Ministry of the Flemish Community – Policy Domain Agriculture and Fisheries

Dienst Zeevisserij, Oostende, Belgium

Flanders Research Institute for Agricultural, Fisheries and Food (ILVO), Oostende, Belgium

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

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

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

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

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

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

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

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

Belgium Annual Report on data collection in the fisheries and aquaculture sectors

2022

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[Belgium, 22 June 2023]

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SECTION 1: GENERAL INFORMATION

Data collection framework at national level

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

Outline the general framework of the national data collection programme in relation to the relevant sections of the EU MAP. If applicable, indicate major methodological changes in approach compared to previous year(s), and to which section(s) they apply.

The present document contains the Belgian National Work Plan for the period 2022-2024, in fulfilment of the Commission Delegated Decision (EU) 2021/1167 and Commission Implementing Decision (EU) 2021/1168, laying down detailed rules for the application Regulation (EU) 2017/1004.

The Belgian National Work Plan 2022-2024 is structured following the guidelines and contains the Text called Belgium_WP-Programme_2022-2024_Text_20211015 and Standard Tables, called Belgium_WP_2022-2024_Tables_2022-2024 in separate documents. Annexes, which are referred to, are added separately.

Give full name, acronym and contact details of all institutes that contribute to the data collection activities, and describe briefly their role in the work plan.

The work regarding the Belgian Data Collection National Work Program is executed by the following partners:

Ministry of the Flemish Community – Policy Domain Agriculture and Fisheries (DVZ)
In Belgium, the Flemish Ministry of Agriculture and Fisheries, Department Agriculture and Fisheries (as part of the Policy Domain Agriculture and Fisheries) is the administrative authority responsible for fisheries and fisheries issues. The collection of information on fishing capacity, fishing effort, landing statistics, VMS data and economics of the fisheries sector is performed by 'Dienst Zeevisserij' (DZV) with the support of the Institute for Agricultural, Fisheries Research and Food (EV ILVO).

Contact details

Dienst Zeevisserij - Departement Landbouw en Visserij
Koning Albert II-Laan 35, bus 40 - 1030 Brussel
Tel. 02 552 77 00 - Fax 02 552 77 01
Website: https://lv.vlaanderen.be/nl/visserij

Institute for Agricultural, Fisheries Research and Food (EV ILVO)
The Institute for Agricultural, Fisheries and Food Research (EV ILVO), i.e. the research department ILVO Marine is responsible for the collection, analysis and processing of biological data, support for the collection of socio-economic data of the fisheries sector, processing of the socio-economic data from the fisheries sector and the collection, analysis and processing of the data from the fish processing industry and aquaculture.

Contact details

ILVO/ILVO Marine
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Royal Belgian Institute of Natural Sciences (RBINS – OD Nature)

From January 2008 onwards, the Royal Belgian Institute of Natural Sciences, Directorate Natural Environment (RBINS – OD Nature) has joined the Belgian National Data Gathering Programme (NDGP). This federal research institute has expertise in the fields of marine modelling, monitoring and management and is responsible for the budget, scientific equipment, and the planning of scientific campaigns of the Belgian research vessel RV Belgica. The research vessel is available for all Belgian marine scientists and used in the North Sea Beam Trawl Survey (BTS). It is in this capacity that RBINS – OD Nature is involved in the Belgian work plan.

Contact details:

Royal Belgian Institute of Natural Sciences
Museum of Natural Sciences
Vautier Street 29
1000 Brussels, Belgium

Division:
Directorate Natural Environment
Marine Environment
3de en 23ste Linieregimentsplein
8400 Oostende
http://odnature.naturalsciences.be/home/

Flanders Marine Institute (VLIZ)

The Flanders Marine Institute (VLIZ) has joined the Belgian NDGP since 2013. VLIZ is an autonomous institute with the legal status of a non-profit organization under Belgian law that receives an annual allowance from the Government of Flanders (Ministry of the Flemish Community – Department of Economy, Science and Innovation (EWI)), and from the province of West-Flanders (West-Vlaanderen). The VLIZ is a centre for coastal research and owns since the beginning of 2013 a multidisciplinary research vessel: RV Simon Stevin. The ship is used for coastal and oceanographic research in the Southern Bight of the North Sea and the eastern part of the English Channel. ILVO embarks RV Simon Stevin for the Demersal and Young Fish Survey (DYFS). It is in this capacity that VLIZ is involved in the Belgian work plan.

Contact details

Flanders Marine Institute (Vlaams Instituut voor de Zee - VLIZ)
InnovOcean site
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E-mail: info@vliz.be
Website: https://www.vliz.be/en/

Instituut Natuur en Bosonderzoek (INBO)

INBO conducts research into the sustainable use and restoration of water-based ecosystems and their services considering climate change, flooding risk, shipping, port development, agriculture, pollution, fishing and alien species. In this way it supports various policy tools: the Water Framework Directive, the Marine Strategy Framework Directive, OSPAR, the Habitats and Birds Directives, the European Eel Regulation, the Long-Term vision for the Scheldt Estuary, the Ramsar Convention, the Nature Decree, the Sigma Plan Update, species protection programmes, etc. It is in the capacity of the eel monitoring that INBO is involved in the Belgian work plan.

Contact details

Instituut Natuur en Bosonderzoek (INBO)

Herman Teirlinckgebouw
Havenlaan 88 bus 73, 1000 Brussel
Tel.: +32 2 430 26 37
Website: https://www.vlaanderen.be/inbo/en-gb/homepage/

Provide a link to the national data collection website, if there is one.

National DCF website:
The Belgian national DCF website can be found on https://smartfisheries.be/data-collection/

This website frames the DCF and describes how Belgium meets and executes the European legislation on a national level. Furthermore, it provides an overview on how data is collected and gives valuable links to several European websites. The website is written in Dutch as the DCF is executed by the Ministry of the Flemish Community.

(max. 1000 words)

Text Box 1a: Test studies description

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

Study to establish a methodology to distinguishing of inactive vessels (if possible)

1. Aim of the test study

The aim of the test study is two-folded:

1. **Determine if active commercial fishing vessels and vessels with low activity in the Belgian fisheries fleet can be distinguished.**
2. **Determine the best methodology to distinguish active and low active commercial fishing vessels in the Belgian fisheries**

2. Duration of the test study

01/01/2022 - 31/12/2024

3. Methodology and expected outcomes of the test study

As per recommendation 5 of the PGECON 2018 (https://datacollection.jrc.ec.europa.eu/docs/pgecon) the minimum wage could be used as a threshold to distinguish between active and low active commercial fishing vessels. Because of the unique social security system in Belgium that befalls the fishermen which are serviced by their own specialized social secretariat (BESOX, https://www.besox.be/), all Belgian fishermen receive a decent minimum wage apart from shared pay of the landings. This social security is robust because even when ship owners cannot pay the minimum wage to their crew, the ship owners can receive funding through the Fisheries Fund (Zeevisserij Fonds) to pay the required minimum wage. In addition, the Belgian social security system makes determining active and low active vessels based on the 'minimum wage' variable difficult. As all vessels are included in the Belgian work plan by census, the 'number of days at sea' are registered in the logbooks. The 'number of days at sea' may be a better variable to distinguish active and low active vessels. These numbers will be extracted from the logbooks for all vessels and will be evaluated to observe if any vessels show a market 'low activity' (reduced number of days at sea).

A second step is to evaluate the 'gross value of landings' and compare these to the 'numbers of days at sea'. This step is important to determine if some vessels spend a relatively low number of days at sea but are very profitable and therefore provide decent wages to the vessels' crew. Such vessels could be

considered as active. In contrast, vessels that spend relatively a high number of days at sea but have low gross value of landings and thus need to pay minimum wages to its crew could be considered as 'low active' vessels. This contradiction emphasises that it needs to be determined if indeed active and low active vessels can be distinguished in the Belgian fleet and with which methodology, for example can the active and low active vessels be identified when only looking at the 'number of days at sea'.

(max 900 words per study)

Brief description of the results (including deviations from the plan and justifications as to why if this was the case).
The study is still ongoing (until 31/12/2024) and no results available yet

Achievement of the original expected outcomes of the study and justification if this was not the case.
The study is still ongoing (until 31/12/2024) and no results available yet

Incorporation of study results into regular sampling by the Member State.
The study is still ongoing (until 31/12/2024) and no results available yet. Based on the outcome, MS will loo to integrate the results in the WP 2025-2027, but probably only from 2026 onwards. The results will only be available second half of 2024 and the new WP deadline is before this. As such it will only be possible to include the results from 2026 onwards.

Study to establish a methodology to distinguishing of inactive vessels (if possible)
To determine which vessels can be considered active or low active, the 'number of days at sea' was shown to be a better variable to distinguish active and low active vessels. These numbers can be extracted from the logbooks for all vessels. However, as the Belgian Government together with the affiliated institutes that cover this logbook data were going through a database change in recent years, no consistent method across years could be easily developed. The same motivation accounts for the 'gross values of landings' as also this parameter was integrated in the new database up until 2023. In addition, in context of data quality assurance, many data quality checks and protocols were applied to the data post-database migration in the first quarter of 2023. As the data migration and integration into a single database system, and database quality checks are expected to be finished later in 2023, the test study methodology will be developed and checked later in the second half of 2023, with results of the applicability of the method being reported on in 2024. Although no progress has been made, data integration and more importantly data quality needs to be on point before the methodology as suggested in the test study can be applied. As these insurances will be reached in the second half of 2023, the test study will be first attempted in the second half of 2023 and further tested in 2024.

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

“VISIM I I– Study on the applicability of electronic monitoring method and self-sampling for the collection of biological data”

1. Aim of the test study

The aim of this project is to determine the possibilities of using alternative electronic tools for the collection of biological catch data from the Belgian fishing sector, to achieve a better picture of the annual Belgian catch (landings and discards).

2. Duration of the test study

01/01/2021 – 31/12/2023

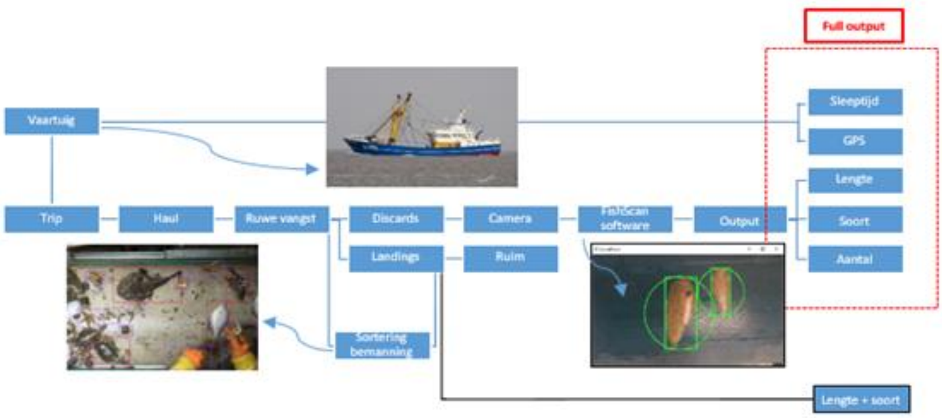
3. Methodology and expected outcomes of the test study

Methodology

In the context of the Belgian implementation of the Data Collection (EC 2017/1004), biological data are collected on board of commercial vessels by ILVO seagoing observers. Collecting data on commercial catches and by-catch is central here and forms the basis for compiling stock estimates for commercial fish species. This data is used in support of policy advice on catch opportunities and quota provisions. Only 1,6% of the total Belgian catch is sampled on an annual basis, through the method of sea going observers on board of commercial vessels of data collection.

ILVO has therefore set the goal that, in addition to qualitative data collection with the help of seagoing observers, the fishing industry itself must also be involved in the collection of biological data, to achieve a higher coverage. This allows the sector to be involved in the data collection which is mandatory. Within the scope of this project, new software (FishScan software Platform) and hardware are developed. The FishScan Software Platform contains both length measurement and species recognition software that is specifically meant for the collection of biological data of singled out, commercial and non-commercial fish species. The hardware contains an IP-camera and an industrial PC (NUC) which are mounted on a carrying structure, which, can be placed on top of a conveyor belt, in order to collect video data of fish.

Initial experiments in the project show that the species recognition software was able to identify plaice and sole with an accuracy of 85,2%, where both the dorsal as well as the ventral side were taken into consideration. Conventional methods for the collection of length measurements of fish were compared on their accuracy next to this novel software platform and showed that both methods have a comparable precision meaning they might be used alongside each other in the future. Participation on a commercial beam trawl vessel is explored in the project to confirm the possibilities for data collection using the Fishscan platform (see scheme below).



Schema for the implementation of an EM system on board of Belgian fishing vessel.

Expected outcomes

- **Establish a protocol to install the Fishscanner on a commercial fishing vessel**
- **Optimal processing of the output of the FishScan Software Platform, with a connection to other available metadata where possible, that can provide benefits for both the fisheries and scientific sectors. Establish the storage of data in the most efficient way possible after processing (and where possible wirelessly**
- **Establish quality control and validation of data collected through the Fishscan platform**
- **Develop length/weight keys based on the data from the Fishscan platform**

(max 900 words per study)

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

"VISIM II– Study on the applicability of electronic monitoring method and self-sampling for the collection of biological data"
In recent years, remote electronic monitoring (REM) has gained prominence in fisheries management as an efficient means to map fishing activities and estimate catches. However, the current Belgian fisheries observer method covers only a small fraction of the total fishing effort, exposing the need for a more intensive sampling program. Cameras have the potential to address this limitation by providing a more representative coverage of catches. Although REM offers advantages such as increased data collection, cost and time efficiency, it is not widely embraced by fishers due to its association with control regulations. To overcome the challenges of manual image screening, deep learning techniques have emerged as a promising solution. This report presents the progress made in the VISIM II project, which aims to automate the collection of fish length-distribution data using deep learning techniques, including identification, segmentation, classification, and tracking.

System Development
A system prototype comprising a PC, storage, camera, and other necessary components has been developed. Currently, the prototype is installed at the fish auction in Zeebrugge, connected via VPN to retrieve images from over 15 different commercial fish species. This data is utilized to train the classification models. The system can already distinguish images containing fish from those without with high accuracy. The fish images are linked to timestamps, enabling the association of each fish to its corresponding species through data exports from the fish auction, which include species, weight, and timestamps. Substantial data has been collected, allowing for effective detection, tracking, segmentation, and classification of species for which sufficient data is available. Attention is given to addressing class imbalances by enhancing the dataset with more images of species with limited representation. Additionally, the feasibility of using synthetic data to gather high-quality and diverse data for species with data scarcity is being explored. A proof of concept is underway to generate a dataset for plaice.

Spline Generation and Length Measurements
Accurate length measurements of fish are crucial for stock assessment. Deep learning techniques are employed to determine the spline on the fish, which aids in precise length measurements. Although initial results are promising, further fine-tuning is required. A new case/box will be developed utilizing a 3D camera based on pixel correlation. This compact 3D camera offers advantages over the current stereo vision setup, as it comes pre-calibrated and provides more accurate measurements. The ability to generate depth maps enhances the measurement process. Once the spline can be accurately determined, length measurements can be performed efficiently. The new camera system will be constructed, featuring greater compactness and autonomy than the existing system. Testing will be

conducted on the research vessel, as well as at the fish auction in Ostend and a commercial vessel towards the project's conclusion.

Conclusion

The VISIM II project has made significant progress in automating fish length-distribution data collection using deep learning techniques. The system prototype, consisting of a comprehensive setup including cameras and associated components, has been successfully deployed at the fish auction in Zeebrugge. High accuracy has been achieved in fish detection, and the images are linked to species data through timestamps. Efforts to enhance the dataset by collecting more images and exploring the use of synthetic data are underway. The determination of the spline for accurate length measurements has shown positive initial results but requires further refinement. The upcoming implementation of a compact and pre-calibrated 3D camera holds promise for improved accuracy and efficiency. Through these advancements, the project aims to contribute to real-time stock assessment tools and prediction models for more sustainable and efficient fisheries management.

Achievement of the original expected outcomes of the study and justification if this was not the case.
The VISIM II project is still ongoing and expected outcomes will only be achieved at the end of the project. However, preliminary results indicate progress is as expected.

Incorporation of study results into regular sampling by the Member State.
The possibility for incorporation of study results into the regular sampling campaign will be investigated for the WP2025 – 2027.

(max. 900 words per study)

Text Box 1b: Other data collection activities

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

“SoleDNA: Characterising a data poor sole stock using DNA and eDNA”

1. Aim of the data collection activity
The Belgian EMFF SoleDNA project aims for a more efficient and sustainable management for sole (*Solea solea*) by focussing on two important issues related to the current management of specific sole stocks:

- **Collecting biological data to monitor fish stocks is labor intensive, and the management of some fish stocks, such as sole and plaice in ICES areas 27.7h-k is based on few data. This project will verify to what extend environmental DNA (eDNA) present in the sea water can be used to determine the presence and biomass of both sole and plaice. Overall, this method has the potential to collect more information on data poor stocks in a fast, non-invasive, and sustainable way.**
- **The stock identity of sole in the southern Celtic Sea/southwest of Ireland (ICES area 27.7h-k) is unclear. This project is looking into the use of genetic data to verify whether sole in these areas consists of one unique fish stock or whether it belongs to other neighboring sole stocks (e.g. sole in 27.7e, sole in 27.7fg).**

2. Duration of the data collection activity
1/9/21-30/11/2023

3. Methodology and expected outcomes of the data collection activity

Methodology

The methods for assessment of the sole stock in 27.7h-k were thoroughly reviewed in February 2020 by ICES (ICES, 2020a; WKFLATNSCS 2020 benchmark). The catches of this stock are situated at two locations: 1) along the southwest coast of Ireland (ICES area 27.7j), for which Ireland and France are responsible and 2) in ICES area 27.7h along the borders of 27.7e and 27.7g where Belgium, England and France are fishing (Figure 2A). Questions arose concerning stock identity of sole in these areas. Additionally, sole in 27.7h-k is fished by two different fisheries (Figure 2B): along the southwest coasts of Ireland (ICES area 27.7j) using otter trawls and in area 27.7h using beam trawls.

The lack of data and the doubts related to the stock identity led to a degradation from category 3 (trend-based assessment) to category 5 (advice based on landings only) for sole in 27.7h-k. For category 5 stocks, ICES applies its precautionary approach, which led to a decrease of 20% in catch advice for 2021 although no real evidence is available showing that this stock is in distress (ICES, 2020b). Comparing this stock with other surrounding sole stocks (sole 27.7fg and sole 27.7e) shows that it is a rather small stock (TAC in 2020 is 329 tonnes). Nevertheless, it plays an important role for the Belgian commercial fishing fleet. In 2019, 25% of the TAC was allocated to Belgium (after quota swaps). Lack of knowledge on stock identity of sole and lack of biological data are two important problems for this stock.

DNA-based studies can clarify stock identity by investigating genetic differences between sole of different areas (Nielsen et al., 2009). This study will analyse genetic differences using so-called 'single nucleotide polymorphisms' or 'SNPs'

Besides determining the genetic identity of sole in 27.7h-k, there is very few data on this area for both sole and plaice. Recent developments in the field of 'environmental DNA' (eDNA) could give a fast, non-invasive and sustainable solution for this problem. Organisms that live in the marine environment release DNA through for example faeces, slime, scales, sperm or eggs. This free DNA gives blueprints of entire fish communities without catching a single fish. In the beginning of 2020, ILVO collected sea water in the Belgian part of the North Sea and successfully detected sole and plaice from locations where both species were caught in fish hauls. In addition, concentrations of eDNA showed positive correlations with the number of fish caught, but also illustrated some discrepancies between eDNA and fish track results.

Expected outcomes

1. **To offer a sustainable non-invasive solution for ICES areas such as 27.7h-k where data are scarce and scientific surveys directed for sole are missing.**
2. **To deal with the lack of knowledge on stock identity of sole and lack of biological data for the sole 27.7h-k by using DNA analyses.**

(max 900 words per activity)

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

[Ongoing] SoleDNA

Update and preliminary results

- **Stock identity**

521 sole samples were collected from January to June 2022 (approximately 20 individuals per ICES rectangle, three rectangles per ICES area, totalling 60 individuals per ICES area). This sampling design allowed for delineation of genetic populations on a large geographical scale and assignment of sole in interest to their unique stock or other neighbouring stocks. The Genotyping-By-Sequencing protocol was optimized for *Solea solea* using two restriction enzymes. The first library containing has been sequenced twice in January and February 2023. Bioinformatic and data-analyses are ongoing, and first results are expected in April.

- **Environmental DNA**

Environmental DNA could be a reliable, cost-effective, and non-invasive method to complement current scientific surveys for sole, especially in data-limited areas. Species-specific, probe-based assays were

developed (for common sole) and validated (for both species) using digital droplet PCR. The species-specificity and sensitivity of the primer-probe assays has been confirmed for sole and plaice.

Mesocosm experiments revealed a significant and positive relationship between biomass/biomass and eDNA concentration for both species at three eDNA emission time periods (5 min, 1 hour and 24 hours). These results illustrated the potential of eDNA for the quantification of both species under controlled conditions. Following this, the correlation was further tested in sea water collected by research surveys in the Belgian part of the North Sea. The samples showed the presence of plaice and sole eDNA in almost all sampling stations, indicating significant populations of these. eDNA concentrations were compared to fish abundance and biomass as observed in the trawl taken immediately after the collection of sea water. Local eDNA concentrations of both sole and plaice were significant and positively correlated with abundance and fish biomass. At regional scale, the correlation between eDNA concentrations and observed biomass was positive and significant for sole in 2020 and for plaice in 2020, but not in 2021. The correlation between eDNA concentrations and observed abundance was significant and positive for sole and plaice in 2020, but not in 2021.

These results illustrate the potential of eDNA for estimating the abundance and biomass parameters for stock assessments of flatfishes in the North Sea. However, eDNA concentration measurements must be handled in their own frame of reference before serving as input to complement current stock assessments since our study emphasizes the need for a well-designed sampling scheme to ensure correct interpretation of outlier values. A manuscript titled “Detection and quantification of two commercial flatfishes (*Solea solea* and *Pleuronectes platessa*) in the North Sea using environmental DNA” is accepted for publication in the journal Environmental DNA (DOI: 10.1002/edn3.426).

Future prospects

- **Stock structure**

Identifying the genetic population structure of commercially interesting species remains relevant in the current geopolitical climate, where fishers might need to adjust fishing areas and/or species in the future. Efforts should be focussed on proactively unravelling the stock structure of these target species, especially as data-limited stocks justify the implementation of the precautionary principle which can hamper efficient fisheries management.

- **Environmental DNA**

Findings emphasize the potential and challenge of implementing eDNA into stock assessments. In a dynamic environment such as the North Sea, eDNA does not remain at the location of release, but is dispersed and degraded over time[1]. A hydrodynamic dispersion model that simulates the distribution of eDNA concentrations can be extremely valuable in estimating fish biomass in the future[2].

Furthermore, different life history processes like spawning can influence the eDNA in the water column[3,4]. Currently, ILVO is analysing monthly collected eDNA water samples that have been collected over two years in the Belgian part of the North Sea to establish baseline eDNA levels, in and outside the spawning season. This temporal eDNA data can potentially provide a better delineation of the spawning period and spawning areas.

