(ver. 1.0; October 2021)

Maciej Adamowicz, Marta Szymańska,
Katarzyna Krakówka, Ireneusz Wójcik
Department of Logistics & Monitoring
National Marine Fisheries Research Institute
Gdynia, Poland

DCF 2022 - 2024

Sampling design description

Region: **Baltic Sea**
Data source: **Commercial fishery**
Schemes: **Baltic at sea, Baltic on shore**

In 2017 Poland has implemented a new sampling design plan, moving gradually from metier based and purely opportunistic sampling towards the plan based on statistics. After a 3 year implementation, it has been updated in 2019 to improve the design, eliminating the identified shortcomings. Afterwards in 2021, based on the recommendations received and experience gained, the further changes have been implemented.

The following approach was applied to a new sampling plan:

Scheme – determination of the sampling scheme is based on the fishing areas. For the Baltic Sea sampling, two separate sampling schemes were created: 'Baltic at sea' and 'Baltic on shore'.

Stratifications – Population is stratified based on the vessels' length category. The following strata were defined:

- BAL VL0010 – Baltic vessels under 10 meters in length
- BAL VL1012 – Baltic vessels between 10 and 12 meters in length
- BAL VL1218 – Baltic vessels between 12 and 18 meters in length
- BAL VL1824 – Baltic vessels between 18 and 24 meters in length
- BAL VL2440 – Baltic vessels between 24 and 40 meters in length

The main advantage of stratifying the population by vessel length categories is that every vessel belongs to exactly one group. Additionally, such approach was found to be very flexible in case of sudden changes in the fisheries caused by e.g. change in a legislation, natural causes. Moreover, the sampling scheme is also stratified by quarters, with various sampling intensities assigned to each quarter calculated based on the historical data. The list of primary sampling units is drawn separately for each quarter.

Sampling frame – all vessels that were active (at least one fishing trip) in 2018-2020 make a list that is a proxy for selecting the PSUs. According to WKPICS 2013:
"At-sea sampling with trips as primary sampling units. When trips can be selected randomly from a fleet of vessels, at least approximately, it is often reasonable to treat vessel-trips as the primary sampling units. In such cases, the list of all trips (obtained at the end of the year) makes up the sampling frame. This is a virtual frame that cannot be used in stage 1 to select the trips. The actual selection is typically based on a frame with a vessel list crossed with time.".

Coverage – assuming the target population consists of all vessels that were active in 2018-2020, the coverage of target population equals 100%.

Primary Sampling Unit (PSU) is „vessel trip"

Sampling intensity – in order to maintain the continuity of the sampling intensity compared to the previous years, the annual number of samples to be collected during 2022-2024 period is at the same level as during the previous multiannual programs (2014-2021). Both at sea and on shore sampling will be continued. The planned number of samples was equally divided between 'Baltic at sea' and 'Baltic on shore' schemes.

Sampling of the Baltic Sea fisheries is based on a quarterly basis. To define the sampling intensity per each stratum per quarter, the half of the total annual number of samples was distributed proportionally to the quarterly distribution of landings and the second half of the total number of samples was distributed proportionally to the total number of trips. It was decided to include both parameters in order to distribute the sampling effort reflecting the different segments of the fishing fleet. So to take into consideration vessels that have high share in total catches (i.e. larger vessels) as well as vessels that have much more fishing trips but small catches (i.e. smaller vessels, active mainly in a coastal fishery).

Reference years –2018-2020 data were used as the reference year

Sample selection – in case of the Baltic Sea fisheries sampling, for each scheme, quarter and for each stratum a list of vessels will be randomly selected with replacement from a sampling frame.
The number of vessels selected will be overrated, to take into account potential refusals and to avoid additional draws. In case, the selected number of vessels will not be enough (more refusals than expected, e.g. lack of contact with the vessel, refusal to take observer on board or provide landed fish for sampling on shore), the supplementary drawing will be performed to maintain the desired number of vessels trips to sample. The complementary trip will be chosen depending on the observer availability. List of vessels selected for sampling will be recorded in a register. This register will contain information on date of selection, date the vessel was contacted to arrange sampling, information if contact with the vessel was successful or not, vessel's owner acceptance or refusal to be sampled (as well as reasons in case of refusal).

Data archiving and quality checks – Data entered to the national database are verified in the

two-stage validation process supported by a number of completeness, data type and range checks. Export procedures which prepare data sets for external databases (like RDB FishFrame or InterCatch) also perform basic checks. Additionally, a number of quality reports were developed to improve the completeness and reliability of the data.

Coverage of fish stocks – as the stratification is based on vessel length and does not put any restrictions on stock sampling, simulations were carried out in order to investigate the potential coverage of stocks fished and metiers used. Based on the designed sampling plan, a simulated selection of vessels and trips was conducted using the data from 2019. It was decided not to use data from 2020 for the simulation because data from that year may not be representative enough due to covid-19 pandemic as well as fisheries closures related to the condition of Baltic cod. The list of PSUs consists of all vessels active in 2019. Unequal probability sampling with replacement was applied to draw vessels from the list. The probability of a vessel being selected is determined by an average annual catches from the period 2018-2020. In the second step, trips were selected using simple random sampling without replacement. The result of these simulations showed that planned sampling design described above provides good coverage of fish stocks and major fishery types.

Until 2016, sampling programme was based on an opportunistic approach. Due to the confidentiality of personal data, the Institute executing the DCF had no full register of the fishing vessels' owners with contact details. Sampling was based on the cooperation with the owners of over 100 vessels (c.a. 12% of all Polish vessels), built over the years on the basis of trust. During last three years efforts were being made to gain access to the full register of vessels' owners. The list of contact details to vessels' owners systematically expands but the process is extended in time. Therefore, the main expected difficulties in execution of the sampling programme is potentially high level of non-response and/or refusals.

References

Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC (OJ L 354, 28.12.2013, p. 22).

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 (OJ L 157, 20.6.2017, p. 1)

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 (OJ L 253, 16.7.2021, p. 51–90)

ICES. 2014. Report of the third Workshop on Practical Implementation of Statistical Sound Catch Sampling Programmes, 19-22 November 2013, ICES HQ, Copenhagen, Denmark. ICES CM2013/ACOM:54. 109 pp.