auxiliary information (e.g. logbooks). The resulting costs data for each vessel are checked internally with data from comparable other vessels (benchmark) and historical data and all panel members get a participant report, which serves also as an extra check on the data. Moreover, outliers of individual cost items per vessel are identified in the estimation process by comparison with other vessels and these values are checked with the basic data. During the data processing and estimation phase, outcomes of estimates are tested for internal consistency and consistency with auxiliary information, Many of these checks have been automated and incorporated in the standard process.

Data storage and documentation

Data is stored in an object-oriented database system at Wageningen Economic Research. Data processing and estimation is done using standardised scripts in SPSS.
Additional information on the sampling method will become available in 2021 in a Wageningen Economic Research publication.

Revision

The Dutch cutter survey is evaluated annually, and the panel is adjusted to changes in the population. The aggregation procedures have been evaluated in 2021.

Confidentiality

Are procedures for confidential data handling in place and documented? Yes. Data are stored in secure databases (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement.

Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information

Are protocols to enforce confidentiality with external users in place and documented? Privacy sensitive data is not exchanged with external users. All panel members have signed an authorization to use their data. Are there any issues with publication of data due to confidentiality reasons? No.

Sector name(s): Large pelagic trawlers

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): Large pelagic trawlers
Sampling scheme: census
Variables: All economic variables
Supra region(s): All supra regions
Survey planning
The population for this sampling scheme consists of 6 vessels of the segment Pelagic trawlers 40 m or larger These large vessels are owned by four internationally operating companies.
Survey design and strategy
Data are retrieved from the accounts of all vessels in the segment. For some companies the data collector has direct on-site access to the ledger, for other companies the accountant fills in the predefined excel format that is send by e-mail. Because of the small number of vessels and companies, all vessels are included in the survey (census). Logbook data and data are used to cross reference the accounts data.
Estimation design
Most of the cost items from the economic data collection are taken directly from the accounts. This information also includes the prices of the fish for each of the species. And the gross value of landings (table 3.1) Consumption of fixed capital is based the accounts value as it is impossible to gain insight in the value of these large fishing vessels. The value of quota and other fishing rights is based on market information on prices of fishing rights and information on the amount of quota per species obtained from the authorities. (see also description of the cutter survey) Only for demersal species ITQs have been traded in recent years. Segment totals are calculated from the total values for all vessels. Because the data are derived directly from the accounts there are no issues with nonresponse. In case one of the companies fails to deliver economic data on time the costs structure of the vessels concerned will be estimated based on the costs structure of the previous year and the changes in fishing activities obtained from auxiliary information (logbooks). Financial information (Gross debt, Investments in tangible assets (net purchase of assets) and Total value of assets) are not available because of privacy reasons.

Error checks
During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors. The economic data is stored in a series of excel datasheets which includes several internal consistency checks for the data of each vessel and cross-checks with auxiliary information (e.g., logbooks). The resulting costs data for each vessel are checked internally. Moreover, outliers of individual cost items per vessel are identified in the aggregation process by comparison with other vessels and historical values and these values are checked with the basic data. During the data processing and estimation phase, outcomes of estimates are tested for internal consistency and consistency with auxiliary information,
Data storage and documentation
Data is stored in an series of excel datasheets at Wageningen Economic Research. Data processing and estimation is done using standardised scripts in SPSS. For each of the procedures (data entry, data checking and data estimation) internal protocols are available. Additional information on the sampling method will become available in 2021 in a Wageningen Economic Research publication.
Revision
The data processing procedures have been evaluated in 2021.
Confidentiality
Are procedures for confidential data handling in place and documented? Yes. Data are stored in secure databases (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information Are protocols to enforce confidentiality with external users in place and documented? Privacy sensitive data is not exchanged with external users. All panel members have signed an authorization to use their data. Are there any issues with publication of data due to confidentiality reasons? Yes, as stated above the group of vessels and companies is very small (4 companies) and financial information is not provided for privacy reasons.