ILVO is expanding the use of eDNA to explore whether ichthyoplankton (i.e., fish eggs and larvae) could be identified using the eDNA from the ethanol preservative[5]. Increasing our knowledge on the early life stages of all fish species in an area would further help to establish a sustainable and future proof fishery.

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[4] Collins, R.A., Baillie, C., Halliday, N.C., Rainbird, S., Sims, D.W., Mariani, S., Genner, M.J. (2022). Reproduction influences seasonal eDNA variation in a temperate marine fish community. Limnology and Oceanography Letters, 7(5), 443-449.

[5] Derycke, S., Maes, S., Van den Bulcke, L., Vanhollebeke, J., Wittoeck, J., Hillewaert, H., Ampe, B., Haegeman, A., Hostens, K., De Backer, A. (2021). Detection of Macrobenthos Species With Metabarcoding Is Consistent in Bulk DNA but Dependent on Body Size and Sclerotization in eDNA From the Ethanol Preservative. Frontiers in Marine Science, 8. doi:10.3389/fmars.2021.637858

Achievement of the original expected outcomes of the study and justification if this was not the case.
The SoleDNA project is still ongoing and expected outcomes will only be achieved at the end of the project. However, preliminary results indicate progress is as expected.

Incorporation of study results into regular sampling by the Member State.
The possibility for incorporation of study results into the regular sampling campaign will be investigated for the WP2025 – 2027.

(max. 900 words per study)

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.

Project Raywatch
1. Aim of the data collection activity
The Belgian EMFF project Raywatch's objective is to provide targeted and efficient data collection for commercially important ray species within the framework of "Roadmap for rays and skates" as well as for the updated Data Collection Framework (DCF). The focus of this project is on obtaining essential biological data, which can be integrated into stock assessment models to provide accurate advice for rays.

2. Duration of the data collection activity
2020-2022

3. Methodology and expected outcomes of the data collection activity
Methodology
In the project, seven ray species are looked at to improve the data collection: thornback ray (*Raja clavata*), blond ray (*Raja brachyura*), small-eyed ray (*Raja microocellata*), spotted ray (*Raja montagui*), big-eye ray (*Leucoraja naevus*), undulate ray (*Raja undulata*) and sandy ray (*Leucoraja circularis*). Three of these seven species are allowed to be landed by the Belgian fishereis: blond ray spotted ray and thornback ray. The four other ray species are sensitive species and released immediately. The project includes a training for the fishermen to improve the identification of the different ray species and to raise the awareness to set back the sensitive species asap when caught in their nets (link to text 4.2).

The data collection of the Raywatch project consists of two different parts, on the one hand the collection of data at sea, and on the other hand data collection in the lab. During future data collection trips at sea, various biological parameters (lengths, weights) of rays in the catch will be determined. In addition, some of the rays will also be scored for general "vitality" based on a vitality score, as in the SUMARiS project. Other technical and environmental parameters are also collected, such as towing duration, temperature, etc. Part of the ray catch is bought by ILVO and taken for further analysis in the lab. In the lab, the rays can be measured and weighed individually, and the maturity is determined. Finally, the age of the rays is also determined on the basis of the vertebrae. After staining the vertebrae, growth rings become visible that can be read. Age and maturity data is important for integration into population models and accurate stock estimates for rays. Registration of data for rays is done by using the Smartfish platform and the

Smartfish digital measuring board as used in the existing protocol of data collection (link annex 1.1 - biological data)

Expected outcomes

- **Improved identification of sensitive species (link to text box 4.2)**
- **A protocol to collect during sampling at sea trips biological data of rays, integrated in the existing protocols**
- **To incorporate the acquired (new) data into the stock evaluation process, which should lead to an improved management of as well commercially interesting rays as sensitive species.**

(max 900 words per activity)

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

[Finished] Project Raywatch

Within the NDGP framework, a protocol for improved data collection of rays was developed together with sea-going observers. Within this protocol, weight data and length distributions per sex for the landing and discard fraction were collected. Furthermore, individuals of thornback ray and blonde ray (dead) were taken to the lab where maturity and age were determined. In addition, several individuals were assigned vitality scores (A (excellent condition), B (good condition), C (bad condition) and D (dead) based on the number of injuries and liveliness of the individual[1,2,3]. Furthermore, survey and sampled length data were incorporated into stock assessment models to estimate the status of the stocks.

Comparing observer data with landing data from the Belgian fleet shows that the sampled data within this project is representative for the Belgian fishery. However, it is clear that there is a difference in sampled data for species that are prone to misidentification such as small-eyed ray and sandy ray. Throughout the project, thornback and spotted ray were mostly caught, while blonde ray and cuckoo ray were caught to a lesser extent, small-eyed ray and undulate ray were rarely caught. The catch quantities varied throughout the season and were dependent on the sampled fishing areas. Most rays caught belonged to the discard fraction, although this is partly due to the PO measure taken for the promotion of ray as "Fish of the year", which allowed only blonde, thornback and spotted ray to be landed in 2021/2022.

Maturity estimates show that proportionally more immature individuals were captured for blonde and thornback ray. Maturity ogives for age and length show that thornback rays mature at lengths of 668 and 795 mm and ages of 5.93 and 7 years for males and females, respectively. Blonde rays mature at lengths of 772 and 810 mm and ages of 5.85 and 6.55 years, respectively. This shows that the Belgian minimum landing size of 500mm does not follow any biological parameters, which may hinder the recovery of these ray stocks.

Calculated growth parameters show that rays are slow growing, and that growth parameters differ between stocks, sex and species. This shows that joint management (one TAC for all rays) does not provide sufficient protection. Furthermore, it became clear that the calculated growth parameters are in line with previous research, although there appears to be methodological differences that complicate the comparison between studies. Standardisation of methods such as for the age determination is recommended to increase comparability between studies.

For all species combined, 70% (47-90%) of the sampled rays were found to be in a good condition (vitality class "A" and "B"), Immediate mortality (0-27%) is largely consistent with previous results like the SUMARiS project, however immediate mortality was much higher for thornback ray (27% compared to 4%). Results show that longer air exposure (sorting time) affects the vitality and immediate mortality. For haul duration and temperature difference (between bottom and surface level), significant

trends were observed for immediate mortality, however the exact influence of these parameters on the immediate mortality need to be further investigated. A joint effort should be made to further collect survival data for less common species, such as undulate ray and sandy ray. In addition, it is also recommended to investigate the cost/ benefits of installing a water spraying system on board of vessels to prevent gill dehydration and increase survival.
Based on the survey data, the spatial distribution of rays was mapped. The species composition within the Raywatch project largely corresponds to the spatial distribution of the survey data, which shows that the project sampling design is representative. For thornback ray, blonde ray, spotted ray and cuckoo ray, sufficient data were available to provide advice. The length data collected together with the estimated growth parameters can be used for stock assessments. Relative fishing mortality and stock status are estimated to be at sustainable levels for most ray stocks of interest for Belgian fisheries. However, adjusting selectivity could increase catches, increasing average length of the catch and length at maturity by 20-40%. There is a need for further validation and expansion of the produced models to international catch rates.

In conclusion, it is clear that the data collected during this project provide important insights into the biology, ecology, survival and distribution of the studied species and that it is important to further collect biological data to form time series that can be used in stock assessment models. In addition, there is a need for international cooperation to further fill knowledge gaps in order to further optimise the management of rays.

[1.] Catchpole, T., Wright, S., Bendall, V., Hetherington, S., Randall, P., Ross, E., Ribiero Santos, A., Ellis, J., Depestele, J., & Neville, S. (2017). Ray discard survival - enhancing evidence of the discard survival of ray species.

[2.] Ellis, J. R., McCully Phillips, S. R., & Poisson, F. (2017). A review of capture and post-release mortality of elasmobranchs. Journal of fish biology, 90(3), 653-722.

[3.] Schram, E., & Molenaar, P. (2018). Discards survival probabilities of flatfish and rays in North Sea pulse- trawl fisheries. Wageningen Marine Research report C037/18, 39. https://doi.org/10.18174/449707

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

Original outcomes were achieved.

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

After finalising the project, data has been continuously collected for thornback ray and blonde ray, for which length, weight, maturity and age data is collected.

(max 900 words per activity)

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.

Project SECWEB
1. Aim of the data collection activity
Support the operation and functioning of the RCG´s Secretariat for a fluent regional coordination of data collection activities.

2. Duration of the data collection activity
01/01/2023 – 31/12/2025

3. Methodology and expected outcomes of the data collection activity

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

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

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

Overall expected outcomes

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

(max 900 words per activity)

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

During 2022 the activities of the RCGs Secretariat still developed in the context of the SecWeb Project, which was extended to last until the end of February 2023. The RCG experts and the Member States' NCs engaged in several discussions about the long-term stabilization of the Secretariat services, given the value added by the project to the RCGs networks, and agreed on a short term solution for continuity in 2023 which was incorporated with a statement in "Text Box 1b: Other data collection activities" of the Annual Work Plans of the Member States

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

Original outcomes were achieved.

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

The longer term perspective will build upon the outcomes from SECWEB and dealt with inter-sessionally and pan regionally by ISSG NCs in 2023 and beyond.

(max 900 words per activity)

SECTION 2: BIOLOGICAL DATA

Text Box 2.1: List of required species/stocks

Region/RFMO/RFO/IO: North Sea and Eastern Arctic

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

Deviations from the work plan

List the deviations (if any) in the achieved data collection (lengths only) compared to what was planned.

The general reasons for deviations from the work plan in terms of planned vs. achieved data collection should be summarised in this section, while detailed comments on deviations on particular species/stocks should be included in the 'AR comments' column in Table 2.1.

Most of the oversampling and under sampling is related to the sampling design of the Belgian at-sea programme (see textbox 4a for the complete description of the sampling design). It is difficult to define the number of length measurements in advance. All fish of a once randomly chosen subsample must be measured to calculate the retained and discarded fraction of the whole catch. Moreover, the observers measure length every other haul during the trip, irrespective of the sampling levels already achieved. Consequently, the number of length measurements is largely dependent on what fish are present in the catches and influenced by the changes in effort of the Belgian fleet from year to year.

Oversampling does not necessarily result in extra costs, since the observers stay on board for the entire trip. Only in the ILVO laboratory, some extra staff time is needed to process the additional samples, which is still within reasonable limits.

***Scyliorhinus canicula* is not covered by a commercial sampling scheme for length. Although registered in table 2.1 for SYC27.3a47d, no lengths were sampled.**

For certain areas and species which are covered by a commercial sampling scheme for length, no individuals were observed during the trips. Hence, the achieved numbers of individuals measured for length at national level from commercial sampling (column t), and the achieved number of samples for length at national level from commercial sampling (column u) are both 0.

- ***Lepidorhombus boscii* – 4, 7d**
- ***Lepidorhombus whiffiagonis* – 4, 7d**
- ***Lophius budegassa* – 3a, 4, 7d**
- ***Raja brachyura* – 7e**
- ***Raja clavata* – 7e**
- ***Microstomus kitt* – 5, 6, 7 (excl. 7d), 8, 9, 10 and 14**

The two year- EMFF funded project: "Raywatch", aimed at collecting more biological, catch and vitality data for seven ray species in the western waters and English Channel. Therefore, in 2021 and 2022 (Q1 and Q2) data were collected (lengths and weights) for thornback ray (*Raja clavata*), blonde ray (*Raja brachyura*), spotted ray (*Raja montagui*), small- eyed ray (*Raja microocellata*), cuckoo ray (*Leucoraja naevus*), undulate ray (*Raja undulata*) and sandy ray (*Leucoraja circularis*). After finalising the project, data has been continuously collected for thornback ray and blonde ray, for which length, weight, maturity and age data is collected.

Actions to avoid deviations

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

Since most of the deviations are related to the sampling design of the Belgian at-sea programme and the issues related to the variable catches in a mixed fishery, it's not feasible to avoid the under sampling neither oversampling in the future. Nevertheless, continuous effort is done to match statistically sound sampling with practical feasibility and to maximize the number of sampled trips (PSUs) to avoid under sampling.

(One text box of max. 1 000 words per region/RFMO/RFO/IO)

Region/RFMO/RFO/IO: North-East Atlantic

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

Deviations from the work plan

List the deviations (if any) in the achieved data collection (lengths only) compared to what was planned.

The general reasons for deviations from the work plan in terms of planned vs. achieved data collection should be summarised in this section, while detailed comments on deviations on particular species/stocks should be included in the 'AR comments' column in Table 2.1.

Most of the oversampling and under sampling is related to the sampling design of the Belgian at-sea programme (see textbox 4a for the complete description of the sampling design). It is difficult to define the number of length measurements in advance. All fish of a once randomly chosen subsample must be measured to calculate the retained and discarded fraction of the whole catch. Moreover, the observers measure length every other haul during the trip, irrespective of the sampling levels already achieved. Consequently, the number of length measurements is largely dependent on what fish are present in the catches and influenced by the changes in effort of the Belgian fleet from year to year.

Oversampling does not necessarily result in extra costs, since the observers always stay on board for the entire trip. Only in the ILVO laboratory, some extra staff time is needed to process the additional samples, which is still within reasonable limits.The two year- EMFF funded project: "Raywatch", aimed at collecting more biological, catch and vitality data for seven ray species in the western waters and English Channel. Therefore, in 2021 and 2022 (Q1 and Q2) data were collected (lengths and weights) for thornback ray (*Raja clavata*), blonde ray (*Raja brachyura*), spotted ray (*Raja montagui*), small- eyed ray (*Raja microocellata*), cuckoo ray (*Leucoraja naevus*), undulate ray (*Raja undulata*) and sandy ray (*Leucoraja circularis*). After finalising the project, data has been continuously collected for thornback ray and blonde ray, for which length, weight, maturity and age data is collected.

Actions to avoid deviations

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

Since most of the deviations are related to the sampling design of the Belgian at-sea programme and the issues related to the variable catches in a mixed fishery, it's not feasible to avoid the under sampling neither oversampling in the future. Nevertheless, continuous effort is done to match statistically sound sampling with practical feasibility and to maximize the number of sampled trips (PSUs) to avoid under sampling.

(One text box of max. 1 000 words per region/RFMO/RFO/IO)

Text Box 2.2: Planning of sampling for biological variables

Region/RFMO/RFO/IO: North Sea and Eastern Arctic

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

Deviations from the work plan

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

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

The sampling targets for the collection of the biological parameters age, weight, maturity and sex, used in practice at ILVO, are expressed in terms of X number of individuals per length class per area per trip. The planned numbers for length, age, weight, maturity and sex, stated in het WP are based on an average of the achieved numbers in the past and provide an indication of what could be expected rather than a real target. Some of these planned numbers can no longer be realised which is related to which trips are sampled, changes in fishing grounds or fish populations. Furthermore, the TBB_DEF fishery is a mixed fishery and a higher or lower occurrence of certain (bycatch) species in the sampled hauls could result in a higher or lower total number of individuals sampled compared to the planned number.

Oversampling does not necessarily result in extra costs, since the observers always stay on board for the entire trip. Only in the ILVO laboratory, some extra staff time is needed to process the additional samples, which is still within reasonable limits.

Actions to avoid deviations.

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

Since most of the deviations are related to the sampling design of the Belgian at-sea programme and the issues related to the variable catches in a mixed fishery, it's not feasible to avoid the under sampling

neither oversampling in the future. Nevertheless, continuous effort is done to match statistically sound sampling with practical feasibility and to maximize the number of sampled trips (PSUs) to avoid under sampling.

(One text box of max. 1 000 words per region/RFMO/RFO/IO)

Region/RFMO/RFO/IO: North-East Atlantic

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

Deviations from the work plan

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

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

The sampling targets for the collection of the biological parameters age, weight, maturity and sex, used in practice at ILVO, are expressed in terms of X number of individuals per length class per area per trip. The planned numbers for length, age, weight, maturity and sex, stated in het WP are based on an average of the achieved numbers in the past and provide an indication of what could be expected rather than a real target. Some of these planned numbers can no longer be realised which is related to which trips are sampled, changes in fishing grounds or fish populations. Furthermore, the TBB_DEF fishery is a mixed fishery and a higher or lower occurrence of certain (bycatch) species in the sampled hauls could result in a higher or lower total number of individuals sampled compared to the planned number.

Oversampling does not necessarily result in extra costs, since the observers always stay on board for the entire trip. Only in the ILVO laboratory, some extra staff time is needed to process the additional samples, which is still within reasonable limits.

Actions to avoid deviations.

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

Since most of the deviations are related to the sampling design of the Belgian at-sea programme and the issues related to the variable catches in a mixed fishery, it's not feasible to avoid the under sampling neither oversampling in the future. Nevertheless, continuous effort is done to match statistically sound sampling with practical feasibility and to maximize the number of sampled trips (PSUs) to avoid under sampling.

(One text box of max. 1 000 words per region/RFMO/RFO/IO)

Text Box 2.3: Diadromous species data collection in freshwater

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

Method selected for collecting data.

***Anguilla anguilla* - eel**

Commercial eel fishing has been banned in Flanders for years. Only sport fishermen are still allowed to catch eels, at most three animals per fishing event.

There is no commercial fishery for yellow eel in inland waters in Belgium. Commercial fisheries for yellow eel in coastal waters or the sea are negligibly small.

There are no commercial glass eel fisheries.

There is no commercial fishery for silver eel in inland waters in Belgium. Commercial fisheries for silver eel in coastal waters or the sea are negligibly small.

(https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf)

Data Collection

Data on anadromous and catadromous species are collected by the Research Institute for Nature and Forest (INBO) under the Belgian Eel Management Plan (Commission Decision C (2009)10510).

Following the Commission Implementing Decision 2021/1167, no duplication of data collection may occur. Therefore, no data on anadromous and catadromous species is collected under this workplan 2022-2024. Table 2.3 is filled in accordingly.

The full description of the Belgian Eel Management Plan can be found on

https://www.natuurenbos.be/sites/default/files/inserted-files/soortbeschermingsplan_voor_de_paling.pdf

There are 5 different types of data collection of European eel (*Anguilla anguilla*):

1. **Abundance of standing stock: silver eel escapement based on yellow eels surveys**

Belgium is required to report every three years in the framework of the EU Eel Regulation (Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel) on the effective migration of silver eel from the eel management units (EMUs) of Meuse and Scheldt.

In Flanders the quantification of the migration of silver eel is based on model calculations. For this purpose, the total number of yellow eels per stratum River Type * River Basin is calculated on the basis of the estimated density of yellow eel (using electrofishing data) and the surface area of watercourses in

the eel management plan, including corrections for various factors of natural and anthropogenic mortality. The data is supplied by Flanders' Freshwater Fish Monitoring Network and other monitoring programs carried out by INBO's MHAF team ("Monitoring en Herstel Aquatische Fauna").

In Wallonia silver eel escapement has been re-evaluated in 2013. However, since 2013 no new data are available.

2. Abundance of recruits in the river Yser in Nieuwpoort

In Flanders, traditionally, glass eel recruitment monitoring is carried out in Nieuwpoort on the river Yser (IJzer) at the Belgian coast. The Yser is a relatively small lowland river (length 76 km) having its spring in the north of France and flowing through Flemish polder area. The whole catchment covers 1400 km2 and is well known for its eel population attracting many eel (sport)fishermen. The river has a mean annual discharge of 5 to 6 m³/s, river flow is regulated by the presence of sea sluices in Nieuwpoort (at a location called the "Ganzepoot") where the river Yser discharges into the Yser estuary. The Yser estuary is a small, highly artificial, polyhaline, mesotidal (average tidal amplitude 4.09 m) lowland estuary that runs into the sea after 3.7 km. Besides the river Yser, five other waterways discharge into the Yser Estuary in Nieuwpoort (at the "Ganzepoot").

In the sea sluice at the Nieuwpoort station the glass eel monitoring (glass eel recruitment) is starting in February and continues till the beginning of May. Fishing is not carried out every day, but is mainly dependent of weather conditions and tide. Usually there are 20 to 30 fishing nights per season. Fishing is starting ca 2-3 hours before high tide and is continued until high tide is attained. The time series is achieved by fishing in the ship lock of the Iepersluis in Nieuwpoort. Two to three hours before high tide the outer (sea side) doors of the ship lock are opened to allow glass eel entering the ship lock. A 5 m long steeled dipnet is held vertical from the ship lock quay and pulled forward, just under the surface, for the length of the ship lock. The dipnet has a width of 80 cm and is 60 cm high. This monitoring has been done since 1964 according to the same protocol. The monitoring is operated by volunteers (anglers). Available data are daily glass eel catches (kg), date and starting and ending hours of the fishing period, tide data. Catches are presented as total annual yield or can be presented as maximum daily catch or mean daily catch. This series relies on total catch but with a variation in effort. Effort data are only reported since 2003 so it is not possible to convert the whole series 1964-2018 to CPUE and this series might hold some bias.

3. Abundance of recruits in the Veurne-Ambacht canal (Westkustpolder) in Nieuwpoort

Adjusted barrier management (ABM: limited barrier opening during tidal rise) is currently applied in Belgium as a measure to improve glass eel passage through sluice complexes at the salt/freshwater interface. ABM is applied at a sluice complex located downstream in the Veurne-Ambacht canal which is a small artificial waterway (835 m length), used to spill excess water from a ± 20000 ha polder area (the 'Westkustpolder') into the Yser estuary in Nieuwpoort (at a location called the "Ganzepoot"). Glass eel recruitment (with ABM) is weekly monitored (March–June) since 2017 by means of 2 eel ladders installed on both sides of a pumping station, the next migration barrier located in the upstream part of the Veurne-Ambacht canal (at 835 m upstream from the sluice complex). Once or twice a week, volunteers (anglers) quantify the amount of glass eels that has been caught with both eel ladders and concordantly release the animals in the polder area. Mostly glass eels are caught, but also small elvers. Total weight of the glass eels is determined. For elvers total numbers (and total weight) are determined. Total numbers for elvers are reported here (more accurate than weight).

4. Abundance of recruits in the river Meuse in Lixhe

On the river Meuse in Lixhe, the University of Liège is monitoring the amount of ascending young yellow eels in a fish-pass (yellow eel recruitment). From 1992 upstream migrating eels are collected in a trap (0.5 cm mesh size) installed at the top of a small pool-type fish-pass at the Visé-Lixhe dam (built in 1980 for navigation purposes and hydropower generation; height: 8.2 m; not equipped with a ship-lock) on the international River Meuse near the Dutch–Belgium border (323 km from the North Sea; width: 200 m; mean annual discharge: 238 m3 s -1 ; summer water temperature 21–26°C). The trap in the fish-pass is checked continuously (three times a week) over the migration period from March to September each year, except in 1994.

5. **Estuarine fish monitoring in the river Scheldt by fykes (*Anguilla anguilla*) and other diadromous fish species (amongst others river lamprey)**

A fish monitoring network by INBO has been put in place to monitor fish stock in the Scheldt estuary using paired fykenets. Campaigns take place in spring and autumn, and also in summer from 2009 onwards. At each site, two paired fykes were positioned at low tide and emptied daily; they were placed for two successive days. Data from each survey per site were standardized as number of fish per fyke per day.

A full and detailed description of the method for collecting the variables presented in table 2.3 is documented for all requested topics in the WGEEL report (*https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf*)

(max 250 words per species and area)

Were the planned numbers achieved? Yes/ No

No, not all sampling units as indicated in the WP where achieved.

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

For the abundance of the standing stock based on yellow eel surveys in the Meuse catchment, the indicated number of sites in the WP is incorrect (145), and needs to be adjusted to 12 sites. The sampled number of sites corresponds with the correct number planned of sites, resulting in a 100% achieved rate.

Dipnet fishing in the river Yser in the sluice in Nieuwpoort is not continuous way of fishing, but results in a catch on a certain moment. The planned number of units that have been achieved are equal to the number of nights the dipnets have been deployed.

The glass eel ladders in the Veurne Ambacht canal at the pumping station in Nieuwpoort are permanently active during the spring fishing season. Because of this permanent setup, the planned number of units is equal to the number of days in which the glass eel ladders are in place.

Lastly, for the trap setup in the upper part of the fish pass on the river Meuse at the dam in Lixhe, the fish passage was under maintenance in 2022 and was inactive in that year. This explains why there has been no data collected in 2022.

Additionally, several sections of the text in the WP needed to be adjusted for clarity, namely:

- **Section: *Anguilla anguilla* – eel:**

Commercial eel fisheries in inland waters (glass eel, yellow eel, silver eel) are prohibited since several years in Flanders (in Wallonia commercial eel fisheries never existed).

Regarding recreational fisheries in inland waters in Flanders sport fishermen are allowed to take at most 3 eel per fishing event (minimum size 30 cm). Recreational fisheries for eel in Wallonia are prohibited since several years.

In coastal and sea waters both recreational and commercial fisheries for eel have always been very small (eel only as bycatch). Since 2023 both commercial and recreational fisheries for eel in coastal and sea waters in Belgium are prohibited.

- **Section: 5. Estuarine fish monitoring in the river Scheldt by fykes including European eel and other diadromous fish species (amongst others river lamprey):**

A fish monitoring network by INBO has been put in place to monitor fish stock in the Scheldt estuary using paired fykenets. Campaigns take place in spring and autumn, and also in summer from 2009 onwards. At each site, two paired fykes were positioned at low tide and emptied daily; they were placed for two successive days. Data from each survey per site were standardized as number of fish per fyke per day.

Besides, each year from 2012 onwards, the fish community from the Scheldt estuary is also monitored through fishing with a mid-water beam trawl from an anchored boat, three times a year (Spring – Summer – Fall) at four sites (Doel, Antwerpen, Steendorp and Branst).

Pilot studies are ongoing to monitor juvenile eel recruits (glass eels/ elvers) at more upstream migration barriers in polder areas.

A full and detailed description of the method for collecting the variables presented in table 2.3 is documented for all requested topics in the WGEEL report (*https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf*)

(max 250 words per species and area)

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

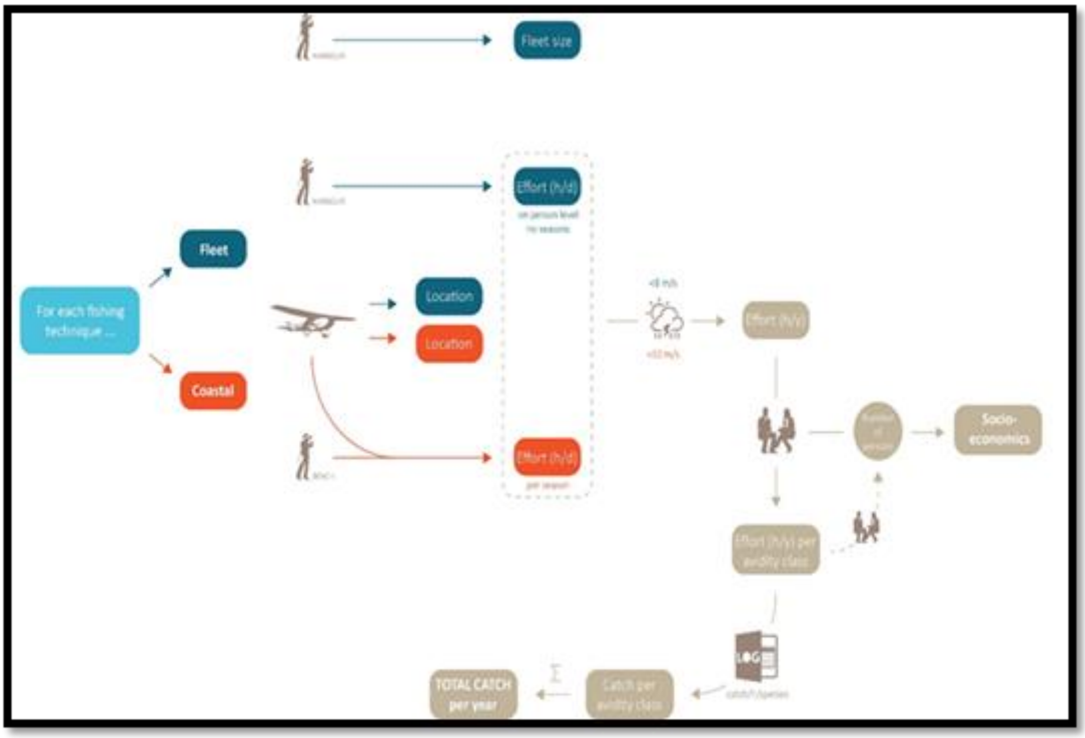
Description of the sampling scheme/survey according to Table 2.4.

The main target species are European sea bass (*Dicentrarchus labrax*), cod (*Gadus morhua*) and pollack (*Pollachius virens*). Other species of which data are requested to collect through the logbook are: brill, mackerel, dab, flounder, sole, whiting, however these are not a priority. All gears are considering in the data collection.

To make an estimation of the catches, a logbook is used. This logbook, as well as digital as in hardcopy, was designed on a national level and approved by WGRFS. The logbook participants are recruited by an omnibus survey that took place in 2017 and added to a pool of purposefully selected logbook participants.

On-site surveys, among which an aerial survey, are carried out in order to estimate total fishing effort. Logbook surveys are used to estimate the recreational catches of a stratified sample of recreational fishermen. Interviews in the 4 major Belgian marine areas and at the coast act as a control on the reported catches. Extrapolation to total catches take into account fishing technique and avidity. The exact protocol is developed and was published in the beginning of 2017 ([https://www.recreatievezeevisserij.be/Monitoring/Methodologie)](https://www.recreatievezeevisserij.be/Monitoring/Methodologie).

A schematic overview of the protocol is given in the figure below.



In addition, there are no recreational glass eel fisheries. In Belgium, both commercial and recreational glass eel fisheries are forbidden by law.

Silver-eel: no time-series available. Due to the specific behaviour of silver eel, catches of silver eel by recreational anglers are considered significant low.

(https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf)

(max 900 words per region)

Deviations from the work plan

Due to low data some avidity classes were not represented. Therefore the avidty was not incorporated for the total catch calculation.

Action to avoid deviations

We expect that the number of participants and reported diaries will rise again due to the easier registration (the mobile application). The increase in data will make the incorporation of avidty possible again.

(max 900 words per region)

Text Box 2.5: Sampling plan description for biological data

Region/RFMO/RFO/IO: North-East Atlantic

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

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

There is no complementary information needed regarding the sampling design done in Belgium.

- **Research survey at sea**
- **Commercial fishing trip**
- **Recreational (on site survey)**

Additional information on sampling schemes

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

Additional description of sampling frames

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

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

A full description of the sampling plan is given in the different Annex 1.1 text boxes:

- **Research survey at sea**
- **Commercial fishing trip**
- **Recreational (on site survey)**

Deviations from the work plan

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

The sampling plan was executed as described in the WP except for the deviations which are described here. Deviations concerning the planned number of trips versus what has been realized in 2022:

In 2022, a total of six trips were planned for TBB_DEF_≤ 221 kW, four trips were sampled. The main reasons are:

- **Some vessels use two different métiers during the year: TBB_DEF and TBB_CRU (targeting shrimp). After summer most vessels where an observer could go onboard were targeting shrimp (TBB_CRU), which meant that these vessels were not available for sampling (TBB_DEF). This was particularly the case in 2022, as a result of larger shrimp catches compared to other years.**
- **Lack of workspace onboard of most vessels to perform sampling**
- **Lack of place to sleep for the observer**
- **Refusal by the vessel owner or crew to have an observer onboard.**

For the TBB_DEF_>221kW SciObsAtSea stratum, 40 trips were planned (according to the WP) and 33 were sampled. The main reasons are:

- **Lack of workspace onboard the vessel to perform the sampling**
- **Lack of place to sleep for the observer**
- **Refusal of the vessel crew or owner to have an observer onboard**
- **Belgian fishermen avoid landing in UK harbours as a result of Brexit (increased administration and more costs involved). Belgian fishermen prefer landing in European harbours (i.e. Ireland) when fishing in the western waters. Although the distance to Irish harbours is much larger and entails more fuel costs. Logistically, this is very challenging for the observers as transporting their specific measuring tools and gear via airplane is almost infeasible.**
- **Limited availability of sat sea going observers: the ILVO observer team consist out of 4 people, however during the third and fourth quarter of 2022, only two of them were available for sampling (personal issues and resignment)**

For the TBB_DEF_>221kW SelfAtSea stratum, According to the WP, 4 self-sampling trips were planned (according to the WP) and 1 trip was sampled. The main reasons are:

- **Refusal of the vessel crew or owner to perform self- sampling**
- **The SelfAtSea sampling programme at ILVO is a voluntary programme so the sampling takes place when the opportunity arises and ILVO aims to enhance awareness/ enthusiasm among vessel owners for this sampling method**
- **Limited availability of sat sea going observers : the ILVO observer team consist out of 4 people, however during the third and fourth quarter, only two of them were available for sampling (personal issues and resignment). This also has an impact on the processing and sensitization of the self-sampling trips.**

Actions to avoid deviations

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

ILVO, as developer and executer of the sampling plan strives daily to maintain good relations with fishermen in order to obtain, maintain and improve access to the vessels for sampling. Nevertheless, having a rather small fleet fishing in 5 different fishing grounds hampers the development of a simple sampling design. Continuous effort is done to optimize the current sampling plan in order to match statistically sound sampling with practical feasibility.

Belgium is investing in the further optimization of the sampling strategy. The ultimate goal is to make the most efficient use of sampling resources and collect unbiased and precise catch data. Alternatives for the traditional observer programme, such as self-sampling and electronic monitoring, are being tested and further developed.

Belgian fishermen avoid landing in UK harbours as a result of Brexit (increased administration and more costs involved). Belgian fishermen prefer landing in European harbours (i.e. Ireland) when fishing in the western waters This however makes it more difficult for observers to join these vessels on short notice. ILVO aims to improve collaborations with fishermen to avoid these practical issues (e.g. putting their gear on board when they leave Belgian harbours). However, doing this also has an impact on the sampling of other vessels, as it hampers flexibility to join other vessels.

Self-sampling: a training for vessels owners, skippers and crew is set up during 2023 with the objective to convince them to do self-sampling. Also, Belgium invests further in the research on implementation of camera's on board for scientific use (see Text box Other data collections 'Project Visism2) with the objective to increase the number of vessels and trips to be sampled.

(One text box of max. 1 000 words per region/RFMO/RFO/IO)

Text Box 2.6: Research surveys at sea

Research survey: North Sea Beam Trawl Survey (BTS)

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

1. Objectives of the survey

The Belgian BTS started in 1985, resulting in a time series of 38 years. During the survey 62 fixed stations (ICES Area 27.4b and 27.4c) are fished in the third quarter of the year.

The objectives are:

- **Create fisheries-independent abundance indices by age group for plaice, sole, dab, cod, lemon sole, turbot, and brill for the sampled area**
- **Collection of biological data for ecosystem analysis purposes:**
  - **On all fish (including elasmobranchs) species, including length and total catch weight measurements**
  - **On all epibenthic species, including count and weight measurements**
  - **On commercially important shellfish and cephalopod species (*nephrops norvegicus, cancer pagurus, hommarus gammarus, loligo vulgaris, loligo forbesii and sepia officinalis*), including weight and length measurements**
- **Collection of marine litter data by international standards**
- **Collection of environmental data, such as depth, surface and bottom temperature and salinity**
- **Assess the feasibility of plankton monitoring and stomach content analysis over the course of the WP2022-2024.**

All collected data is frequently used by end-users.

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 design is discussed annually with the other member states at the WGBEAM to maintain and increase standardization in sampling. WGBEAM has published an offshore manual, describing the

standardized sampling protocols and practices by each country (WGBEAM, 2019; WGBEAM Offshore Manual). The national manual (in Dutch) is stored on the internal server and available on request.**

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

International agreements for the BTS are coordinated at the WGBEAM, where all beam trawl surveys in the North Sea and North-East Atlantic are discussed and where Belgium is represented. Belgium samples stations situated in the southwestern part of the North Sea (red dots Figure 1). Other vessels carrying out beam trawl surveys in the North Sea are represented in Figure 1:

- **RV Tridens: The Netherlands (purple dots)**
- **RV Solea: Germany (green dots)**
- **RV Endeavour: United Kingdom (blue dots)**

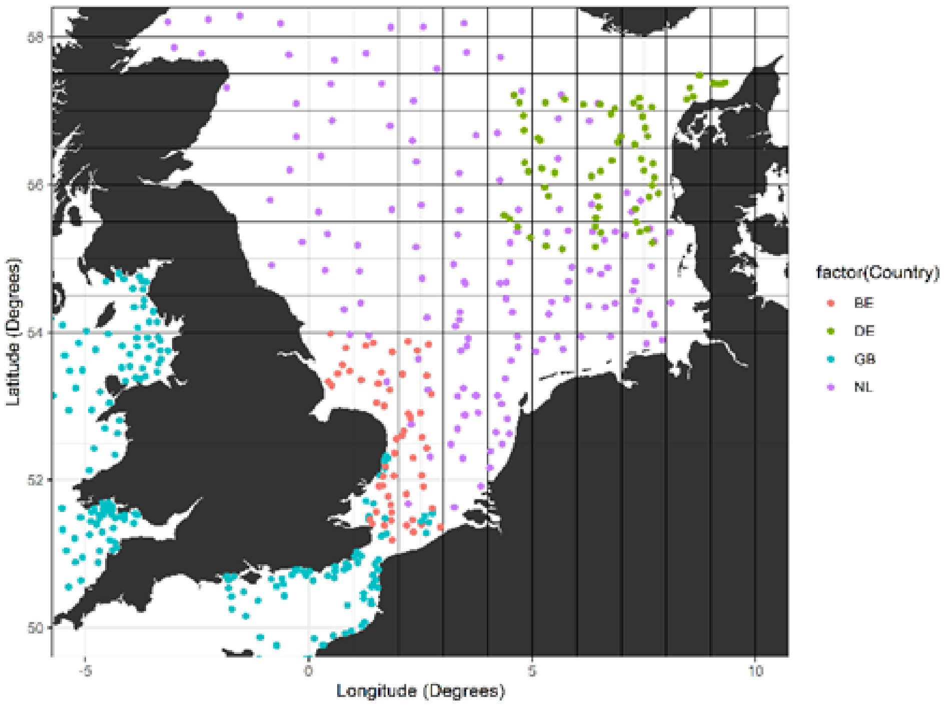


Figure 1 Beam Trawl Surveys in the North Sea with indication of sampling stations per country

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

The Belgian BTS is a mandatory survey in which no other MS participate (no threshold rules are therefore applied).

For all but two target species, defined in both Table 1 of the EU Map Implementing Decision and the international coordinating group WGBEAM, the threshold is attained (≥3% of the Union TAC or ≥3% of the share in the average total EU landings in the previous 3 years when no TAC is fixed). The Belgian BTS is only covering ICES Area 27.4, therefore, the TAC and average Belgian and EU landings of Area 27.4 are used to verify the thresholds (Table 1). Although the threshold is not attained, the monitoring of smooth hounds and small-eyed rays is allowed as the BTS aims to maximize ecosystem monitoring, as internationally agreed.

Table 1 Comparison of threshold values with Belgian and EU landing data of 2018-2020 in Area 27.4

Target Species	Belgian landings in 2018-2020 (tonnes)	% of Union TAC in 2018-2020	% of EU landings in 2018-2020
Plaice	3805	5	12
Sole	307	8	4
Turbot	218	7^	5
Dab	264	/	6
Cod*	743	3	3
Lemon sole*	403	5^^	6
Brill*	99	7^	4
Thornback ray	90	**	10
Small-eyed ray	0	***	0
Spotted ray	19	**	4
Smooth hounds	0.422	/	0.5
Small-spotted catshark	67	/	14
Nursehound	0.138	/	6

Cod, lemon sole and brill are additional species for which biological data is collected to fulfil end-user needs.

^ Turbot and Brill are managed under a shared TAC.

^^ Lemon sole is managed under a shared TAC with witch flounder.
*** Thornback and spotted ray are managed under a general TAC for all skates and rays.*

**** Small-eyed ray should not be caught in area 27.4 (vulnerable species).*

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

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

[Working Group on Beam Trawl Surveys (WGBEAM) (figshare.com)]

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

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

- **The Belgian BTS data on plaice is included in the international combined beam trawl survey index which is used in the assessment of the North Sea plaice stock (ple.27.420) during WGNSSK.**
- **The Belgian BTS data on sole is included in the international combined beam trawl survey index which is used in the assessment of the North Sea sole stock (sol.27.4) during WGNSSK.**
- **The Belgian BTS data on sole and plaice also feeds into the MSFD assessments for Descriptor 3, which are based on the ICES fish stock assessments for the North Sea.**
- **The Belgian BTS data on Thornback rays (*Raja clavata*) is used in the MSFD assessment for Descriptor 1 and is included in the combined beam trawl survey index which is used in the**

assessment of the North Sea, Skagerrak, Kattegat, and eastern English Channel stock (rjc.27.3a47d) during the ICES Working Group on Elasmobranch Fishes (WGEF).

- **The Belgian BTS data on lesser-spotted dogfish (Scyliorhinus canicular) is included in the combined beam trawl survey index which is used in the assessment of the North Sea, Skagerrak, Kattegat, and eastern English Channel stock (syc.27.3a47d) during the ICES Working Group on Elasmobranch Fishes (WGEF).**
- **The Belgian BTS data on marine litter is used in the MSFD assessment for Descriptor 10 concerning marine litter and is available for the ICES Working Group on Marine Litter (WGML).**

7. Extended comments

Extended AR comments can be placed under this section.

The WGBEAM offshore manual has been updated in 2023:

https://ices-library.figshare.com/articles/report/ICES_Survey_Protocols_Offshore_Beam_Trawl_Surveys_Coordinated_by_Working_group_on_Beam_Trawl_Surveys_WGBEAM_/21603336

ILVO has been involved in the CINEA SC10- Study on stomach content of fish to update databases and analyse possible changes in diet or food webs interactions. The study involves collecting and analysing new stomach samples for whiting, grey gurnard and mackerel. Besides that, historical data will be uploaded to the developing ICES stomach database. Additionally, ILVO will support the case study analysis where new stomach samples will be used to investigate potential changes in 'who eats who' with the help of modelling. ILVO's participation in this project has provided us with valuable knowledge and experience in the analysis of stomach samples. This newfound expertise can now be applied to explore the feasibility of analysing stomachs during the BTS survey.

(max. 450 words per survey)

Research survey: Demersal Young Fish and Brown Shrimp Survey (DYFS)

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

1. Objectives of the survey

The Belgian DYFS started in 1973, resulting in a time series of 48 years. During the survey 33 fixed stations are fished in the third quarter of the year. The location of the sampling area matches the main flatfish nursery grounds along the Belgian coast (red dots Figure 2). The aims are:

- **Create fisheries-independent abundance indices by age group for plaice and sole**
- **Collection of biological data for ecosystem analysis purposes:**
    - **Of 16 commercial fish species and brown shrimp, including length and total catch weight measurements**
    - **On all elasmobranchs per sex, including length and weight measurements**
    - **On all epibenthic species and non-commercial fish, including count and weight measurements**
- **Collection of marine litter data by international standards**

- **Collection of environmental data: depth, surface and bottom temperature and salinity**

All collected data is frequently used by end-users.

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.

As an inshore manual is not yet publicly available, the method of the survey is described below. Belgium guarantees to continue incorporating updated method designs as coordinated by WGBEAM.

33 stations are fished for ~30 min, with a standard 6-m shrimp beam trawl (cod-end mesh size 22 mm, no tickler chains) at 3.5 knots against tide. The catch is poured into a rotating shrimp riddle to sort it in 'small', 'medium' and 'large' fractions. All fractions are processed separately but in a similar manner. Commercial fish (sole, plaice, dab, whiting, brill, turbot, red, English and grey gurnard, flounder, cod, horse mackerel, mackerel, lemon sole, sea bass and surmullet) and elasmobranchs are handpicked from the fractions, sorted by species, weighed and measured. Subsequently, if the fraction is large, a subsample is taken after picking out litter, stones, wood and the 'general sweep' (i.e. epibenthic and non-commercial fish species that are not representative of the fraction composition). From each subsample, 250 brown shrimps are picked. These shrimps are measured and weighed. What rests of the subsample and the 'general sweep' is sorted by species, counted and weighed.

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

International agreements for the inshore surveys are coordinated annually by WGBEAM, where Belgium is represented. Other MS carrying out inshore surveys in the coastal zones of the North Sea are represented in Figure 2:

- **RV Isis, RV Stern and RV Luctor: The Netherlands**

- **RV Clupea and chartered vessels: Germany**

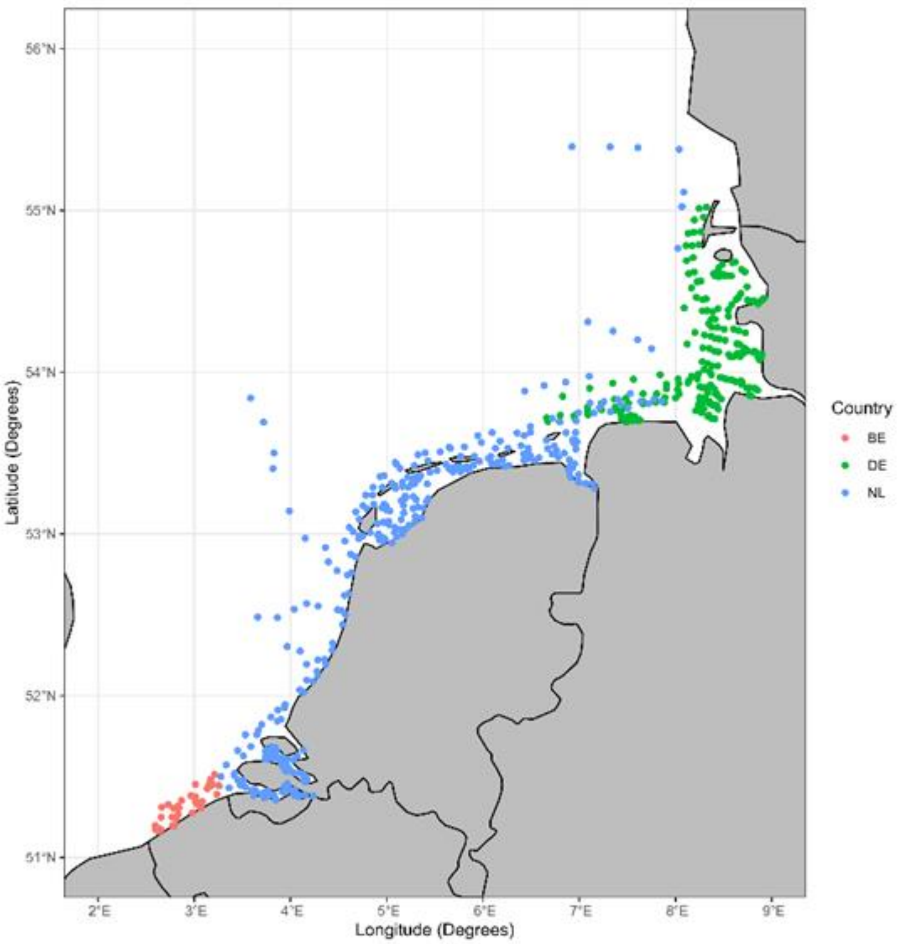


Figure 2 Beam Trawl Surveys in the coastal zones of the North Sea with indication of sampling stations per country

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

The Belgian DYFS is a mandatory survey in which no other MS participate (no threshold rules are therefore applied).