Sector name(s): Other coastal fisheries

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): Other coastal fisheries

Sampling scheme: census

Variables: All economic and social variables

Supra region(s): All Supra regions

Survey planning

The population for this sampling scheme consists of all vessels that are not taken into account in the other surveys (cutter and trawler economics). As a result, the population for this survey consists of the following segments/clusters:

- Beam trawlers 0-< 10 m*
- Drift and/or fixed netters 18-< 24 m*
- Inactive vessels 0-< 10 m
- Inactive vessels 10-< 12 m
- Inactive vessels 12-< 18 m
- Inactive vessels 18-< 24 m
- Inactive vessels 24-< 40 m
- Inactive vessels 40 m or larger
- Vessel using other active gears 18-< 24 m*
- Vessel using other active gears 18-< 24 m*
- Vessels using other Passive gears 0-< 10 m*
- Vessels using other Passive gears 10-< 12 m*

Survey design and strategy

Data is collected by two surveys:

- Telephone interviews on
- Questionnaire (by both mail and e-mail) on the other economic variables

As it is known that the overall response rates to questionnaires is low (<30%), all vessel owners are contacted to provide data on their fishing activities and economic performance. Based on an extensive internet search telephone numbers of most owners are obtained. All owners are called (maximum three times) to ask for the level of activity and main fishing method, and in case of inactive vessels, the capital value and costs. Besides the respondents are asked whether they would like to receive a paper questionnaire or an email with the questionnaire. After this telephone survey a paper/email questionnaire is send out to all fishermen that:

- Could not be reached during the telephone survey.
- Have stated that they would like to receive the survey on economics (either by mail/e-mail)

Besides returning the mail or paper survey the survey can also be filled in by the fishermen themselves through an internet survey. All three surveys ask for all economic variables in the EU map and additional information on fishing gear, fishing activities and landings. After some weeks a reminder of the questionnaire is send to those owners which have not responded yet.
Logbook are used to cross reference the questionnaire data.

Estimation design

Most of the costs items from the economic data collection are taken directly from the questionnaires and estimation to totals per cluster are based on Horvitz-Thompson (HT) estimations. For some specific costs items the numbers are inferred from other information from the questionnaire:

- Value of unpaid labour: In small fishing operations the value of unpaid labour is often unknown. In the questionnaire information is obtained on the labour that the owner does, the number of crew members and their wages. In case the owner joins fishing operations and one

or more crewmembers are paid, the value of unpaid labour is estimated from the total wages divided by the number of crew. In case no crew members are joining fishing operations the value of unpaid labour is estimated based on the average proportion of the wage of the crew over the total revenue in the cluster and the revenue of the vessel concerned.

- Due to the large variety of the vessels and their values, an assessment of the average value per ton would result in highly uncertain values which may not be applicable to a large proportion of these small fisheries. Therefor the value of the vessel (value of physical capital) is taken from on the insurance value, requested from the questionnaires.
- The number of FTE, paid labour and unpaid labour is derived from information about the fishing time (number of trips and trip time), the number of fishers on board the vessel and whether the owner joins fishing operations or not.
- Gross debt is calculated from the proportion of own capital, and the value of the vessel as requested in the questionnaire.
- The value of quota and other fishing rights is based on market information on prices of fishing rights and information on the amount of quota per species obtained from the authorities. (see also description of the cutter survey)

In the years in which social variables are collected, the questions about the social variables are also included in the questionnaire. This information is used to estimate the proportion of fishers with various characteristics and together with the information about total labour and FTE, this forms the basis for the social indicators.

The survey also provides information on the average price per species and the totale value per species for dredgers for the activity data (table 3.1)

In case of missing/unclear information the respondent is contacted by telephone to discuss the provided information. In case this is not feasible, the questionnaire is ignored in the estimation process.

Error checks

During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors.

The economic data is stored in an access database which includes several internal consistency checks to prevent inconsistent data entry (e.g. negative values for costs and income, value of landings per species and totals). During data processing extra inconsistency checks (both internally, and with auxiliary logbook information) are carried out and improbable data are flagged. Moreover, outliers of individual cost items per vessel are identified in the aggregation process by comparison with other vessels. These values are checked with the basic data (questionnaires) and with the respondent in case basic data seem to be incorrect. The outcomes of estimation process are tested for internal consistency, historic consistency and consistency with auxiliary information,

Data storage and documentation

Data is stored in access databases and SPSS datasets at Wageningen Economic Research. Data processing and estimation is done using standardised SPSS scripts and procedures. For each of the procedures (data entry, data checking and data estimation) internal protocols are available.

Additional information on the sampling method and quality assessment of the procedures of the will become available in 2021 in a Wageningen Economic Research publication.

Revision

The data processing procedures have been evaluated in 2021.

Confidentiality

Are procedures for confidential data handling in place and documented? Yes. Data are stored on a secure data server (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information. Are protocols to enforce confidentiality with external users in place and documented? Yes, privacy sensitive data is not exchanged with external users. In the accompanying letter of the questionnaire, the confidentiality policy is explained. Are there any issues with publication of data due to confidentiality reasons? No, because of the clustering of segments with less than 10 vessels, none of the resulting estimates have issues with confidentiality..