The target species for the DYFS as defined by Table 1 of the EU Map Implementing Decision is sole. The Belgian DYFS is only covering Area 27.4. For sole the threshold is attained (Table 1 BTS). Other commercial species monitored are *i.e.* plaice, turbot, dab, brill, lemon sole, smooth hounds, small-spotted catshark and thornback ray, brown shrimp, whiting, tub gurnard, flounder, seabass and surmullet for which the thresholds are attained as well (Table 1 and Table 2). Even though red and grey gurnard, mackerel and horse mackerel do not attain the threshold, they are still monitored as being important species in the coastal zone.

Table 2 Comparison of threshold values with Belgian and EU landing data of 2018-2020 in Area 27.4

Target Species	Belgian landings in 2018-2020 (tonnes)	% of Union TAC in 2018-2020	% of EU landings in 2018-2020
Brown shrimp	**986**	**/**	**3**
Whiting	**141**	**2**	**6**

Red gurnard	**3**	/	**1**
Tub gurnard	**98**	/	**4**
Grey gurnard	**25**	/	**1**
Flounder	**134**	/	**9**
Horse mackerel	**12**	**0.1**	**1**
Mackerel	**66**	**0.1**	**0.04**
Seabass	**6**	/	**3**
Surmullet	**106**	/	**10**

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

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

https://ices-library.figshare.com/articles/report/Working_Group_on_Beam_Trawl_Surveys_WGBEAM_/20376717

The meeting report of the latest WGBEAM meeting (April 21-23, 2023) was not published yet, but when published can be found on the ICES Website).

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

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

- **The Belgian DYFS data on plaice and sole is used in the international combined inshore indices for age groups 0 and 1 which are explored in the assessments of the North Sea plaice (ple.27.420) and North Sea sole (sol.27.4) stocks during WGNSSK.**
- **The Belgian DYFS data on marine litter is available for the ICES Working Group on Marine Litter (WGML).**
- **The Belgian DYFS data on brown shrimp (*Crangon crangon*) is available for the ICES Working Group on Crangon Fisheries and Life History (WGCRAN), where the data is used to calculate biological stock status indicators.**
- **The Belgian DYFS data is used for the national MSFD (Marine Strategy Framework Directive) assessment of descriptor 1, concerning marine biodiversity, descriptor 3 concerning commercially exploited fish and shell fish stocks and descriptor 10 concerning marine litter.**

7. Extended comments

Extended AR comments can be placed under this section.

One haul cannot be sampled anymore and is permanently cancelled as it is in the middle of a new marine aquaculture site ('Corlruyt Zeeboerderij'). From 2023 onwards, there will be looked at an alternative station to sample, and this will be brought forward to WGBEAM.

(max. 450 words per survey)

SECTION 3: FISHING ACTIVITY DATA

Text Box 3.1: Fishing activity variables data collection strategy

General comment: This text box fulfils Article 5 (2)(c), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter II point 3.1 of the EU MAP Delegated Decision annex. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under the Control Regulation (EC) No 1224/2009 or where data collected under Regulation (EC) No 1224/2009 are not at the right aggregation level for the intended scientific use. Text Box 3.1 should be filled only in case complementary data collection is planned
Explain the reasons for implementing complementary data collection. *Information on the sampling schemes is available in the quality document (Annex 1.2). However, the Member State is invited to highlight additional information here on sampling schemes and sampling frames deemed necessary to understand the actual sampling design planned for the implementation year(s).* *(max. 900 words)*
Deviations from the work plan *List the changes from the work plan (if any) and explain the reasons.* **NA** Actions to avoid deviations *Briefly describe the actions that will be considered / have been taken to avoid deviations in the future and when these actions are expected to produce an effect. If there are no deviations, then this section is not applicable.* **NA** *(max. 900 words)*

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.
Describe data collection of inland eel commercial fisheries landings, effort and capacity. List or describe, for instance, the number of fishing entities, fishing methods, and the associated units used. *(max. 900 words)* **Commercial eel fishing has been banned in Flanders for years. Only sport fishermen are still allowed to catch eels, at most three animals per fishing event.** **There is no commercial fishery for yellow eel in inland waters in Belgium. Commercial fisheries for yellow eel in coastal waters or the sea are negligibly small.**

There are no commercial glass eel fisheries. A feasibility study to assess the possibilities for commercial glass eel fisheries on the river Yser, did not indicate significant potential (Pauwels et al., 2016).

There is no commercial fishery for silver eel in inland waters in Belgium. Commercial fisheries for silver eel in coastal waters or the sea are negligibly small.

Commercial fisheries for silver eel in coastal waters or the sea are negligibly small.

(https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf)

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

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

(max. 900 words)

Text Box 4.2: Incidental catches of sensitive species

(Region/RFMO/RFO/IO: Please indicate per text box and update the table of contents)

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

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

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

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

No, the Belgian commercial sampling scheme applies to beam trawl fisheries, which form the largest part of the Belgian commercial fishing fleet. Sea going observers have been monitoring incidental catches of sensitive species on beam trawlers since 2014 and all their registrations have been transferred to ICES WGBYC. Up until now, very few sensitive species were registered, except for certain elasmobranchs. Belgian fisheries policy strongly focuses on reducing bycatch of sensitive species, especially regarding the elasmobranchs. Currently, only blonde ray, spotted ray and thornback ray can be landed. Other ray species are released immediately. Fishermen are encouraged to use techniques and equipment to ensure rapid and safe release in accordance with European regulations.

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

The Belgian fishing fleet uses both passive and active gears as shown in the table below. Most vessels use active gears. Within the WP, Belgium only monitors beam trawl fisheries as this is the largest part of the commercial fishing fleet (~70% of the fishing vessels; see table below).

Type of fishing technique		**N° of vessels**
Active gears	**Beam trawlers**	**44**
Active gears	**Demersal trawlers and/or demersal seiners**	**16**
Active gears	**Dredges**	**1**
Passive gears	**Drift and/or fixed netters**	**1**
Passive gears	**Pots and/or traps**	**1**

Beam trawling is still prone to catch bycatch. However, the amount of bycatch of sensitive species is found to be low (data reported to WGBYC). Beam trawlers impact a considerably lower amount of water volume compared to demersal trawlers and seiners (bottom trawls) and gillnets (the latter not present in Belgian fleet). The latter (bottom trawls and gillnets) have been flagged by Suuronen *et al.* (2012) to have the disadvantage to catch incidental bycatch of non-target species often sea birds, turtles and other charismatic species. WGBYC latest report states that the highest number of dolphins and vulnerable elasmobranchs are caught with gill/trammel nets and bottom otter trawling. Given that the Belgian commercial fishing fleet consists mostly of beam trawlers, the risk of catching sensitive species is limited compared to the other gear types/metiers.

***Sources*:**

- **Suuronen, P.; Chopin, F.; Glass, C.; Løkkeborg, S.; Matsushita, Y.; Queirolo, D.; Rihan, D. (2012). Low impact and fuel-efficient fishing - Looking beyond the horizon, Fisheries Research, Volumes 119–120, Pages 135-146, https://doi.org/10.1016/j.fishres.2011.12.009.**
- **ICES. 2020. Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. 2:81. 216 pp. http://doi.org/10.17895/ices.pub.7471**

— What methods are used to calculate the observation effort?

See Annex 1.1

— 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.

Belgium relies on the DCF sampling programme to monitor marine mammals and incidental catches of sensitive species. In addition, both ICES WGBYC and WGEF (Working Group on Bycatch of Protected Species and Working Group on Elasmobranch Fishes respectively) have issued a list of sensitive species. Belgium's protocol is to only report species from these lists which are observed on the conveyor belt and to register numbers, no weights. If the species are still alive, they are put back overboard as quickly as possible to increase survival chances. The seagoing observers are trained by following a species recognition workshop, they have received the Harokit project training and internally an app to identify rays species by using AI is used as well.

***Sources*:**

- **ICES. 2019. Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. 1:51. 163 pp. http://doi.org/10.17895/ices.pub.5563**
- **ICES. 2019. Working Group on Elasmobranch Fishes (WGEF). ICES Scientific Reports. 1:25. 964 pp. http://doi.org/10.17895/ices.pub.5594**
- **(EU) 2016/1251 of 12 July 2016 (Table 1D)**
- **1_HAROkit_Inleiding.pdf (vliz.be)**

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

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

No, rare specimens are monitored at the conveyor belt. However, if large specimens are present in the catch and are not transferred to the conveyer belt, observers will notice and register them.

— 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. Belgium only monitors beam trawl fisheries.

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

Yes, the protocol instructs to check for rare specimen during sorting of a large catch at the conveyor belt. The observer writes down the number per species.

Yes, the observer indicates what percentage of the sorting process has been checked. Typically, this is 50% (starboard OR portside) or 100% (starboard AND portside) of the catch.

Additional information on sampling schemes:

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

Belgium is involved in the LIFE EU Bycatch project proposal 'CiBBRiNA' which aims to minimize bycatch in fisheries with a high risk of incidental bycatch by working together with fishers, scientists, fisheries and environment ministries and NGO's. The proposal was re-submitted dd 4th of October 2022.

Marine mammals are also monitored under a range of international treaties such as the OSPAR treaty for the protection of the marine environment and the Habitat and Marine Strategy Framework Directives. Dedicated aerial surveys are carried out biannually to determine the density and distribution of marine mammals in Belgian waters. This is coordinated by ICES WGMME to ensure standardised methodology across countries. The national report (in Dutch with English summary) on the 2020 monitoring can be found here: http://www.marinemammals.be/static-file/report_marinemammals_2020_NLBE.pdf

Sources:

- **Haelters, J., F. Kerckhof, K. Moreau, Team SeaLife, E. Lambert & T. Jauniaux, 2021. Strandingen en waarnemingen van zeezoogdieren en opmerkelijke andere soorten in België in 2020 [Strandings and sightings of marine mammals and remarkable other species in Belgium in 2020]. Koninklijk Belgisch Instituut voor Natuurwetenschappen (KBIN), Brussel. 34 pp.**

Additional description on sampling frames

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

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

Results

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

Seagoing observers register incidental bycatch of sensitive species in commercial fishing trips, both TBB_DEF_>221kW and TBB_DEF_<=221kW and on the national BTS and DYFS surveys. Observations of incidental bycatch on commercial fishing trips are registered directly in the SmartFish application and automatically stored in the Smartfish database at ILVO. Belgium answers the data call of ICES WGBYC hereby providing information on observations made within the Belgian sampling plan. The data collected during the surveys (BTS & DYFS) are also recorded in SmartFish and are uploaded to the international survey database of ICES (DATRAS).

Data on incidental by-catch is recorded on the haul level. Incidental bycatch was handled with care and released as fast as possible after recording the necessary information. A total of thirteen different sensitive species were encountered during our 2022 sampling programme. Table ..; shows the number of hauls in which the vulnerable species was observed.

Species	Metier	Mesh size (mm)	Number of hauls present
Anarhichas lupus	**>221kW**	**>= 120**	**42**
Conger conger	**<= 221kW**	**70-99**	**9**
	>221kW	**70-99**	**50**
Dasyatis pastinaca	**<= 221kW**	**70-99**	**1**
	>221kW	**70-99**	**1**
Hippoglossus hippoglossus	**>221kW**	**>= 120**	**1**
Raja microocellata	**<= 221kW**	**70-99**	**5**
	>221kW	**70-99**	**2**
Raja undulata	**<= 221kW**	**70-99**	**5**
	>221kW	**70-99**	**36**
Scophthalmus maximus	**>221kW**	**70-99**	**58**
Scophthalmus rhombus	**>221kW**	**70-99**	**57**

Scyliorhinus stellaris	**>221kW**	**70-99**	**9**
Sebastes norvegicus	**>221kW**	**>= 120mm**	**8**
Torpedo marmorata	**>221kW**	**70-99**	**14**
Torpedo torpedo	**>221kW**	**70-99**	**2**
Zeus faber	**<= 221kW**	**70-99**	**9**
	>221kW	**70-99**	**55**
		>= 120mm	**1**

Alongside the registration of bycatch of PETS by seagoing observers, two additional project have been submitted that aim to work towards reducing the bycatch of PETS, namely the CiBBRiNA and MarineBeacon projects.

The re-submitted LIFE EU Bycatch proposal 'CiBBRiNA', where ILVO is partner of the consortium, , has been approved, and the project should start by the end of 2023. The aim of this project is to address the need for an international perspective for coordinated effort to minimize incidental bycatch by setting up a European flagship initiative in which fishers, scientists, fisheries, environment ministries and NGOs from 13 European countries will work jointly to minimize incidental bycatch in fisheries which have higher risk of bycatch and to work towards transparent and environmentally and socioeconomically sustainable fisheries in the Northeast Atlantic, Baltic and Mediterranean regions.

Apart from that, a new HORIZON project named 'MarineBeacon' has been submitted to continue the work on the incidental bycatch of sensitive species. The proposed project's key objective will address the impact of bycatch of PETS on the decline of marine biodiversity. Expertise and ambition present within the consortium will be used to progressively build upon existing knowledge and to work towards the production of state-of-the-art data products, tools and technologies that can be applied to reduce bycatch and mortality of PETS across different fisheries and regions. The case studies span over six regions, namely the Greenlandic, Icelandic, and Azorean waters, The Greater North Sea Ecoregion, Bay of Biscay and the High Seas.

Deviations from the work plan

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

No deviations.

Actions to avoid deviations

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

NA

(One text box of max. 1 000 words per region/RFMO/RFO/IO)

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.
1. Aim of the study 2. Duration of the study 3. Methodology and expected outcomes of the study   *(max 900 words per study)*
Brief description of the results (including deviations from the plan and justifications as to why if this was the case). ***NA*** Achievement of the original expected outcomes and justification if this was not the case. ***NA*** Follow-up to the activities (what are the next steps, how the results will be used). ***NA*** *(max. 900 words per study)*

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

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

(a) Clustering may be necessary in order to design the sampling plan and to report economic variables;

(b) Member States shall report which fleet segments have been grouped at the national level and shall justify the clustering on the basis of statistical analysis;

(c) In their annual report, Member States shall report the number of sampled vessels for each fleet segment regardless of any clustering made to collect or provide the data."

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

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

(a) *Important segments with distinct characteristics;*

(b) *Segments similar to other segments;*

(c) *Non-important segments with distinct characteristics.*

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

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

(a) *Important segments with distinct characteristics*

(b) *Such segments should not be clustered unless strictly necessary in data reporting for confidentiality reasons. Data should be separately collected for these segments and included in national totals (unless separate identification is then made possible as a consequence).*

(c) *Segments similar to other segments*

(d) *Such segments can be clustered for sampling purposes, as well as for confidentiality reasons. The segments merged should be selected according to criteria that should be fully explained and justified by the Member State. In particular, the approach to determine similarity should be clearly described by the Member State.*

(e) *Non-important segments with distinct characteristics*

(f) *Such segments can be clustered for sampling purposes, as well as for confidentiality reasons. These segments can be merged with other non-important segments. Clustering of these segments with other important segments should be avoided. The Member State should explain how the lower importance had been determined and for which reasons the clustered segments have been selected. Clusters should be named after the biggest segment in terms of number of vessels or economic significance.*

The Belgian Fishing fleet numbers as reported in the AER 2021.

Type of fishing technique		**Length classes (LOA)**	**N° of vessels**	**Cluster**
Active gears	**Beam trawlers**	**10-<12 m**	**0**	

		12-<18 m	**2**	**TBB VL1824**
		18-<24 m	**17**	**TBB VL1824**
		24-<40 m	**25**	
Active gears	**Demersal trawlers and/or demersal seiners**	**10-<12 m**	**0**	
		12-<18 m	**1**	**DTS VL2440**
		18-<24 m	**8**	**DTS VL2440**
		24-<40 m	**7**	**DTS VL2440**
Active gears	**Dredges**	**18-<40 m**	**1**	**PMP VL1824**
Passive gears	**Drift and/or fixed netters**	**18-<24 m**	**1**	**PMP VL1824**
Passive gears	**Pots and/or traps**	**10- <12 m**	**1**	**PMP VL1824**
		Total active vessels	***63***	
		Inactive vessels	***4***	
		Total	**67**	

Fleet segments are determined as described in the European legislation. Many segments consist of less than 10 fishing vessels (see table above) and raises a confidentiality issue related to sensitive socio-economic data. Therefore, and in order to both report on a full dataset as well as report a continuous time series clustering is necessary.

The beam trawlers 12-18m are clustered with beam trawlers 18-24m. The latter is an economic important segment and hence determines the name, however both segments use the same fishing gear and exhibit similar behaviour in terms of target species.

For demersal trawlers and/or seiners, all length categories present in the current Belgian fleet contain less than 10 vessels. The vessels in the three length classes are clustered to retain confidentiality of the data reported for these vessels and in order to report consistent data over time. In addition, this clustering is made in response to the changing number of vessels over the years in all specified length classes.

For dredges and passive gears, the 'non-important segments with distinct characteristics' principle in order to provide a full dataset and retain confidentiality is applied. Also, for this cluster a time series continuation argument can be used, because we have reported on this clustered segment in previous Annual Reports (2008 onwards). As there is no real dominant segment in this cluster and in an attempt to avoid misleading the end-user, these vessels were clustered as 'vessels using active and passive gears' (PMP). A category 'Other' is non-existent.

2. Description of activity indicator

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

Currently Belgium does not use an activity indicator and the MS has not reported this variable, a test study has been suggested (see Text Box 1a) to determine the viability of analysing and reporting this variable in the subsequent WP cycle (2025-2027).

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

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

To report the variables 'capital value' and 'capital costs', the Member State does not use the PIM method. This because the MS does not collect the necessary values used for the PIM calculation. In addition, as the MS has limited fishing licences and a fishing vessel is connected to a licence, the 'capital value' and 'capital costs' have abstract values. This because these values are influenced by both the value of the vessel and the value of the licence. However, the value of the licence is difficult to determine. The MS therefore asks the 'capital value' and 'capital costs' variables in a questionnaire and are given by the accountants of the fishing company. The MS chooses for consistency in reporting these variables collected by a questionnaire and thus respect the time series.

(max. 900 words)

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

There were no deviations from the work plan. However, responses to the questionnaire for some variables were lower compared to other years. As this is considered a quality issue, an explanation is provided in quality annex 1.2, under the question about 'estimation design'.

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

See quality annex 1.2.

(max. 900 words)

SECTION 6: ECONOMIC AND SOCIAL DATA IN AQUACULTURE

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

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

1. Description of the threshold application

Please provide a percentage for the Member State's production from the latest EU aquaculture production reported to Eurostat. Describe and justify the applied threshold(s).

According to EUROSTAT, the total Belgian annual production of the aquaculture sector was 86 tonnes, with a value of 538,016 EURO (last data year 2019). These values represent respectively less than 1% of the total weight and less than 5% of the total value (last total value in EUROSTAT 2015) produced in the European Union. <u>Yet, as the national government considers this as an important topic, and is an end-user for the data, from 2022 onwards Belgium will undertake efforts to collect both economic and social data of the aquaculture sector annually.</u> Specific details on the step-wise improvement of data gathering of the aquaculture sector can be found in Annex 1.2 (Sector Name(s): Aquaculture).

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

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

(max. 900 words)

Deviations from the work plan

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

There were no deviations from the work plan.

Actions to avoid deviations

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

NA

(max. 900 words)

Section 7: Economic and social data in fish processing

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

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

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

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

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

The MS collects data from the fish processing industry. The complementary data collection is necessary to ensure consistent time series and also at the request of the Flemish government. The needed data of both economic and social variables is mostly covered by the balance accounts and financial statements of large enterprises that have to submit a full balance account and financial statement. Yet specific economic and social variables cannot be extracted from the balance accounts and financial statements. The data of these variables is collected through questionnaires. In addition, questionnaires and by consequence stakeholder interaction is key for collecting data on economic and social variables of medium and small fish processing enterprises. Part of the challenge of collecting data via questionnaires is non-response. To cover the within group (size of enterprise) non-response, average values are calculated based on the data reported by respondents within that group and thus covering the data reporting required. Details of the sampling scheme can be found in Annex 1.2 (Fish processing industry).

(max. 900 words)

Deviations from the work plan

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

Since June 2022, the MS had an open vacancy seeking a new staff member to handle socio-economic data collection and reporting related to the fish processing and the aquaculture industry. This position was filled in January 2023. In accordance with the decision of the 2021 AR, the new staff member was tasked with collecting data for the years 2021 and 2022. Due to the training of the new employee, it is anticipated that the data collection for both 2021 and 2022 will be accurately and comprehensively reported in the 2023 AR.

Consequently, the data reported in Table 7.1 remains unchanged from the AR2020. In the AR2020, only data was collected for the main processing companies, which means that the number of non-main processing enterprises which relied on the variable 'turnover' could not be determined.

The following parameters were not included in the 2020 questionnaire, and therefore, cannot be reported in this AR:

- **Value of raw material by country of origin (domestic, other EU or non-EU)**
- **Value of raw material by production environment (capture based fishery and aquaculture sector)**
- **Value of raw material by species**

- **Value of raw material by type of processed material (fresh, frozen and semi processed materials)**
- **Weight of raw material by country of origin (domestic, other EU or non-EU)**
- **Weight of raw material by production environment (capture based fishery and aquaculture sector)**
- **Weight of raw material by type of processed material (fresh, frozen and semi processed materials)**
- **Employment by age**
- **Employment by employment status**
- **FTEs by gender**
- **Unpaid labour by gender**

As a result~~-~~, the "Updated planned" column in Table 7.1 reflects 0% for these parameters. The data collection for 2021 and 2022 will include these parameters and will be presented in the AR of 2023.

Actions to avoid deviations

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

An online survey will be sent out by the end of the second quarter of 2023 to all companies for which email addresses were obtained, collecting data for the years 2021 and 2022, because the last questionnaire was sent out in 2021, inquiring about the 2020 data. Two surveys were developed, one exhaustive survey for smaller companies and one limited survey for larger companies, to increase the response rate and avoid duplication of data collection. This approach is particularly relevant for larger companies, where much of the requested information can already be found in their balance accounts. After two weeks, a reminder will be sent to the non-responsive companies. If there is still no response after a month, ILVO's team will contact them via phone, with a focus on the main processors.

It is expected that some of the identified companies will no longer be involved in fish processing and this number will be updated in the next Annual Report.

(max. 900 words)

LANNEX 1.1 - QUALITY REPORT FOR BIOLOGICAL DATA SAMPLING SCHEME

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

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

Sampling scheme identifier: BTS, DYFS

MS : BEL
Region: North Sea and Eastern Arctic
Sampling scheme identifier: BTS, DYFS
Sampling scheme type: Research surveys at sea
Observation type: SciObsAtSea
Time period of validity: 2022-2024
The main objective of the **Belgian Beam Trawl Survey (BTS)** is to create fisheries-independent abundance indices by age group of commercially important fish species, primarily plaice and sole, in the sampled area (ICES Area 27.4b,c). The target data are abundances, weight and length distributions of all fish and elasmobranchs, and length-weight-age-sex-maturity data of target species. In addition, epibenthic species (count and weight), hydrographic data and marine litter are recorded. During the **Demersal Young Fish Survey (DYFS)** the same target data is collected as the BTS in the Belgian coastal zone, in addition to length measurements of *Crangon crangon*.
Description of the population
Population targeted: **BTS – ICES Area 27.4b,c** The target species and collected parameters are: • Length-weight-age-sex data: cod (*Gadus morhua*), plaice (*Pleuronectes platessa*), dab (*Limanda limanda*), turbot (*Scophthalmus maximus*), brill (*Scophthalmus rhombus*) and sole (*Solea solea*) • Length-weight-age-sex-maturity data: lemon sole (*Microstomus kitt*) • Length-weight per sex data: elasmobranchs and commercially important crustaceans (*Cancer pagurus*, *Nephrops norvegicus* and *Homarus gammarus*) • Length-weight data: cephalopods (*Loligo vulgaris*, *Loligo forbesii* and *Sepia officinalis*) and remaining fish species • Count-weight data: epibenthic species Collection of environmental data: • Depth • Bottom and surface salinity and temperature • Marine litter **DYFS – Belgian coastal zone (ICES Area 27.4c)** The target species and collected parameters are: • Length-weight-age-sex data: plaice (*Pleuronectes platessa*) and sole (*Solea solea*) • Length-weight per sex data: elasmobranchs

- Length-weight data: 16 commercially important fish species (sole, plaice, cod, turbot, dab, brill, lemon sole, whiting, English gurnard, grey gurnard, red gurnard, flounder, mackerel, horse mackerel, seabass, surmullet) and brown shrimp (*Crangon crangon*)
- Count-weight data: epibenthic and non-commercial fish species

Collection of environmental data:
- Depth
- Bottom and surface salinity and temperature
- Marine litter

Population sampled:
Sampling of demersal marine species

Stratification:
For both the BTS and the DYFS, the stations are fixed as discussed at WGBEAM and as included in the survey design:
Manual for the Offshore Beam Trawl Surveys version 3.4

On the BTS biological parameters (age, sex, length, weight) of 7 species (cod, sole, plaice, turbot, brill, lemon sole and dab) are collected, stratified by ICES rectangles, namely five specimens/cm class/ICES rectangle.

On the DYFS biological parameters (age, sex, length, weight) of plaice and sole are collected, stratified by haul, namely one specimen/cm class/haul.

AR comment: Indicate any deviations or developments. Do not change the text already adopted in the work plan.
No deviations

Sampling design and protocols

Sampling design description:
The sampling design of the BTS is described in the international manual for the offshore beam trawl surveys. The sampling design of the DYFS is described in the inshore manual, which will be published in 2022. National protocols in Dutch available upon request.

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

Regional coordination:
The BTS and DYFS sampling design is an international agreement developed by ICES Working Group on Beam Trawl Surveys (WGBEAM).
Link to sampling design documentation:
BTS: Manual for the Offshore Beam Trawl Surveys version 3.4. A Belgian protocol for the BTS (in Dutch) is available on demand (L. Vandecasteele and H. Raat, 2021, National protocol BTS).
DYFS: An international inshore manual will be published in 2022. A Belgian protocol for the DYFS (in Dutch) is available on demand (H. Raat, 2021, National protocol DYFS).

Compliance with international recommendations:
Y

Link to sampling protocol documentation:
BTS: Manual for the Offshore Beam Trawl Surveys version 3.4
DYFS: An international inshore manual will be published in 2022. A Belgian protocol for the DYFS (in Dutch) is available on demand (H. Raat, 2021, Nationaal protocol DYFS). A concise version of the DYFS protocol can be consulted in Text box 2.6

Compliance with international recommendations:
Y

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling implementation

Recording of refusal rate:

NA

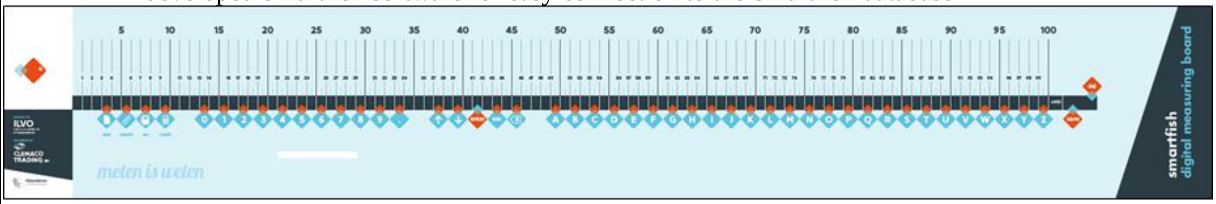
Monitoring of sampling progress within the sampling year:
The planned number of days for each survey (BTS: 10 days, DYFS: 8 days) should accommodate the number of trawls planned. If, due to weather conditions or other unforeseen circumstances the planned schedule cannot be maintained, the chief scientist decides upon a change of schedule. If needed, the international survey coordination group (WGBEAM) is contacted.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Data capture

Means of data capture:

- Environmental data:
  - CTD sensor connected to mobile concentrator which allows automatic data transfer and storage
  - Vessel’s system for trawl information (TRANSAS)
- Length data registered on electronic measuring boards (picture below; power supply via power bank, registers lengths using a linear magnetic sensor) coupled to rugged tablets with inhouse developed Smartfish software for easy connection to the Smartfish database



- Weight data registered on calibrated scales (type Marelec D4/W10)
- Litter recording according to international standards
- Sex and maturity staging following international standards
- Shrimp length measurements registered using inhouse developed Smartshrimp hard- and software
- Age readings using SmartLab software

Data capture documentation:

- CTD sensor: manual available upon request (NKE Instrumentation (2019), “Wisens CTDS – Conductivity, pressure, temperature and salinity measurements”)
- Mobile concentrator: manual available upon request (Rovin (2021), “User Manual Mobile Concentrator”)
- Smartfish: manual available upon request (W. Allegaert (2015, 2021 in prep), “ Smartfish manual”)
- Weight data: manual online available (https://manualzz.com/doc/27548711/marelec-d4)
- Maturity staging: Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)
- Smartshrimp: manual available upon request (W. Allegaert (2017) “Smartshrimp – protocol for measuring length of shrimps”)
- SmartLab and Smartdots: applications to record lab data and determine and manage age records SmartDots (ices.dk)

Quality checks documentation:
Y, the process of QC is described in the national manuals which are available upon request:

- Belgian BTS protocol: L. Vandecasteele and H. Raat (2021), Nationaal protocol BTS in Dutch
- Belgian DYFS protocol: H. Raat (2021), Nationaal protocol DYFS in Dutch

Quality checks are performed at different levels and before entry in the international database DATRAS.

- While recording data:
  - Pop-up messages built into the Smartfish software warn the user when the registered individual weight data deviates from the weight as deducted from general length-weight keys (LWK). This gives the opportunity to correct the weight and reduces outliers.
  - In SmartLab: Ages are checked separately by two lab technicians (age readers). If ages match, it is registered as “approved” in Smartlab.

- Using Smartfish: the status of the trip must be set from ‘raw’ to ‘validated’ in the Smartfish software as it is coupled with Smartlab and the latter program needs a validated dataset. When changing the status of a trip in Smartfish, certain checks are performed on the dataset such as is end date of the survey being later than the start date, weight of subsample cannot be larger than weight of sample, etc.
- Using Power BI: visual check of species composition, sampling locations, duration and distance of trawls, outliers in length-weight-keys and age-length-keys, positions in otolith blocks, etc.
- Using R-scripts: extra quality checks are performed. Scripts are available on demand.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Data storage

National database:
Data is stored in the national Smartfish database (SQL Server). The database has different user access rights and is not publicly accessible through a website.

International database:
DATRAS
https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx

Quality checks and data validation documentation:
https://datsu.ices.dk/web/selRep.aspx

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sample storage

Storage description:
- Fish for which biological variables are to be determined are sometimes stored overnight in the refrigerator/freezers of ILVO ahead of analysis.
- After biological sampling, otoliths are stored in otolith containers and vertebrae are stored in the freezer before they enter the flow of age reading
- After age reading, otoliths are stored at ILVO’s archive for an indefinite period.
- Litter which is too light to weigh at sea are stored in the freezer of ILVO until analysis.

Sample analysis:
- Maturity staging: Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)
- Length measurement of shrimp: manual available upon request (W. Allegaert (2017) “Smartshrimp – protocol for measuring length of shrimps”)
- Determination of biological parameters of target species:
  - Manual for the Offshore Beam Trawl Surveys version 3.4
  - National protocol, internally available: K. Bekaert (2021), “Beproevingsprocedure VSL”
- Age readings: are performed in ILVO’s accredited ANIMALAB laboratory

AR comment: Indicate any deviations.
No deviations

Data processing

Evaluation of data accuracy (bias and precision):
N/Y
During and ahead of the data collection care is taken to collect the data as accurately as possible:
- Trained experts carry out the survey and they follow an annual refresher on species determination in ILVO's yearly “Species Determination Workshop” which is open for public as well.
- Determination of rare species or unsure identifications can be cross-checked with members of WGBEAM.
- WGBIOP assures consistency regarding the collection of biological parameters across member states and regularly organizes exchange workshops in which Belgium participates

After the data collection, there is no direct evaluation of data accuracy of the trawl hauls. The coordinating survey group WGBEAM conducts some analyses for the international data set, not only on e.g., the year classes, but also on species identification consistency. Assessment groups such as WGNSSK annually check sole and plaice cohort tracking to evaluate the survey series.

Editing and imputation methods:
N
When outliers or mistakes are encountered during the quality check procedure, editing and imputation takes place. Corrections are then made directly in the Smartfish database. An adapted dataset is submitted to the international database DATRAS if necessary, mentioning the corrections done.

Quality document associated to a dataset:
N

Validation of the final dataset:
National checks are performed prior to submission of data to the international ICES database DATRAS. In addition, consistency checks are performed in the data portal DATRAS itself during the process of uploading. After submission, the coordinating survey groups analyse last year's survey data, especially data used in stock assessments. In case certain oddities are identified, the data can still be edited prior to the stock assessment meetings (e.g. ICES WGNSSK) take place.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling scheme identifier: SciObsAtSea*Commercial fishing trip*Selected species/stocks

MS : BEL

Region: North Sea and Eastern Arctic

Sampling scheme identifier: SciObsAtSea*Commercial fishing trip*Selected species/stocks

Sampling scheme type: Commercial fishing trip

Observation type: SciObsAtSea

Time period of validity: 2022-2024

The SciObsAtSea*Commercial fishing trip*Selected species/stocks sampling scheme is aiming at collecting information related to catch quantities, length frequency distributions and biological parameters of several commercial species. The data collection is performed by ILVO observers onboard of commercial beam trawl vessels active in areas 4, 7d, 7e-h, 7a and 8ab. There are 2 sampling frames within the sampling scheme SciObsAtSea*Commercial fishing trip*Selected species/stocks: beam trawlers with a maximum power of 221 kW targeting demersal species (TBB_DEF_<=221kW) and beam trawlers with a capacity of more than 221 kW targeting demersal species (TBB_DEF_>221kW). The obtained information is mainly used for stock assessment purposes.

Description of the population

Population targeted:

The PSU for the TBB_DEF_<=221kW sampling frame is vessel*trip. The population targeted = all vessel*trips in the TBB_DEF_<=221kW sampling frame.

The PSU for the TBB_DEF_>221kW sampling frame is vessel*trip. The population targeted = all vessel*trips in the TBB_DEF_>221kW sampling frame.

Population sampled:

The vessels that are taking observers onboard and those that are suited, from a logistic point of view, to have an observer onboard are included in the vessel list used for sampling. The rest of the vessels is excluded from this list. This applies to both to the TBB_DEF_<=221kW sampling frame and to the TBB_DEF_>221kW sampling frame.

Stratification:

The population is not stratified, either for the TBB_DEF_<=221kW sampling frame or for the TBB_DEF_>221kW sampling frame.

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

No deviations

Sampling design and protocols

Sampling design description:

Catch information (all catch fractions are covered) is obtained through on-board observation or ‘at sea sampling’. The sampling effort targets for one year are set at 6-euro cutter trips for the TBB_DEF_<=221kW sampling frame and 40 trips for the TBB_DEF_>221kW sampling frame. The sampling effort is proportionally to the fleet effort of the last available year. For both sampling frames, the primary sampling unit (PSU) is vessel*trip (as a proxy for trip) and the haul (within a trip) is defined as the secondary sampling unit (SSU). The PSU selection for both sampling frames can be defined as a Non-Probabilistic Convenience Sampling (including Quota sampling) and the SSU selection for both sampling frames can be defined as a Systematic Sampling Without replacement because every other haul is sampled by an observer. The crew is sorting the marketable fish from the conveyor belt and stores it per species for the observer to sample later on. In the meantime, the observer is sampling the other catch fractions by species. The total weight per species (all commercial species) per catch category in each sampled haul is determined by the observer and lengths are measured for the species/stocks referred to in table 2.1. (column ‘Covered by a commercial sampling scheme for length’). When a species is extremely abundant, a smaller representative subsample (TSU) is measured. During each trip, minimum 3 fish per cm-size class (except for *Gadus morhua* 1 fish per cm-size class and for *Raja Brachyura* and *Raja Clavata* 1 fish per 5 cm-size class) per species, per catch category and per area, are collected for estimations of biological parameters in the ILVO lab. (see table 2.2 for more details).

Alongside collecting data on commercial species, sea going observers also monitor incidental catches of sensitive species on beam trawlers (TBB_DEF_<=221kW as well as TBB_DEF_>221kW) for the SciObsAtSea programme. Similar to the sampling of commercial species, every other haul is sampled for PETS by an observer. The observer indicates what percentage of the sorting process has been checked. Typically, this is 100% (starboard AND portside) or 50% (starboard OR portside) of the catch. Based on this information, the observation effort can be calculated. The observer checks for sensitive species during sorting of the catch at the conveyer belt. The observer writes down the number per species (no weight info). If the species are still alive, they are put back overboard as quickly as possible to increase survival chances. Additional information related to the list of sensitive species for which data is collected by ILVO is available in Text Box 4.2

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

Regional coordination:
N

Link to sampling design documentation:
Documentation can be found on the Belgian national DCF website https://smartfisheries.be/data-collection/

Compliance with international recommendations:
Y

Link to sampling protocol documentation:
Documentation can be found on the Belgian national DCF website https://smartfisheries.be/data-collection/

Compliance with international recommendations:
Y

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling implementation

Recording of refusal rate:
The SciObsAtSea sampling programme at ILVO is defined as Non-Probabilistic Convenience Sampling (including Quota sampling). Therefore, ILVO considers collecting non-responses and refusals on PSU (trip) level not relevant. However, the sea-going observers keep track of the vessels they contact within the sampling frame.

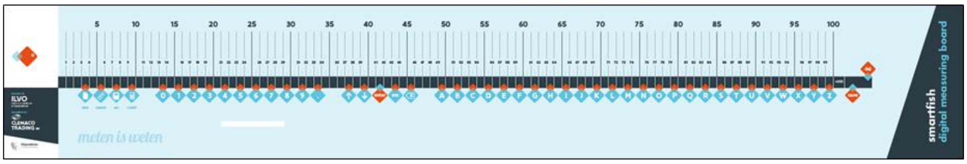
Monitoring of sampling progress within the sampling year:
Adjustments to the initial planning/sampling allocations are avoided. Follow-up of the sampling progress is covered during the weekly observer/scientist meetings. If, due to unforeseen circumstances the initial planning cannot be maintained, the scientist in charge decides upon a change of schedule.

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

Data capture

Means of data capture:

- Length data registered on electronic measuring boards (picture below; power supply via power bank, registers lengths using a linear magnetic sensor) coupled to rugged tablets with inhouse developed Smartfish software for easy connection to the Smartfish database



- Weight data registered on calibrated scales (type Marelec D4/W10)
- Sex and maturity staging following international standards
- Age readings using SmartDots software and the SmartLab platform
    - SmartLab application: this in-house developed tool is used to follow up the analysis of samples, processed in the lab to determine biological parameters.
    - SmartDots application: this in-house developed tool for age reading and quality control of age reading is endorsed by WGBIOP and used by the ICES community for exchanges and workshops on age reading. https://www.ices.dk/data/tools/Pages/smartdots.aspx

All tools and supporting software are developed by ILVO.

Data capture documentation:

- Smartfish: manual available upon request (W. Allegaert (2015, 2021 in prep), “ Smartfish manual”)
- Weight data: manual online available (https://manualzz.com/doc/27548711/marelec-d4)
- Maturity staging: Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)
- SmartLab and Smartdots: applications to record lab data and determine and manage age records SmartDots (ices.dk)

Quality checks documentation:

Y, the process of QC is described in the national protocol which is available upon request:
https://smartfisheries.be/data-collection/

Quality checks are performed at different levels:

- While recording data:
    - Pop-up messages built into the Smartfish software warning the user when the registered individual weight data deviates from the weight as deducted from general length-weight keys (LWK). This gives the opportunity to correct the weight and reduces outliers.
- Using Smartfish: the status of the trip must be set from ‘raw’ to ‘validated’ in the Smartfish software as it is coupled with Smartlab and the latter program needs a validated dataset. When changing the status of a trip in Smartfish, certain checks are performed on the dataset such as its end date of the trip being later than the start date, weight of subsample cannot be larger than weight of sample, etc. These checks are described in the Smartfish manual (W. Allegaert, 2015 and 2021 in prep.).
- Age reading: SmartLab software is used for sample and laboratory management. SmartDots software is used for age reading: images are taken from all otoliths and images are annotated using the SmartDots software, making quality assurance easier and faster. Age reading results are directly included into the SmartLab database, avoiding copying mistakes. After several quality checks, age data is synchronized with the Smartfish database. Following quality checks are done: Readers register

the certainty of their reading (age quality (AQ) 1, 2 or 3). Only AQ1 data are synchronized with the final database. All readings are performed by two readers (double reads of the otoliths). If ages match, the reading is registered as "approved" in Smartdots. Reference collections are used on a monthly basis as a tool to monitor possible deviation in age readings in time. Furthermore, a scientist makes stock-based age-length keys using R-scripts as final check before synchronization with the Smartfish database.

- Using Power BI: using graphs and tables to check species composition, sampling locations, duration and distance of trawls, outliers in length-weight-keys and age-length-keys, positions in otolith blocks, etc. A description of what is checked by Power Bi is available on demand (in Dutch).
- Using R-scripts: extra quality checks are performed. Scripts are available on demand.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Data storage

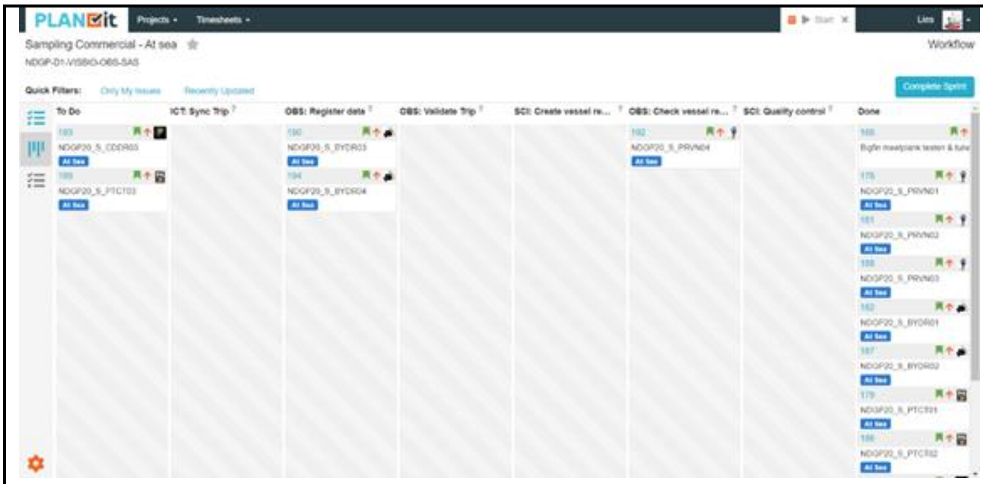
National database:
Data is stored in the national Smartfish database (SQL Server). The database has different user access rights and is not publicly accessible through a website. Laboratory data is stored in the SmartLab database.

International database:
National data are uploaded in The Regional DataBase (RDB). ICES is hosting the database and the database is accessible through this website:
https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation:
Belgium uses a well-documented protocol to ensure high quality data from sampled trips (documentation is stored at the ILVO-ICT intranet web portal). When seagoing observers return from sampling a commercial fishing trip, collected data are immediately transferred from their ruggedized tablet to the SmartFish database (Sync Trip). Metadata of the trip are added to the database and all data are checked by a second observer. Before the trip can be validated, an internal quality control is run within the database. In the next step, a R-markdown script is run by a scientist and a vessel report is produced. This vessel report is checked by the seagoing observer of that specific trip and the report is sent to the vessel owner. Next, scientists run an intensive quality control in which the raw data is checked in a set of consecutive steps (among which outlier detection) using PowerBi. When no quality issues arise, the trip is given a status 'consolidated'. If quality issues arise, the observer is requested to check the raw data and to correct where needed. Finally, the trip receives status done, and data can be used for analysis and raising.

To track the data flow for each trip, the in-house developed tool 'Plan-it' is used. Plan-It application is an in-house developed tool for project and time management and implemented since 2016 and continuously used up to date.

In the figure below, the status of each trip is visible and provides an efficient overview for both observers and scientists. This procedure has been in place since 2017 and has proved to be very efficient.



AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sample storage

Storage description:

– Fish for which biological variables are to be determined are sometimes stored overnight in the refrigerator/freezers of ILVO ahead of analysis.
– After biological sampling, otoliths are stored in otolith containers and vertebrae are stored in the freezer before they enter the flow of age reading.
– After age reading, otoliths and vertebrae are stored in paper bags at ILVO’s archive for an indefinite period.

Sample analysis:

– Determination of biological parameters of target species:
    - National protocol, internally available: K. Bekaert (2021), “Beproevingsprocedure VSL001” for biological parameters.
    - “Werkvoorschrift WV001 VSL001” for maturity determination of flatfish based on Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)
– Age readings: are performed in ILVO’s accredited ANIMALAB (ISO17025). National protocols are used “Beproevingsprocedure OTL001” for otoliths and “Beproevingsprocedure OTL003” for vertebrae.