Sector name(s): Mussel sector economics

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): Mussel sector
Sampling scheme: stratified random sampling
Variables: All economic variables
Supra region(s): All Supra regions
Survey planning
The population for this sampling scheme consists of all companies that are active in mussel cultivation. Most of these companies are only involved in mussel culture, but an increasing part of the population combines mussel culture and processing.
Survey design and strategy
Economic are retrieved directly from the fiscal annual reports of a rotating panel of companies. Auxiliary information on technical characteristics of the fleet and production data is available through access to the official fleet vessels register and sales data of the mussel auction in Yerseke. Sample size was determined based on an overall sampling proportion of 25% of the population (number of companies) in order to allow for high quality estimates of the economic performance of the sector. Because of the difference in company size, the sampling units are based on PSS (methodology handbook section 3.5). Production data from the mussel auction is used to cross reference the collected data.
Estimation design

Most of the cost items from the economic data collection are taken directly from the fiscal annual reports. For some specific costs items the numbers are inferred from additional information:

- Livestock used: inferred from livestock costs and average price of seed mussels.
- Fish feed used and Raw material: feed costs: As feed is not used in mussel farming this information is not collected
- Operational subsidies and subsidies on investments: subsidies are taken from national official databases on subsidies.
- Weight of sales: taken from national statistical office (based on auction statistics).

Totals of most variables are based on Horvitz-Thompson (HT) estimations. In case variables are clearly related to production capacity, regression estimation will be used in order to further enhance the quality of estimations.

In case of missing/unclear information the respondent is contacted by telephone to discuss the provided information.

As fiscal annual reports only become available one year after the closed book year, the collection of economic data from the mussel sector lags one year behind the normal data collection and economic data are collected from year N – 2. Provisional estimates of the costs of the year N – 1 are estimated based on the developments in production, mussel price, number of vessels and oil price.

Error checks

During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors.

The economic data is stored in an object-oriented database which includes a large number of internal consistency checks for the data of each company and cross-checks with auxiliary information on production. The resulting costs data are checked internally with data from comparable other vessels (benchmark) and historical data and all panel members get a participant report, which serves also as an extra check on the data. Moreover, outliers of individual cost items per vessel are identified in the estimation process by comparison with other vessels and these values are checked with the basic data.

During the data processing and estimation phase, outcomes of estimates are tested for internal consistency and consistency with auxiliary information, Many of these checks have been automated and incorporated in the standard process,

Data storage and documentation

Data is stored in an object-oriented database system at Wageningen Economic Research. Data processing and estimation is done using standardised scripts in SPSS. For each of the procedures (data entry, data checking and data estimation) internal protocols are available.

Additional information on the sampling method will become available in 2021 in a Wageningen Economic Research publication.

Revision

The sampling design and data processing procedures have been evaluated in 2020. The sampling plan will be evaluated annually

Confidentiality

Are procedures for confidential data handling in place and documented? Yes. Data are stored on a secure data server (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement.

Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information.

Are protocols to enforce confidentiality with external users in place and documented? Yes, privacy sensitive data is not exchanged with external users other that the owners of the data. All panel members have signed an authorization to use their data. Are there any issues with publication of data due to confidentiality reasons? No.

Sector name(s): Oyster and Eel sector economics

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): Oyster and Eel sector
Sampling scheme: census
Variables: All economic variables
Supra region(s): All Supra regions
Survey planning
The population for this sampling scheme consists of all companies that have oyster culture and eel culture as their main activity (resp. 11 and 10 companies).
Survey design and strategy
Economic are retrieved by means of a questionnaire that is send to all company owners and follow up of non-response will be done by telephone calls. Auxiliary information on production is available through access to the official production statistics by the Dutch statistical office. Because of the small group sized in both sectors and the assumed low response rates, the quesionnaire will be send out to all companies.
Estimation design
The questionnaire will include all variables requested in the EU-map. Totals of most variables are based on Horvitz-Thompson (HT) estimations. In case variables are clearly related to production capacity, regression estimation will be used in order to further enhance the quality of estimations. In case of missing/unclear information the respondent is contacted by telephone to discuss the provided information.
Error checks
During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors. The economic data is stored in an access database which includes internal consistency checks for the data of each company. The resulting data are checked internally with data from comparable other companies (benchmark) and historical data. During the data processing and estimation phase, outcomes of estimates are tested for internal consistency and consistency with auxiliary information. Many of these checks are automated and incorporated in the standard process,

Data storage and documentation
Data is stored in an object-oriented database system at Wageningen Economic Research. Data processing and estimation is done using standardised scripts in SPSS. For each of the procedures (data entry, data checking and data estimation) internal protocols are available.
Revision
The sampling plan will be evaluated annually
Confidentiality
Are procedures for confidential data handling in place and documented? Yes. Data are stored on a secure data server (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information. Are protocols to enforce confidentiality with external users in place and documented? Yes, privacy sensitive data is not exchanged with external users other that the owners of the data. All panel members have signed an authorization to use their data. Are there any issues with publication of data due to confidentiality reasons? No.