AR comment: Indicate any deviations.
No deviations

Data processing

Evaluation of data accuracy (bias and precision):
Y
During and ahead of the data collection, care is taken to collect the data as accurately as possible:

- Sea going observers are trained and they follow an annual refresher on species determination in ILVO's yearly “Species Determination Workshop” (which is open for public as well).
- WGBIOP assures consistency regarding the collection of biological parameters across member states and regularly organizes exchanges and workshops in which Belgium participates.

Editing and imputation methods:
N

When outliers or mistakes are encountered during the quality check procedure, editing and imputation takes place. Corrections are then made directly in the Smartfish database.

Quality document associated to a dataset:
N

Validation of the final dataset:
National checks are performed prior to submission of data to ICES data calls in InterCatch and RDB. Scripts used for raising observer data to fleet level consist of a thorough data check including outlier detections, verifying length-weight and age-length relationships and the checks included in the COST library package. Scripts are available on demand.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling scheme identifier: SelfAtSea*Commercial fishing trip*Selected species/stocks

MS : BEL
Region: North-East Atlantic
Sampling scheme identifier: SelfAtSea*Commercial fishing trip*Selected species/stocks
Sampling scheme type: Commercial fishing trip
Observation type: SelfAtSea
Time period of validity: 2022-2024
The SelfAtSea*Commercial fishing trip*Selected species/stocks sampling scheme is aiming at collecting information related to the quantities of the catch of *Solea solea* in area 7a and 8ab and the length frequency distributions as well as the biological parameters of the discarded part of the catch of *Solea solea* in area 7a and 8ab. The data collection is performed by trained fishermen onboard of commercial beam trawl vessels with a capacity of more than 221 kW targeting demersal species (TBB_DEF_>221kW), active in areas 7a and 8ab. The information obtained through this self-sampling programme is mainly used for stock assessment purposes.
Description of the population
Population targeted: The PSU for SelfAtSea*Commercial fishing trip*Selected species/stocks is vessel*trip. The population targeted = all vessel*trips in the TBB_DEF_>221kW in area 7a and 8ab. **Population sampled:** Only the vessels crews that are willing to carry out the self-sampling protocol will deliver sampling information (voluntary). **Stratification:** The population is not stratified
AR comment: Indicate any deviations or developments. Do not change the text already adopted in the work plan. No deviations
Sampling design and protocols
Sampling design description: The sampling effort targets for one year are set at 4 trips for the TBB_DEF_>221kW sampling frame (vessels active in 7a and 8ab). Since this is a voluntary programme, the timing of the data collection is dependent on the industry. It should be noted that TBB_DEF_>221kW activity in 8ab is limited to the summer period (with licenses). Information on *Solea solea* is obtained through on-board observation by the industry. All catch fractions are covered in the data collection process because the crew is asked to collect total catch weights of this species by haul and by catch fraction. When it comes to sampling, only the sampling of the discarded part of the catch is performed by the fishermen. The crew is asked to collect a representative *Solea solea* discard sample (more details below). The *Solea solea* landings (all landing fractions) on the other hand are sampled by ILVO in the fish auction/harbour (more information: see SciObsOnShore*Commercial fishing trip*Selected species/stocks sampling scheme). The primary sampling unit (PSU) is vessel*trip (as a proxy for trip). The PSU selection can be defined as a Non-Probabilistic Convenience Sampling (including Quota sampling) since the self-sampling programme is a voluntary programme and as a consequence the sampling takes place when the opportunity arises.

The secondary sampling unit (SSU) is a basket of 30 kg *Solea solea* discards (within a trip). The 30 kg discard sample is collected randomly throughout the trip and contains fish from at least 3 hauls spread out over the entire trip (beginning, middle and end part of the trip are covered). The discard sample is stored on ice, brought ashore by the crew and further analysed in the ILVO lab: the entire discard sample is measured and 5 fish per cm-size are randomly selected for estimations of biological parameters (see table 2.2 for more details).

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

Regional coordination:
N

Link to sampling design documentation:
Documentation can be found on the Belgian national DCF website https://smartfisheries.be/data-collection/

Compliance with international recommendations:
Y

Link to sampling protocol documentation:
Documentation can be found on the Belgian national DCF website https://smartfisheries.be/data-collection/

Compliance with international recommendations:
Y

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling implementation

Recording of refusal rate:
The SelfAtSea sampling programme at ILVO is a voluntary programme so the sampling takes place when the opportunity arises. Therefore ILVO considers collecting non-responses and refusals on PSU (trip) level not relevant.

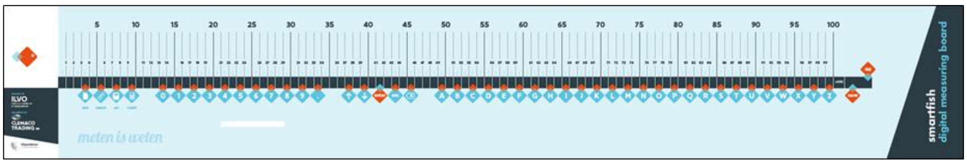
Monitoring of sampling progress within the sampling year:
The SelfAtSea sampling programme at ILVO is a voluntary programme so the sampling takes place when the opportunity arises. Follow-up of the sampling progress is covered during the weekly observer/scientist meetings and the industry is motivated in different ways in order to achieve the annual planned number of PSUs.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Data capture

Means of data capture:

- Length data registered on electronic measuring boards (picture below; power supply via power bank, registers lengths using a linear magnetic sensor) coupled to rugged tablets with inhouse developed Smartfish software for easy connection to the Smartfish database



- Weight data registered on calibrated scales (type Marelec D4/W10)

- Sex and maturity staging following international standards
- Age readings using SmartDots software and the SmartLab platform
- SmartLab application: this in-house developed tool is used to follow up the analysis of samples, processed in the lab to determine biological parameters.
- SmartDots application: this in-house developed tool for age reading and quality control of age reading is endorsed by WGBIOP and used by the ICES community for exchanges and workshops on age reading. https://www.ices.dk/data/tools/Pages/smartdots.aspx

All tools and supporting software are developed by ILVO.

Data capture documentation:

- Smartfish: manual available upon request (W. Allegaert (2015, 2021 in prep), " Smartfish manual")
- Weight data: manual online available (https://manualzz.com/doc/27548711/marelec-d4)
- Maturity staging: Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)
- SmartLab and Smartdots: applications to record lab data and determine and manage age records SmartDots (ices.dk)

Quality checks documentation:

Y, the process of QC is described in the national protocol which is available upon request: https://smartfisheries.be/data-collection/

Quality checks are performed at different levels:

- While recording data:
    - o Pop-up messages built into the Smartfish software warning the user when the registered individual weight data deviates from the weight as deducted from general length-weight keys (LWK). This gives the opportunity to correct the weight and reduces outliers.
- Using Smartfish: the status of the trip must be set from 'raw' to 'validated' in the Smartfish software as it is coupled with Smartlab and the latter program needs a validated dataset. When changing the status of a trip in Smartfish, certain checks are performed on the dataset such as is end date of the trip being later than the start date, weight of subsample cannot be larger than weight of sample, etc. These checks are described in the Smartfish manual (W. Allegaert, 2015 and 2021 in prep.).
- Age reading: SmartLab software is used for sample and laboratory management. SmartDots software is used for age reading: images are taken from all otoliths and images are annotated using the SmartDots software, making quality assurance easier and faster. Age reading results are directly included into the SmartLab database, avoiding copying mistakes. After several quality checks, age data is synchronized with the Smartfish database. Following quality checks are done: Readers register the certainty of their reading (age quality (AQ) 1, 2 or 3). Only AQ1 data are synchronized with the final database. All readings are performed by two readers (double reads of the otoliths). If ages match, the reading is registered as "approved" in Smartdots. Reference collections are used on a monthly basis as a tool to monitor possible deviation in age readings in time. Furthermore, a scientist makes stock-based age-length keys using R-scripts as final check before synchronization with the Smartfish database.
- Using Power BI: using graphs and tables to check species composition, sampling locations, duration and distance of trawls, outliers in length-weight-keys and age-length-keys, positions in otolith blocks, etc. A description of what is checked by Power Bi is available on demand (in Dutch).
- Using R-scripts: extra quality checks are performed. Scripts are available on demand.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Data storage
National database: Data is stored in the national Smartfish database (SQL Server). The database has different user access rights and is not publicly accessible through a website. Laboratory data is stored in the SmartLab database. **International database:** National data are uploaded in The Regional DataBase (RDB). ICES is hosting the database and the database is accessible through this website: https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx **Quality checks and data validation documentation:** Belgium uses an internal protocol (several steps) to ensure high quality data from sampled trips: *Step 1:* When a crew member that performed the self-sampling returns from a trip, the handwritten data (trip and haul information + total catch weights of *Solea solea* by haul and by catch fraction) is imported in the SmartFish database by an ILVO observer/scientist. If issues arise or data is missing, the observer/scientist will contact the responsible crew member to correct the data. PowerBi and excel is used to check for outliers in the data (a.o. plot of haul positions is made). A discard rate for the trip is calculated and compared to the discard rate of trips with vessels that use similar gear and were active in similar regions and in the same season. *Step 2:* Discard Length frequency distributions and biological parameters of the *Solea solea* discards, imported in Smartfish, are checked for outliers using powerBI and excel. The overall discard length frequency distribution for the self-sampled trip is plotted and compared to the LFD of trips with vessels that use similar gear and were active in similar regions and in the same season. If issues arise in step 2, the scientist will check the raw data and/or contact the responsible crew member to explain the deviation in the data and to adjust accordingly (if possible). *Step 3:* Before the trip can be validated, an internal quality control is run within the database. If the quality of the data was checked and approved the trip is given a status 'consolidated' and data can be used for analysis and raising.
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. No deviations
Sample storage
Storage description: • Fish for which biological variables are to be determined are sometimes stored overnight in the refrigerator/freezers of ILVO ahead of analysis. • After biological sampling, otoliths are stored in otolith containers before they enter the flow of age reading • After age reading, otoliths and vertebrae are stored in paper bags at ILVO’s archive for an indefinite period. **Sample analysis:** • Determination of biological parameters of target species: o National protocol, internally available: K. Bekaert (2021), “Beproevingsprocedure VSL001” for biological parameters.

- "Werkvoorschrift WV001 VSL001" for maturity determination of flatfish based on Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

- Age readings: are performed in ILVO's accredited ANIMALAB (ISO17025). National protocols are used "Beproevingsprocedure OTL001" for otoliths.

AR comment: Indicate any deviations.
No deviations

Data processing

Evaluation of data accuracy (bias and precision):
Y
During and ahead of the data collection, care is taken to collect the data as accurately as possible:

- Crew members that are willing to perform the self-sampling are properly trained by ILVO before they start collecting the requested information. They get instructions on how to collect the data and the discard sample and how they are supposed to deal with the paper work. They also get contact information in case something goes wrong during data collection.
- WGBIOP assures consistency regarding the collection of biological parameters across member states and regularly organizes exchanges and workshops in which Belgium participates.

Editing and imputation methods:
N
When outliers or mistakes are encountered during the quality check procedure, editing and imputation takes place. Corrections are then made directly in the Smartfish database.

Quality document associated to a dataset:
N

Validation of the final dataset:
National checks are performed prior to submission of data to ICES data calls in InterCatch and RDB. Scripts used for raising data to fleet level consist of a thorough data check including outlier detections, verifying length-weight and age-length relationships and the checks included in the COST library package. Scripts are available on demand.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling scheme identifier SciObsOnShore*Commercial fishing trip*Selected species/stocks

MS : BEL
Region: North-East Atlantic
Sampling scheme identifier: SciObsOnShore*Commercial fishing trip*Selected species/stocks
Sampling scheme type: Commercial fishing trip
Observation type: SciObsOnShore
Time period of validity: 2022-2024
The SciObsOnShore*Commercial fishing trip*Selected species/stocks sampling scheme is directly linked to the SelfAtSea*Commercial fishing trip*Selected species/stocks sampling scheme (related to TBB_DEF_>221kW vessels, active in areas 7a and 8ab) and is aiming at collecting information related to landing (all fractions) quantities, length frequency distributions and biological parameters for *Solea solea* in area 7a and 8ab. The data collection is performed by ILVO observers/scientists in the fish auction and is only focusing on those trips were the self-sampling protocol onboard was performed (see sampling design description of the SelfAtSea*Commercial fishing trip*Selected species/stocks sampling scheme). The obtained information is used for stock assessment purposes.
Description of the population
Population targeted: The PSU for SciObsOnShore*Commercial fishing trip*Selected species/stocks is vessel*trip. The population targeted = all vessel*trips in the TBB_DEF_>221kW in area 7a and 8ab. **Population sampled:** The data collection is performed by ILVO observers/scientists in the fish auction and is only focusing on those trips were the self-sampling protocol onboard was performed (see sampling design description of the SelfAtSea*Commercial fishing trip*Selected species/stocks sampling scheme). Only the vessels crews that are willing to carry out the self-sampling protocol will deliver sampling information (voluntary). **Stratification:** The population is not stratified
AR comment: Indicate any deviations or developments. Do not change the text already adopted in the work plan. No deviations
Sampling design and protocols
Sampling design description: The sampling effort targets for one year are set at 4 trips for the TBB_DEF_>221kW sampling frame (vessels active in 7a and 8ab). Since this onshore sampling programme is only focusing on those trips were the self-sampling protocol onboard was performed (see sampling design description of the SelfAtSea*Commercial fishing trip*Selected species/stocks sampling scheme) and the fact that the SelfAtSea*Commercial fishing trip*Selected species/stocks sampling scheme is a voluntary programme, the timing of the data collection is dependent on the industry. It should be noted that TBB_DEF_>221kW activity in 8ab is limited to the summer period. Landing (all fractions) information of *Solea solea* is obtained through onshore observation by ILVO observers/scientists in the fish auction/harbor. The primary sampling unit (PSU) is vessel*trip (as a proxy for trip). The PSU selection can be defined as a Non-Probabilistic Convenience Sampling (including Quota sampling) since the self-sampling programme to

which this onshore sampling programme is linked, is a voluntary programme so sampling takes place when the opportunity arises.

The secondary sampling unit (SSU) is a representative number of fish boxes (randomly selected from all *Solea solea* landings from the trip. All the fish in this sample are measured and 4 fish per cm-size are randomly selected for estimations of biological parameters (see table 2.2 for more details) in the ILVO lab (reimbursement is provided for the shipowner). It should be noted that the *Solea solea* landings are sampled *before* the sorting process takes place in the auction.

Is the sampling design compliant with the 4S principle?

Y

Regional coordination:

N

Link to sampling design documentation:

Documentation can be found on the Belgian national DCF website https://smartfisheries.be/data-collection/

Compliance with international recommendations:

Y

Link to sampling protocol documentation:

Documentation can be found on the Belgian national DCF website https://smartfisheries.be/data-collection/

Compliance with international recommendations:

Y

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

No deviations

Sampling implementation

Recording of refusal rate:

The SciObsOnShore sampling programme is directly linked to the SelfAtSea sampling programme. The SelfAtSea sampling programme at ILVO is a voluntary programme so the sampling takes place when the opportunity arises. Therefore ILVO considers collecting non-responses and refusals on PSU (trip) level not relevant.

Monitoring of sampling progress within the sampling year:

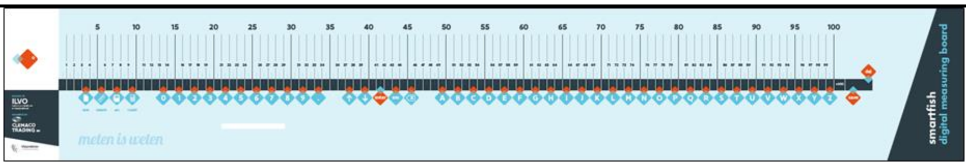
The SciObsOnShore sampling programme is directly linked to the SelfAtSea sampling programme. The SelfAtSea sampling programme at ILVO is a voluntary programme so the sampling takes place when the opportunity arises. Follow-up of the sampling progress is covered during the weekly observer/scientist meetings and the industry is motivated in different ways in order to achieve the annual planned number of PSUs.

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

Data capture

Means of data capture:

- Length data registered on electronic measuring boards (picture below; power supply via power bank, registers lengths using a linear magnetic sensor) coupled to rugged tablets with inhouse developed Smartfish software for easy connection to the Smartfish database



- Weight data registered on calibrated scales (type Marelec D4/W10)
- Sex and maturity staging following international standards
- Age readings using SmartDots software and the SmartLab platform
- SmartLab application: this in-house developed tool is used to follow up the analysis of samples, processed in the lab to determine biological parameters.
- SmartDots application: this in-house developed tool for age reading and quality control of age reading is endorsed by WGBIOP and used by the ICES community for exchanges and workshops on age reading. https://www.ices.dk/data/tools/Pages/smartdots.aspx

All tools and supporting software are developed by ILVO.

Data capture documentation:

- Smartfish: manual available upon request (W. Allegaert (2015, 2021 in prep), " Smartfish manual")
- Weight data: manual online available (https://manualzz.com/doc/27548711/marelec-d4)
- Maturity staging: Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)
- SmartLab and Smartdots: applications to record lab data and determine and manage age records SmartDots (ices.dk)

Quality checks documentation:

Y, the process of QC is described in the national protocol which is available upon request: https://smartfisheries.be/data-collection/

Quality checks are performed at different levels:

- While recording data:
  - Pop-up messages built into the Smartfish software warning the user when the registered individual weight data deviates from the weight as deducted from general length-weight keys (LWK). This gives the opportunity to correct the weight and reduces outliers.
- Using Smartfish: the status of the trip must be set from 'raw' to 'validated' in the Smartfish software as it is coupled with Smartlab and the latter program needs a validated dataset. When changing the status of a trip in Smartfish, certain checks are performed on the dataset such as is end date of the trip being later than the start date, weight of subsample cannot be larger than weight of sample, etc. These checks are described in the Smartfish manual (W. Allegaert, 2015 and 2021 in prep.).
- Age reading: SmartLab software is used for sample and laboratory management. SmartDots software is used for age reading: images are taken from all otoliths and images are annotated using the SmartDots software, making quality assurance easier and faster. Age reading results are directly included into the SmartLab database, avoiding copying mistakes. After several quality checks, age data is synchronized with the Smartfish database. Following quality checks are done: Readers register the certainty of their reading (age quality (AQ) 1, 2 or 3). Only AQ1 data are synchronized with the final database. All readings are performed by two readers (double reads of the otoliths). If ages match, the reading is registered as "approved" in Smartdots. Reference collections are used on a monthly basis as a tool to monitor possible deviation in age readings in time. Furthermore, a scientist makes stock-based age-length keys using R-scripts as final check before synchronization with the Smartfish database.

- Using Power BI: using graphs and tables to check species composition, sampling locations, duration and distance of trawls, outliers in length-weight-keys and age-length-keys, positions in otolith blocks, etc. A description of what is checked by Power Bi is available on demand (in Dutch).
- Using R-scripts: extra quality checks are performed. Scripts are available on demand.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Data storage

National database:
Data is stored in the national Smartfish database (SQL Server). The database has different user access rights and is not publicly accessible through a website. Laboratory data is stored in the SmartLab database.

International database:
National data are uploaded in The Regional DataBase (RDB). ICES is hosting the database and the database is accessible through this website:
https://www.ices.dk/data/data-portals/Pages/RDB-FishFrame.aspx

Quality checks and data validation documentation:
Belgium uses an internal protocol (several steps) to ensure high quality data from sampled trips:

Step 1:
When observers/scientists return from sampling a commercial fishing trip in the auction, collected data are immediately transferred from their ruggedized tablet to the SmartFish database (Sync Trip).

Step 2:
Length frequency distributions and biological parameters of the *Solea solea* landings, imported in Smartfish, are checked for outliers using powerBI. If issues arise, the scientist will check the raw data and adjust accordingly.

Step 3:
Before the trip can be validated, an internal quality control is run within the database. If the quality of the data was checked and approved the trip is given a status 'consolidated' and data can be used for analysis and raising.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sample storage

Storage description:
- Fish for which biological variables are to be determined are sometimes stored overnight in the refrigerator/freezers of ILVO ahead of analysis.
- After biological sampling, otoliths are stored in otolith containers are stored in the freezer before they enter the flow of age reading
- After age reading, otoliths and are stored in paper bags at ILVO’s archive for an indefinite period.

Sample analysis:
- Determination of biological parameters of target species:
    - National protocol, internally available: K. Bekaert (2021), “Beproevingsprocedure VSL001” for biological parameters.
    - “Werkvoorschrift WV001 VSL001” for maturity determination of flatfish based on Report of the Workshop for Advancing Sexual Maturity Staging in Fish (WKASMSF) (ices.dk)

• Age readings: are performed in ILVO’s accredited ANIMALAB (ISO17025). National protocols are used “Beproevingsprocedure OTL001” for otoliths.
AR comment: Indicate any deviations. No deviations
Data processing
Evaluation of data accuracy (bias and precision): **Y** During and ahead of the data collection, care is taken to collect the data as accurately as possible: • Observers/scientists are trained and they follow an annual refresher on species determination in ILVO's yearly “Species Determination Workshop” (which is open for public as well). • WGBIOP assures consistency regarding the collection of biological parameters across member states and regularly organizes exchanges and workshops in which Belgium participates. **Editing and imputation methods:** **N** When outliers or mistakes are encountered during the quality check procedure, editing and imputation takes place. Corrections are then made directly in the Smartfish database. **Quality document associated to a dataset:** **N** **Validation of the final dataset:** National checks are performed prior to submission of data to ICES data calls in InterCatch and RDB. Scripts used for raising data to fleet level consist of a thorough data check including outlier detections, verifying length-weight and age-length relationships and the checks included in the COST library package. Scripts are available on demand.
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. No deviations

Sampling scheme identifier: EMA Water body*Diadromous scientific

MS : BEL
Region : North Sea and Eastern Arctic
Sampling scheme identifier : EMA Water body*Diadromous scientific
Sampling scheme type: Diadromous (scientific)
Observation type: EMU Water Body
Time period of validity : 2022-2024
The sampling scheme collects data of the glass eel recruitment series at Nieuwpoort (river Yser), and the ascending yellow eels at Lixhe on the River Meuse.
Description of the population
Population targeted: Eel (*Anguilla anguilla*), mostly 'yellow eel' stage, but also some silver eel **Population sampled**: Eel (*Anguilla anguilla*), mostly 'yellow eel' stage, but also some silver eel **Stratification**: Stratification is applied, a full description will be available from 2023 onwards.
AR comment: Indicate any deviations or developments. Do not change the text already adopted in the work plan.
Sampling design and protocols
Sampling design description: Y Sampling design is described in https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf **Is the sampling design compliant with the 4S principle?** NA **Regional coordination**: N **Link to sampling design documentation**: Elaborated sampling protocols are available in Dutch on request; In the url link below, a brief overview is available, a separate English version will be available from 2022 https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf and https://purews.inbo.be/ws/portalfiles/portal/15669538/WGEEL_CRs_2018.pdf **Compliance with international recommendations** Y **Link to sampling protocol documentation**: https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf and https://purews.inbo.be/ws/portalfiles/portal/15669538/WGEEL_CRs_2018.pdf
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. No deviations
Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year**: NA
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
Data capture
Means of data capture: In accordance with regulation (EC) No 1100/2007 of 18 Septemer 2007 (the Eel regulation) and in accordance with eel management plan in Belgium, rivers index were selected for each eel management unit: Scheldt EMU (Scheldt and Ijzer catchments) , Meuse EMU (Meuse catchments) and Scheldt EMU (Grote Beverdijkvaart –

Westkustpolder). All these data collections (index River and specific networks) monitor all stages of the eel and the evolution of stocks in place. The choice of index sites makes it possible to investigate different types of environment. Figure 1 illustrates how data are collected here.