Sector name(s): Social data fisheries sector

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): Cutter sector and large pelagic sector.
Sampling scheme: census
Variables: All social variables
Supra region(s): All Supra regions
Survey planning
The population for this sampling scheme consists of all fisheries companies of the following segments/clusters: • Beam trawlers 12-< 18 m • Beam trawlers 18-< 24 m • Beam trawlers 24-< 40 m • Beam trawlers 40 m or larger • Demersal trawlers and/or demersal seiners 18-< 24 m • Demersal trawlers and/or demersal seiners 24-< 40* • Pelagic trawlers 40 m or larger*
Survey design and strategy

Social data are collected by means of a questionnaire (paper or by e-mail) that are send to all companies. Follow up reminder will be by mail/e-mail. Auxiliary information on total employment is available through the economic sampling programs in each of the sectors. For the small coastal fisheries, the social data will be collected in combination with the economic data.
Estimation design
The questionnaire will include all variables requested in the EU-map. Totals of variables per sector (small scale fisheries, large scale fisheries, trawlers) are based on Horvitz-Thompson (HT) estimations. In combination with total employment in each of these sectors (from the economic surveys), the employment per category (e.g., age, sex) is estimated. In case of missing/unclear information the respondent is contacted to discuss the provided information. In case this is not possible results will be ignored in the aggregation procedure.
Error checks
During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors. The social data is stored in an access database which includes internal consistency checks. The resulting data are checked internally with economic data from the companies and historical data. During the data processing and estimation phase data will be cross checked with trends in number of companies/vessels. Many of these checks are automated and incorporated in the standard process,
Data storage and documentation
Data is stored in an access database at Wageningen Economic Research. Data processing and estimation is done using standardised scripts in SPSS. For each of the procedures (data entry, data checking and data estimation) internal protocols are available.
Revision
The sampling plan will be evaluated every three years
Confidentiality
Are procedures for confidential data handling in place and documented? Yes. Data are stored on a secure data server (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information. Are protocols to enforce confidentiality with external users in place and documented? Yes, privacy sensitive data is not exchanged with external users. In the accompanying letter of the questionnaire, the confidentiality policy is explained. Are there any issues with publication of data due to confidentiality reasons? No.

Sector name(s): Social data aquaculture sector

Survey Specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.*

Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.
Sector name(s): Aquaculture sector.
Sampling scheme: census
Variables: All social variables
Supra region(s): All Supra regions
Survey planning
The population for this sampling scheme consists of all aquaculture companies.
Survey design and strategy
Social data are collected by means of a questionnaire (paper or by e-mail) that are send to all companies. Follow up reminder will be by mail/e-mail. Auxiliary information on total employment is available through the economic sampling programs in each of the sectors.
Estimation design
The questionnaire will include all variables requested in the EU-map. Totals of variables per sector (mussel, oyster and eel sector) are based on Horvitz-Thompson (HT) estimations. In combination with total employment in each of these sectors (from the economic surveys), the employment per category (e.g., age, sex) is estimated. In case of missing/unclear information the respondent is contacted to discuss the provided information. In case this is not possible results will be ignored in the aggregation procedure.
Error checks
During the process of data collection and data processing various errors might be introduced. The most important errors for this survey are data entry errors and data processing errors. The social data is stored in an access database which includes internal consistency checks. The resulting data are checked internally with economic data from the companies and historical data. During the data processing and estimation phase data will be cross checked with trends in number of companies/vessels. Many of these checks are automated and incorporated in the standard process,
Data storage and documentation
Data is stored in an access database at Wageningen Economic Research. Data processing and estimation is done using standardised scripts in SPSS. For each of the procedures (data entry, data checking and data estimation) internal protocols are available.
Revision
The sampling plan will be evaluated every three years
Confidentiality
Are procedures for confidential data handling in place and documented? Yes. Data are stored on a secure data server (two factor authentication) which are only accessible by the persons who work with the data and have signed a nondisclosure agreement. Are protocols to enforce confidentiality between DCF partners in place and documented? Yes, a processing agreement has been signed for the use of auxiliary information. Are protocols to enforce confidentiality with external users in place and documented? Yes, privacy sensitive data is not exchanged with external users. In the accompanying letter of the questionnaire, the confidentiality policy is explained.

Are there any issues with publication of data due to confidentiality reasons? No.

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