Besides, each year from 2012 on, fish from the Scheldt is also monitored through fishing with a mid-water beam trawl from an anchored boat, three times a year (Spring – Summer – Fall) at four sites (Doel, Antwerpen, Steendorp and Branst)

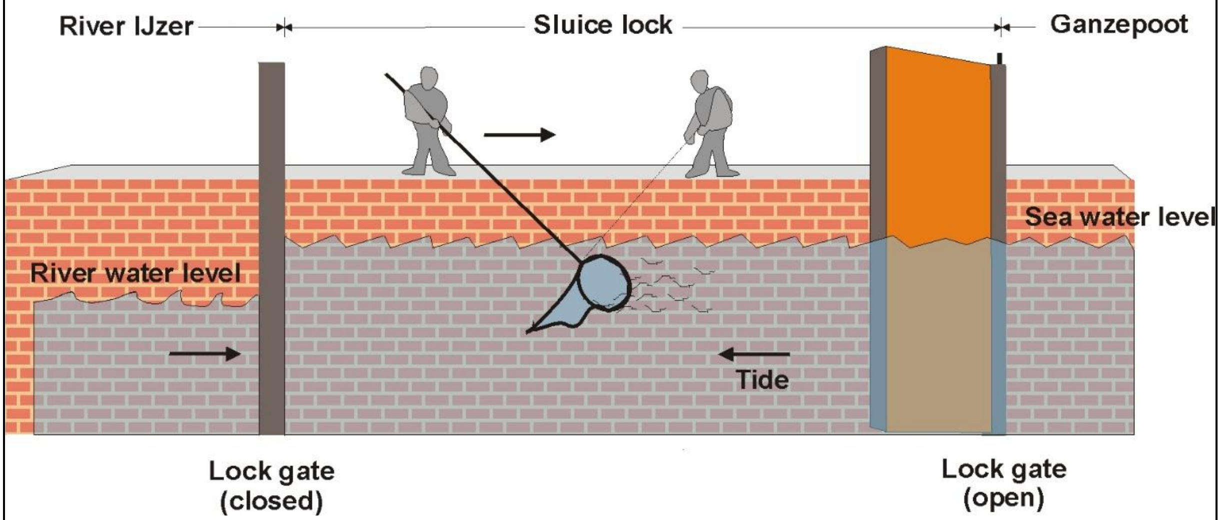


Figure 1: schematic overview of how data are collected at the sluices

In Wallonia:
Based on a constant year-to-year sampling effort, a non-selective cone-trap pool retaining eels in a fish pass build in the Belgian Meuse river at Lixhe is scientifically and homogeneously monitored since 1992 to assessing the abundance of the ascending yellow eels from the Dutch Meuse. Scientific data processing make it possible to establish the trend of incoming stocks of wild eels in the Belgian Meuse
Wallonia also include electrofishing and mobile telemetry in seven rivers (Mosbeux, Hoegne, Wayai, Winamplanche, Berwinne, Gueule and Oxhe) belonging to the Meuse river basin for recruited yellow eels after stocking.

Length and weight is collected for all diadromous species monitored by INBO.
Measuring length is done by using an analogue measuring board.
Weights are collected by using electronic scales up to gram or 5 grams, and wet weight is measured.
INBO has developed an in-house database to store the data in a central location and where quality checks are performed.

Data capture documentation:
https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf and
https://purews.inbo.be/ws/portalfiles/portal/15669538/WGEEL_CRs_2018.pdf

Quality checks documentation: Y
Quality checks are conducted upon processing at the institute, and before entry into the national database. Several scripts are used for the data quality checks

https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf

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

Several sections of the text need to adjusted for clarity, namely:

- **Means of data capture**: In accordance with regulation (EC) No 1100/2007 of 18 September 2007 (the Eel regulation) and in accordance with the Eel Management Plan in Belgium, rivers index were selected for each eel management unit: Scheldt EMU (Scheldt and Yser catchments) , Meuse EMU (Meuse catchments) and Scheldt EMU (Grote Beverdijkvaart – Westkustpolder). All these data collections (index River and specific networks) together monitor all stages of the eel and the evolution of stocks in place. The choice of index sites makes it possible to investigate different types of environment and life stages. Figure 1 illustrates how, for example, data are collected at our decades long glass eel monitoring station on the river Yser at Nieuwpoort.

- **Caption Figure 1:** schematic overview of how data are collected at the sluicessluice-complex of the river Yser at Nieuwpoort.

Data storage

National database: Y
The different users of the INBO eel database have different access rights and restrictions apply for the database, depending on the user.

International database: Y

1. ICES-WGEEL
2. Eel quality database

Quality checks and data validation documentation:
https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
Data are available in the database: https://vis2.inbo.be/
The data are not publicly available, users of the data need to send a request to INBO.

Sample storage

No public information available yet, will be available in 2023.

AR comment: Indicate any deviations.
Data are available in the database: https://vis2.inbo.be/
The data are not publicly available, users of the data need to send a request to INBO.

Data processing

Evaluation of data accuracy (bias and precision): Y
The data are checked on outliers. All editing is documented and traceable

https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf

Editing and imputation methods: Y
https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf

Quality document associated to a dataset: N

Validation of the final dataset:
Before data are submitted to an end user (e.g ICES WGEEL), the data are reviewed and checked on errors.

General information on the validation of the dataset can be found in:
https://purews.inbo.be/ws/portalfiles/portal/29133073/CRs_2020.pdf and
https://purews.inbo.be/ws/portalfiles/portal/15669538/WGEEL_CRs_2018.pdf

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
No deviations

Sampling scheme identifier: SciObsOnShore*recreational (on site surveys); SelfAtSea*recreational (on site surveys); SelfOnshore*recreational (on site surveys)

MS : BEL
Region : North Sea and Eastern Arctic
Sampling scheme identifier : SciObsOnShore*recreational (on site surveys) SelfAtSea*recreational (on site surveys) SelfOnshore*recreational (on site surveys)
Sampling scheme type: recreational (on site surveys)
Observation type: SciObsOnShore, SelfAtSea and SelfOnshore
Time period of validity : 2022-2024
The sampling scheme aims at to check the relative contribution of the Belgian recreational catches of European sea bass (Dicentrarchus labrax), cod (Gadus morhua) and pollack (Pollachius virens) in the total national catches (recreational and commercial) of these species with regards to possible thresholds. The sampling scheme applies to marine recreational fisheries, with the focus on the Belgian continental shelf
Description of the population
Population targeted: The target population is the catches of all resident fishers fishing in the Belgian water bodies. PSU = catches per fishermen per year **Population sampled:** Average 2000 recreational fishermen were identified during a questionnaire dd 2018. In 2020, 259 of these recreational fishermen are sampled through a voluntary corporation to fill in logbooks. **Stratification:** NA
AR comment: There were no deviations from the work plan.
Sampling design and protocols
Sampling design description: Y Sampling design is described in **https://www.recreatievezeevisserij.be/Portals/0/Bestanden/BIN%20Recreatieve%20Zeevisserij%202018_FINAL.pdf**. For the completion of the logbook, a separate protocol is available (in Dutch): **https://www.recreatievezeevisserij.be/Portals/0/Bestanden/Logboek_Inleiding.pdf**. The logbook can be filled in online (through the website), through a hardcopy (see example below) or from 1st of January 2022 onwards by using an recreational fisheries app.

LOGBOEK

RECREATIEVE ZEEVISSERIJ

Identificatienummer

Datum *(dd-mm-jj)*

VISTECHNIEK *(aanvinken)*

HENGELEN ☐ met kunstaas ☐ met levend aas

- ☐ boothengelen
  - ☐ focus op zeebaars/kabeljauw
  - ☐ focus andere soorten
- ☐ hengel vanaf strand of golfbreker
- ☐ hengel vanaf pier, staketsel of strekdam

ANDERE

- ☐ boot met sleepnet ☐ kruien ☐ paardevisser
- ☐ passieve strandvisserij - type:

aantal:

VISLOCATIE *(aanvinken, meerdere opties mogelijk)*

- ☐ kust
- ☐ 0 tot 3 nautische mijl
- ☐ 3 tot 6 nautische mijl
- ☐ 6 tot 12 nautische mijl
- ☐ voorbij 12 nm
- ☐ scheepswrak
- ☐ Schelde-estuarium

Indien buitenland, welk land?

DUUR VISACTIVITEIT *(werkelijke duur visactiviteit, zonder transit)* u m

VANGSTEN *(enkel invullen wat voor u van toepassing is)*

lengtes *(cm)*		n° 1	n° 2	n° 3	n° 4	n° 5	n° 6	n° 7	n° 8	n° 9	n° 10
KABELJAUW MORUE	houden	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
	teruggooi	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
ZEEBAARS BAR	houden	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
	teruggooi	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm

	BOT FLET	GRIET BARBUE	MAKREEL MAQUEREAU	SCHAR LIMANDE	PLADIJS PLIE	STEENBOLK TACAUD
aantal stuks						
houden						
teruggooi - ondermaats						
teruggooi - bovenmaats						
totaal gewicht *(kg)*						
houden	kg	kg	kg	kg	kg	kg

	TARBOT TURBOT	TONG SOLE	WIJTING MERLAN	GARNAAL CREVETTE	andere	andere ....
aantal stuks						
houden				nvt		
teruggooi - ondermaats				nvt		
teruggooi - bovenmaats				nvt		
totaal gewicht *(kg)*						
houden	kg	kg	kg	kg	kg	kg

Eventuele bemerkingen kunnen op de ommezijde worden vermeld. www.recreatievezeevisserij.be

Is the sampling design compliant with the 4S principle?

NA

Regional coordination:

N

Link to sampling design documentation:

https://www.recreatievezeevisserij.be/Monitoring/Methodologie

Compliance with international recommendations

Y

Link to sampling protocol documentation:

https://www.recreatievezeevisserij.be/Monitoring/Methodologie

AR comment:

-Avidity was excluded from the methodology due to low data.

-The recreational app will be released in 2023.

Sampling implementation
Recording of refusal rate: NA **Monitoring of sampling progress within the sampling year:** NA
AR comment: There were no deviations from the work plan.
Data capture
Means of data capture: Data are collected through a survey which consists of two parts: the estimation of the total population of recreational sea fishermen or recreational fishing effort and the estimation of catches for a sample of recreational fishermen. An online omnibus survey was sent in 2017 to a representative sample of 200.000 Belgian inhabitants, inquiring about their recreational fishing activity in the Belgian part of the North Sea in the past 12 months. Follow-up questions, when a positive response was received, allows to estimate the total population of Belgian fishermen in function of the used fishing technique and avidity classes. A logbook, as well digital as in hardcopy, was designed, and logbook participants are recruited in the omnibus survey and were added to a pool of purposefully selected logbook participants. On-site surveys, among which an aerial survey, were done in 2017 to estimate total fishing effort. Logbook surveys are used to estimate the recreational catches of a stratified sample of recreational fishermen. Interviews in the 4 major Belgian marine areas and at the coast act as a control on the reported catches. Extrapolation to total catches take into account fishing technique and avidity. The exact protocol is developed and was published in the beginning of 2017. However, this is currently only available in Dutch. (see https://www.recreatievezeevisserij.be/Portals/0/Bestanden/PROTOCOL%20Recreatieve%20zeevisserijmonitoring_FINAL_incl%20annex.pdf) An update of the protocol is foreseen and a translation into English. Aiming to have this ready by the 15th of October 2022. A schematic overview of the current protocol is given in figure 1.

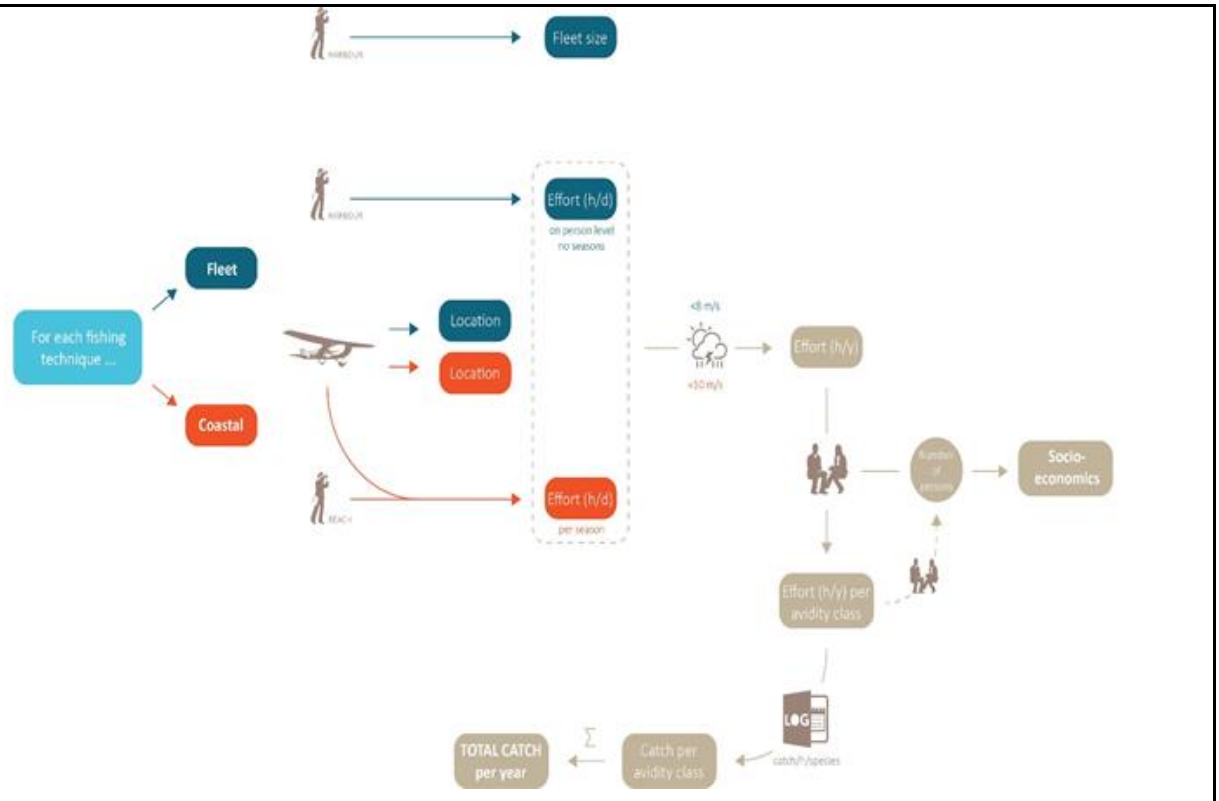


Figure 1: schematic overview of the protocol for collecting data on recreational fisheries and estimate the relative shares of catches of recreational fisheries.

Although no prior studies regarding the total Belgian recreational catch (including all species) have been performed before 2017, it was expected that only for sea bass a significant share of the total Belgian catch can be attributed to recreational fishermen. Although cod is a target species for recreational fisheries, the volume of recreational catch is rather low compared to the commercial landings. The recreational catch of pollack and elasmobranchen is insignificant. Salmon is not present in the Belgian recreational fisheries.

Data capture documentation:
https://www.recreatievezeevisserij.be/Monitoring/Methodologie

Quality checks documentation:
N

Documentation will be available in the year 2023.

AR comment: The translation of the protocol to English is delayed to 2023.

Data storage

National database:
Y
Link: https://www.recreatievezeevisserij.be/Logboek/Hoe-data-bijhouden

The website has a protected part which is only accessible for ILVO and where login and password is needed. The data uploaded by an individual recreational fisher, is not visible for another individual. The individual has only access to a protected part where only his data can be consulted, access is by individual login and password.

International database: NA **Quality checks and data validation documentation:** Through the processing of the data, various quality checks can and will be implemented. These quality checks will be performed at the level of raw data, to check for data input errors and outliers. The checks will also happen at later stages, where calculations can validate the data and the out coming results will also be checked.
AR comment: There were no deviations from the work plan.
Sample storage
Sample storage is not applicable in this context. Fish caught by the recreational fisheries is either taken home, either thrown back as soon as possible.
AR comment: There were no deviations from the work plan.
Data processing
Evaluation of data accuracy (bias and precision): N An initial analysis on the accuracy is started in 2021 and will be continued in 2022 and 2023. Documentation will be available in the year 2023. **Editing and imputation methods:** N Documentation will be available in the year 2023. **Quality document associated to a dataset**: N Validation of the final dataset: The process of validation of the final dataset has started in 2021 and will completed and available during 2023.
AR comment: There were no deviations from the work plan.

ANNEX 1.2 - QUALITY REPORT FOR SOCIOECONOMIC DATA SAMPLING SCHEME

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

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

Provide information under each point in all sections. Do not delete any text from the template.

Sampling scheme identifier: 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): Fisheries
Sampling scheme: Census
Variables: Fleet Economic and social (2021/1167, Table 7, Table 9)
Supra region(s): All supra regions
Survey planning
Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'. **Economic and social variables** Full population including all Belgian fishing vessels. Data is collected by census.
AR comment: There were no deviations from the work plan.
Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.
See text below.
Describe how the sample sizes were determined.
See text below
Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.
See text below
Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.
See text below

Economic variables

A census is carried out for socio-economic data collection. All vessels are surveyed (questionnaire). Since the 1st of September 2010, a Decision was agreed upon by the Flemish Government, regarding the obligation to supply economic data. Thus, national legislation was introduced to impose the obligation to provide data requested under Appendix VI of the DCF. As a consequence, response rates increased.

Methodologies are in accordance with ad hoc contract Commitment No. SI2 725 694 - Methodologies for the socio-economic data described in EU MAP.

An annual survey is conducted by Dienst Zeevisserij, Department of Agriculture and Fisheries (Flemish Government) to collect fleet socio-economic data. Information is collected by vessel. Employment data are obtained through the employers social-accounting secretariat, who gather data regarding the social costs. The Belgian fishery sector has a unique system of social security. These data are delivered directly to Dienst Zeevisserij via the accredited accountancy office Morbee & Ballegeer.

Social variables

Although fleet social data is gathered from every vessel, per crew member and per trip, the MS is still struggling the achieve a full data coverage on 'nationality' and 'education level' variables. The Belgian fishery sector has a unique system of social security. Fishermen receive relatively high incomes. Since 2003, a law on employment ended the 'No catch, no pay' principle, assuring income security for each sea trip (Royal Decree, Belgian State Journal, 07/03/2005). The crew receive a fixed percentage of the value of landings. If the value of landings is lower than a certain minimum wage, the employer has to pay a minimum wage. This is a system that favours employees over employer, bearing in mind that being fisherman remains a dangerous profession. The fact that this has been set legally for all vessels is unique in Europe and might contribute to the fight against illegal fishing. The office responsible for the social security of the Belgian fishermen is BESOX. This organisation has a census coverage of all social data except the 'nationality' and 'education level' variables. During the current WP cycle, the MS will improve the collaboration between Dienst Zeevisserij (Department of Agriculture and Fisheries, Flemish Government) and BESOX in order to include a census sample of the 'nationality' and 'education level' variables. These variables are currently included in the table (5.2). The MS will indicate in the 'comments' section when the MS was not able to collect the data, but will add the data as soon as that data could be collected.

AR comment: There were no deviations from the work plan.

Estimation design

Describe method of calculating population estimate from sample.
See text below

Describe method of calculating derived data: e.g. imputed values.
See text below
Describe treatment of nonresponse.
See text below

Economic variables

As the Belgian Fishing fleet is covered by a census data collection scheme no estimation of values is necessary, except for estimation of missing values based on existing values.

Costs and earnings from the active vessels are surveyed through a questionnaire. As the response within the important fleet segments is high, missing data will be estimated by calculating the mean per fleet segment in the sample. This is then raised to the population level of each segment. The sum of the totals of the different categories estimates the total value for the entire fleet.

Information on technical characteristics, effort and landings from all vessels in the population are available from the logbooks and the vessel register (collected under Regulation (EU) no. 1224/2009).

Social variables

As social data on the Belgian Fisheries Fleet is collected by census, no estimation of values is necessary. In addition, the MS cannot see any valid methods how to estimate the 'nationality' or 'education level' of fishermen as this is highly individual and sensitive data which should be reported based on actual figures and not on estimates.

AR comment: The number answers to the question about the several variables, such as 'unpaid labour', 'value of unpaid labour', 'total hours worked per year', 'operating subsidies', 'subsidies on investment', 'energy costs', 'investment in tangible assets', 'value of physical capital' (both active and inactive vessels) and 'consumption of fixed capital' (both active and inactive vessels) have been dwindling in recent years, although our questionnaire is sent to every vessel owner in our fleet (census). For example, in 2021, except one, no answers for the variable 'unpaid labour' were received. The data was reported as is and therefore below the 50% aimed data coverage. Later in 2023 a sector meeting will be organised to identify and communicate these data coverage issues towards the stakeholders. If no increasing response rate will be obtained, a more personal approach will be used to achieve an above 50% data coverage, by using raising protocols and confirming our results with vessel owners during interviews that are taken.

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

Economic variables

As part of the yearly AER the MS has developed reproducible quality reports with R-markdown. The R-markdown scripts function to analyse the raw fleet activity data and observe the time series and data trends. The application of these scripts on the raw data allows the MS to scan for outliers or unexpected data points. Observation of outliers and unexpected data points allows the MS to couple back to the initial data sources (logbooks, sales notes). The MS aims to update and improve these R-markdown scripts yearly to improve error detection and elimination.

Social variables

The MS has developed as part of the yearly AER reporting R-markdown scripts. The R-scripts function to analyse the raw social data and observe time series data and trends. Although these R-scripts are part of the AER output (especially the trends analyses), the application of these scripts on the raw data allows the MS to scan for outliers or unexpected data points. Observation of outliers and unexpected data points allows the MS to couple back to the raw data database as well as the initial data sources. The initial data source for the social data is either the central database of Dienst Zeevisserij (Department of Agriculture and Fisheries, Flemish Government) or the raw data provided by BESOX. Although no R-markdown scripts are developed as yet for the social data, with improved collaboration of Dienst Zeevisserij (Department of Agriculture and Fisheries, Flemish Government) and BESOX the MS aims to create similar R-markdown scripts for the social data. These scripts will be developed once satisfactory collaboration between the three partners is reached.

AR comment: There were no deviations from the work plan.

Data storage and documentation

Economic variables

Describe how the data is stored.

The raw economic data (from the electronic log book, sales notes and surveys) of the fisheries fleet is stored in a central data platform administered by the Dienst Zeevisserij (Department of Agriculture and Fisheries, Flemish Government) called Polaris. ILVO will receive the relevant data for the AER from Dienst Zeevisserij. At ILVO the data will be stored as three separate MS SQL databases, that is log book and sales data, employment data and survey (balance sheet) data. These databases will be stored in a local databank server.

The R-scripts used to fill the AR template tables, to generate the AER output, as well as the error checking R-Markdown scripts are stored in a centrally accessible GitLab repository allocated to ILVO.

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

Access to protocols and data files can be provided upon request as all files are stored on ILVO-intranet sites and an ILVO-own GitLab repository. To request access to files please contact:

adelbert.declercq@ilvo.vlaanderen.be (responsible socio-economic data collection)
els.torreele@ilvo.vlaanderen.be (NC)

Social variables

Describe how the data is stored.

The raw social data of the fisheries fleet is provided by BESOX to Dienst Zeevisserij (Department of Agriculture and Fisheries, Flemish Government). ILVO will receive the relevant data for the AER from Dienst Zeevisserij. At ILVO the data will be stored as a separate MS SQL database. This database will be stored in a local databank server.

The R-scripts used to fill the AR template tables, to generate the AER output, as well as the error checking R-Markdown scripts are stored in a centrally accessible GitLab repository allocated to ILVO.

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

Access to protocols and data files can be provided upon request as all files are stored on ILVO-intranet sites and an ILVO-own GitLab repository. To request access to files please contact: adelbert.declercq@ilvo.vlaanderen.be (responsible socio-economic data collection) els.torreele@ilvo.vlaanderen.be (NC)
AR comment: There were no deviations from the work plan.
Revision
Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc. **Economic and social variables** Methodologies under the current WP will be evaluated and updated each WP cycle.
AR comment: There were no deviations from the work plan.
Confidentiality
Are procedures for confidential data handling in place and documented? Yes – see text below Are protocols to enforce confidentiality between DCF partners in place and documented? Yes– see text below Are protocols to enforce confidentiality with external users in place and documented? Yes– see text below Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. No - See text below **Economic and social variables** The DCF partners ILVO and the Dienst Zeevisserij (Department of Agriculture and Fisheries, Flemish Government) have an agreement on the transfer and use of data on Belgian sea fisheries. In addition, data managers and scientists working with the data sign a data sharing declaration of confidentiality and transfer of rights. Both the raw data as the processed data with regard the National Data Gathering Programme are only shared with the Commission and ICES following the correct procedures in place. Specifically, for ILVO, the data is stored on a private domain server (intranet) and can only be accessed by the relevant data managers and scientists. ILVO uses Windows Authentication services to provide authenticated access to the relevant data managers and scientists.
AR comment: There were no deviations from the work plan.

Sampling scheme identifier: Aquaculture economics and social

Survey Specifications
Sector name refers to socio economic data on fisheries, aquaculture and any complementary data collection of fishing activity and processing as given in the EU MAP Delegated Decision annex. *Sampling scheme refers to survey technique: by census, by sampling, random or non-random, other (with explanation). If sampling then outline sampling design.* *Variables refer to Tables 7, 9 and 10 of the EU MAP Delegated Decision annex. Supra region refers to Table 2 of the EU MAP Implementing Decision annex. If the sampling scheme is the same in all supra regions put 'All Supra regions'.*
Sector name(s): Aquaculture
Sampling scheme: Census
Variables: Aquaculture economics and social
Supra region(s): All supra regions
Survey planning
Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'. Full population including all Belgian Aquaculture enterprises. Data is collected by census.
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. According to the WP, the collection of socio-economic data in 2022 was scheduled for the largest aquaculture enterprises in Belgium, specifically those with full financial statements and balance accounts that are accessible through the Belgian National Bank. However, it was noted that no companies with full financial statements existed. As a result, economic and social data was collected for the companies with abbreviated financial statements accessible through the Belgian National Bank.
Survey design and strategy

List data sources; e.g. interviews, registers, log books, sales notes, VMS, financial accounts etc.
See text below
Describe how the sample sizes were determined.
See text below
Describe survey methods and distribution; e.g. questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.
See text below
Describe the role of auxiliary information, if any, in the strategy: e.g. for validation, cross referencing, fall back data source etc.
See text below

Socio-economic data for the Belgian aquaculture will be first collected under the current WP cycle (2022-2024). As a full coverage of all aquaculture companies from the start of this WP is impossible the MS suggest a multi-year and multi-step plan to reach a 100% coverage of data collection of all Aquaculture enterprises in Belgium, thus reaching data collection by census.

A list of aquaculture companies administered by FASFC (Federal Agency for the Safety of the Food Chain) is the starting point. This list will be updated and refined over the coming years by cross referencing the list provided by FASFC (Federal Agency for the Safety of the Food Chain) with internet searches as well as stakeholder contacts (especially for Wallonia). Although medium and large aquaculture companies may be identified via the latter approach, the suspected many smaller aquaculture enterprises may be challenging to identified using this approach. Identifying all large and small aquaculture companies in Belgium is one of the aims of the current WP cycle, yet the MS realises this list will have to be subject to a yearly update in the future.

2022:

Socio-economic data will be collected of the largest aquaculture enterprises in Belgium, that is those companies which have a full financial statement and balance accounts which is accessible through the Belgian National Bank. As the data collection for these enterprises is new for both the MS as the enterprises themselves, the MS will focus in this first year on economic variables that can be extracted from the balance accounts and financial statement. Each of the enterprises that will be included in the 2022 AR will be notified and asked for their collaboration in the coming years.

Also in 2022, the medium and smaller enterprises will be further identified as much as possible. As well as building a questionnaire that can go to the larger companies. The questionnaire will include data collection of economic data that cannot be extracted from the balance accounts, social data, environmental data and data necessary to apply the correct segmentation as stated in Table 11 (Commission Decision No. 2021/1167).

2023:

Socio-economic data will be collected of the largest and medium large aquaculture enterprises in Belgium, that is those companies which have full and shortened financial statements and balance accounts which are accessible through the Belgian National Bank. Socio-economic data will be extracted from those financial statement and balance accounts as well as questionnaires that will be sent out to these companies. The questionnaires will collect socio-economic data that is not available in the financial statements and balance accounts, environmental data and the data necessary for correct segmentation. The environmental and segmentation data will be reported where possible.

Also in 2023, increased efforts will be made to identify the one-man enterprises. In order to facilitate the identification, stakeholder interactions will be used to create a closer connection between ILVO (as responsible organisation for data collection and reporting for the aquaculture data). This closer cooperation with the smaller aquaculture enterprises will ultimately improve the data density and quality collected for the NDGP programme.

In addition, the questionnaires will be fine-tuned so that redundant questions can be omitted or extra questions added, the latter being more important for smaller enterprises that do not need to have full financial statements and balance accounts.

2024:

The last year of the current WP cycle aims to have an up-to-date list of aquaculture enterprises of all sizes in Belgium and to collected data of these enterprises by census via their financial statements and balance accounts as well as via the questionnaires. ILVO will further invest in stakeholder interaction where necessary and fine-tune the process of data collection, especially the questionnaires.

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

As no companies with full financial statements existed, economic and social data was collected for seven companies with abbreviated financial statements accessible through the Belgian National Bank. However, a new comprehensive list of aquaculture companies in Belgium for data collection was constructed based on the FASFC's list (Federal Agency for the Safety of the Food Chain), which was used as a starting point, and via cross-referencing with sources like the National Bank of Belgium's (NBB) balance accounts and the Trends Top Database of Belgian Companies based and NACE-codes. Thus the targets set out in the WP for 2022 were met.

In the third quarter of 2023, balance accounts of companies with an abbreviated and micro scheme will be downloaded in a new in-house build and maintained database. Furthermore, an electronic survey will be sent to all companies for which email addresses were obtained, requesting data for the year 2021 and 2022. An extensive survey data collection scheme will be developed as the aquaculture sector in Belgium consists mostly of smaller enterprises. After two weeks, a reminder will be sent to the non-responsive companies. If there is still no response after a month, ILVO's team will contact them via phone. The survey data will on its turn be uploaded into the new database in order to check for data quality and to consistently produce the data necessary for data calls.

Estimation design

Describe method of calculating population estimate from sample.
See text belowDescribe method of calculating derived data: e.g. imputed values
See text below.
Describe treatment of nonresponse.
See text below

As the MS aims to reach data collection by census, no variables will be estimated. As the current WP cycle is the starting phase of collecting and reporting socio-economic data of the aquaculture sector, a non-response is expected to some degree. The MS will use either of two strategies in the first reporting year. If the non-response is above 50% the MS will not report the data until a non-response of <50% is reached. Second, if the non-response is lower than 50% (but not 100%) the MS will report values as is. Totals can be calculated by first calculating the means per segment and making the sum of those means. As the first year(s) focus on larger enterprises with similar cost structures and similar access to the socio-economic data via balance accounts and financial statements, the totals calculated by means is a valid method. In year 2023 a first questionnaire will be sent to the enterprises that were identified to be active in the aquaculture sector. As in 2023 a new database specific for the collection of socio-economic data for aquaculture (and fish processing, see Annex 1.2: fish processing) will be launched, the non-responses will be indicated in the database. This will allow the MS to identify and track the non-responses in order to develop a targeted approach aiming at engaging those enterprises to contribute to the socio-economic data collection, and therefore reducing the number of non-responses. As the aquaculture data collection is new for the MS and thus for the enterprises within the MS, stakeholder interaction will be a key method of increasing response rates. No estimations will be made for non-responses as this would not fit with the census data collection strategy the MS is aiming at.

AR comment: Indicate any deviations. Do not change the text already adopted in the work plan.
The first year's focus was on enterprises with comparable cost structures and access to socio-economic data through balance accounts and financial statements. As most reported and/or known variables could be collected across the companies for which data was collected, calculating values was deemed unnecessary.

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

The initial error check, especially in the first year of the current WP cycle will be focused on the list of aquaculture enterprises. These checks will continue throughout the current WP cycle.

Especially in the second and third year of the current WP cycle, error checks will focus on the comparison of collected data via financial statements and balance accounts, and the data collected by questionnaires. This in order to fine-tune the questionnaires, to avoid double data collection and to improve data density and quality. As the data collection for aquaculture is new for the MS, it is expected that all processes involved to collect this data will be under severe scrutiny during the current WP cycle.

AR comment: There were no deviations from the work plan.

Data storage and documentation

Describe how the data is stored.

As the data collection for aquaculture is new, ILVO will have regular meetings with their IT-members, in order to build a new database for socio-economic information related to aquaculture and fish processing industry (see Annex 1.2: fish processing). The correct documentation and protocols will be stored centrally at an ILVO server. As the database will be running from 2023 onwards, direct specifications cannot be provided as of yet. Any scripts that will be developed related to the data collection and reporting will be stored on a GitLab repository. As these scripts will be developed in R-markdown, they can function also as protocols in place.

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

Access to protocols and data files can be provided upon request as all files are stored on ILVO-intranet sites and an ILVO-own GitLab repository. To request access to files please contact:

adelbert.declercq@ilvo.vlaanderen.be (responsible socio-economic data collection)
els.torreele@ilvo.vlaanderen.be (NC)

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

The construction is in its final stages, with adjustments being made to ensure its optimal functionality. It is estimated that the database will be operational by the third quarter of 2023. A comprehensive explanation of the database's operations will be provided in the next AR. Following the completion of this database, ILVO's IT team will develop R-packages to extract data from the database. Once these R-packages are available, R-markdown scripts will be written to reproduce the data in the desired format. .
Revision
Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc. As the socio-economic data collection for aquaculture enterprises in Belgium is new, the processes involved in the data collection will be revised every year of the current WP cycle.
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. Due to confidentiality concerns, the segmentation by production type was not conducted. With data collected from only seven companies, ensuring data confidentiality would not be possible if companies were segmented per production type and species. The coverage of data was therefore reported in the segment 'other freshwater fish', leaving all non-collected variables and other segments blank. After clarification of the STECF EWG, the NWP will be adjusted and the AR in subsequent years will be filled accordingly.
Confidentiality
Are procedures for confidential data handling in place and documented? Yes – see text below Are protocols to enforce confidentiality between DCF partners in place and documented? Yes – see text below Are protocols to enforce confidentiality with external users in place and documented? Yes – see text below Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. Yes – see text below All measures will be taken by ILVO (responsible for data collection and reporting) to respect confidentiality procedures as outlined in the Commission Decision No. 2021/1167. The protocols involved to retain confidentiality will be documented accordingly.
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. Due to confidentiality concerns, the segmentation by production type and species was not applied. With data collected from only seven companies, ensuring data confidentiality would not be possible if segmentation was applied to the data.

Sampling scheme identifier: FPI economic and social

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): Fish Processing Industry
Sampling scheme: Census
Variables: FPI economic and social
Supra region(s): All supra regions
Survey planning
Provide a short description of the population the sampling scheme applies to; e.g. '*less active vessels using passive gears*'. Due to the variability of activities within the processing industry and still unknown elements, Belgium will pursue a census approach.
AR comment: There were no deviations from the work plan.
Survey design and strategy

List data sources; e.g., interviews, registers, log books, sales notes, VMS, financial accounts etc.
See text below
Describe how the sample sizes were determined.
See text below
Describe survey methods and distribution; e.g., questionnaire forms by post, by email, on website, by phone etc. access to other datasets etc.
See text below
Describe the role of auxiliary information, if any, in the strategy: e.g., for validation, cross-referencing, fall-back data source etc.
See text below

In the previous Belgian National Programme, ILVO strived to list all 'fish processing companies'. This list was based on information from the Federal Agency for the Safety of the Food Chain (FASFC), combined with the top-255 (ranking based on company turnover and number of employees) Belgian companies that were identified as being involved in 'fish processing' in a national survey of private company performance indicators and other sources. Every year, this list of fish processing companies was rigorously updated. However, the identification of genuine fish processing companies, with fish processing as their main activity, remains a challenge in order to set up a meaningful collection scheme.

The list of fish processing companies has been vigorously updated by cross-checking different sources with information on companies involved in fish-based activities. The constant refinement of the base list led to an improved identification of the target group and thus of the quality of the gathered data.

ILVO compared the initial list with the list provided by the Federal Agency for the Safety of the Food Chain (FASFC) who strictly monitor processing activities of these companies from a health safety perspective. The list was further cross-checked with other lists, such as the 'top-255' list, the database of FPS Economy, S.M.E.s, Self-employed and Energy (Federal Government) and a list of the Belgian representative of AIPCE-CEP (European Fish Processors Association - European Federation of National Organisations of Importers and Exporters of Fish).

This resulted in a population of approximately 208 companies. Not all companies process fish as their main activity. Based on answers obtained through a questionnaire, consulting public balance accounts, direct contact with some companies as well as web-research, it was estimated that in 2019 there were 60 companies that processed fish as a main activity, with an estimated turnover of 653 million euro and 1300 FTE's.

This list will be updated on an annual basis through consultation of the following sources:

- Federal Agency for the Safety of the Food Chain (FASFC)
- FPS Economy, S.M.E.s, Self-employed and Energy (Federal Government)
- Balance accounts, National Bank of Belgium
- Questionnaire

Data can be acquired from different sources:

Balance sheets: The balance sheets for most companies can publicly be consulted, except for self-employed workers. Especially for larger companies a lot of information is available in these sheets. A limitation is that not all variables requested under the Delegated Decision, Table 11, are available in the company accounts. For example, energy costs are not separately available, but aggregated within other operational costs.

Questionnaires: Information which is not available through balance sheets, or in general not publicly available will be obtained via online questionnaires.

The main activity of the fish processing companies will be further and yearly defined through web researches and an annual questionnaire. In addition, a better response to the questionnaire can be obtained by strengthening the ties with the fish processing industry. Eventually this will lead to higher quality data on for example the amount of seafood and fish used as raw material for the most commonly processed species. During the current WP period the MS will improve the data collection on the amount by origin but will not report on these values in the Annual report of the current WP. The MS aims to report on the amount by origin in the subsequent WP term. The data requested under the Delegated Decision is considered to be sensitive data. Some companies have previously responded that they were constrained by time or that they simply would not provide the requested economic data. Especially small and medium enterprises do not see the purpose of providing their economic data and therefore their response rate is limited. Regular and direct contact with enterprises improves trust, and hence the understanding and willingness of companies to cooperate. As a result, response rate and data coverage will increase. This may also improve the quality of the provided data. On the other hand, direct contact with enterprises, given the size of the population, is labour intensive and Belgium cannot yet guarantee that the necessary resources will be available to effectively adopt this approach.
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. Since June 2022, the MS had an open vacancy seeking a new staff member to handle socio-economic data collection and reporting related to the fish processing and the aquaculture industry. This position was filled in January 2023. In accordance with the decision of the 2021 AR, the new staff member was tasked with collecting data for the years 2021 and 2022. Due to the training of the new employee, it is anticipated that the data collection for both 2021 and 2022 will be accurately and comprehensively reported in the 2023 AR. The new employee started by updating and refining the ILVO 2020 list of fish processing companies. This involved cross-checking data from various sources such as the Federal Agency for Safety of the Food Chain (FASFC), balance accounts from the National Bank of Belgium (NBB) and Trends Top Database of Belgian Companies based on NACE-codes. These sources helped identify new fish processing companies and those that ceased operations due to bankruptcy or discontinuation of fish processing activities. To gather contact details for new companies, an extensive web research was conducted, resulting in a list of approximately 245 companies involved in fish processing in 2022, either as main or a side activity. An electronic survey will be sent out by the end of the second quarter of 2023 to all companies for which email addresses were obtained, collecting data for the years 2021 and 2022, since the last questionnaire was sent out in 2021, inquiring about the 2020 data. Two surveys were developed, one extensive for smaller companies and one basic for larger companies, to increase the response rate and avoid duplication of data collection. This approach is particularly relevant for larger companies, where much of the requested information can already be found in their balance accounts. After two weeks, a reminder will be sent to the non-responsive companies. If there is still no response after a month, ILVO's team will contact them via phone, with a focus on the main processors. It is expected that some of the identified companies will no longer be involved in fish processing and this number will be updated in the next Annual Report.
Estimation design
Describe method of calculating population estimate from sample. See text below

Describe method of calculating derived data: e.g. imputed values.
See text below
Describe treatment of nonresponse.
See text below

Due to the variability of activities within the processing industry and still unknown elements, Belgium will pursue a census approach.

Enterprises for which fish processing is a main and/or an important activity are targeted first. As it is not possible to directly determine the importance of the fish processing activity relative to other activities from the list of the total company population, a questionnaire aims to determine the proportional importance of the fish processing activity based on turnover and employment. When fish processing is not an important activity, the companies only have to complete a shortened version of the questionnaire. Also, both economic and social variables are collected for the main fish processing companies.

The enterprises are classified in categories according to the number of employees (≤10; 11-49; 50-249; ≥ 250 employees). When the number of companies per category is low, several categories will be grouped to retain confidential reporting. Variables for missing data are estimated by calculating the mean per category in the sample. This is subsequently raised to the population level of each category. The sum of the totals of the different categories estimates the total value for the entire population. More information will be included on larger companies (less abundant) than on smaller ones (more abundant). This leads to a stratified sample in which larger companies are oversampled. However, the total estimation is likely to be more precise, given that larger companies contribute more.

Should the variance between observations in a given category be large, an alternative method will be applied. This concerns mostly the 11-49 employee group. Companies in this group could be further subdivided based on their balance account type. Above certain thresholds, companies must lay down a 'full' balance account. Estimations, based on average calculations, could then be applied to the 'full' and the 'micro or short' balance account separately.

As in 2023 a new database specific for the collection of socio-economic data for fish processing data (and aquaculture data, see Annex 1.2: aquaculture) will be launched, the non-responses will be indicated in the database. This will allow the MS to identify and track the non-responses in order to develop a targeted approach aiming at engaging those enterprises to contribute to the socio-economic data collection, and therefore reducing the number of non-responses. Also for the fish processing industry, stakeholder interaction will be a key method of increasing response rates.

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

As previously noted, due to the recent hiring and training of a new employee, there is a gap in data collection, and the data for 2021 and 2022 will be reported in the AR2023. Consequently, the data reported in Table 7.1 remains unchanged from the AR2020. In the AR2020, only data was collected for the main processing companies, which means that the number of non-main processing enterprises which relied on the variable 'turnover' could not be determined.

The following parameters were not included in the 2020 questionnaire, and therefore, cannot be reported in this AR:

- Value of raw material by country of origin (domestic, other EU or non-EU)
- Value of raw material by production environment (capture based fishery and aquaculture sector)

- Value of raw material by species
- Value of raw material by type of processed material (fresh, frozen and semi processed materials)
- Weight of raw material by country of origin (domestic, other EU or non-EU)
- Weight of raw material by production environment (capture based fishery and aquaculture sector)
- Weight of raw material by type of processed material (fresh, frozen and semi processed materials)
- Employment by age
- Employment by employment status
- FTEs by gender
- Unpaid labour by gender

As a result, the "Updated planned" column in Table 7.1 reflects 0% for these parameters. The data collection for 2021 and 2022 will include these parameters and will be presented in the AR of 2023.

Regarding the database, the construction is in its final stages, with adjustments being made to ensure its optimal functionality. It is estimated that the database will be operational by the third quarter of 2023. A comprehensive explanation of the database's operations will be provided in the next AR.

Error checks

Describe potential errors and how and where in the process these are detected, avoided or eliminated e.g., data; duplication, double counting, respondent error, upload error, processing error etc.

The identification of genuine fish processing companies remains a continuous challenge. Every WP cycle the list of existing and potential new companies will be reviewed with scrutiny in order to eliminate companies which do not fit the definition of fish processing company and to eliminate double entries. Error checks will focus on the comparison of collected data via financial statements and balance accounts, and the data collected by questionnaires. This in order to fine-tune the questionnaires, to avoid double data collection and to improve data density and quality.

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

Once the surveys are completed, the exact number of companies that are no longer involved in fish processing will be determined and subsequently disclosed in the upcoming Annual Report.

Data storage and documentation

Describe how the data is stored.

ILVO will have regular meetings with their IT-members, in order to build a new database for socio-economic information related to aquaculture and fish processing industry (see Annex 1.2: Aquaculture). The correct documentation and protocols will be stored centrally at an ILVO server. Any scripts that will be developed related to the data collection and reporting will be stored on a GitLab repository. As these scripts will be developed in R-markdown, they can function also as protocols in place.

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

Access to protocols and data files can be provided upon request as all files are stored on ILVO-intranet sites and an ILVO-own GitLab repository. If there should be a specific request to access to the files please contact: adelbert.declercq@ilvo.vlaanderen.be (responsible socio-economic data collection) els.torreele@ilvo.vlaanderen.be (NC)
AR comment: Indicate any deviations. Do not change the text already adopted in the work plan. As previously mentioned, the construction of the database is in its final stages. Following this, ILVO's IT team will develop R-packages to extract data from the database. Once these R-packages are available, R-markdown scripts will be written to reproduce the data in the desired format.
Revision
Describe the frequency of the methodology review e.g., revision of; segmentation, survey method per segment, per variable etc. The processes involved in the data collection will be revised every year of the current WP cycle.
AR comment: There were no deviations from the work plan.
Confidentiality
Are procedures for confidential data handling in place and documented? Yes Are protocols to enforce confidentiality between DCF partners in place and documented? Yes Are protocols to enforce confidentiality with external users in place and documented? Yes Are there any issues with publication of data due to confidentiality reasons? Provide an explanation. NO. ILVO will take every possible measure to respect confidentiality procedures as defined in the Commission Decision No. 2021/1167. The protocols involved to retain confidentiality will be documented accordingly.
AR comment: There were no deviations from the work plan.