Ministry of Agriculture and Forestry (MAF)Natural Resources Institute Finland (Luke)

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

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

Commission Implementing Decision (EU) 2019/909 of 18 February 2019 establishing the list of mandatory research surveys and thresholds for the purposes of the multiannual Union programme for the collection and management of data in the fisheries and aquaculture sectors

Commission Delegated Decision (EU) 2019/910 of 13 March 2019 establishing the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors

Commission Implementing Decision (EU) 2016/1701 of 19 August 2016laying down rules on the format for the submission of work plans for data collection in the fisheries and aquaculture sectors.

Commission Implementing Decision (EU) 2018/1283 of 24 August 2018 laying down rules on the format and timetables for the submission of annual data collection reports in the fisheries and aquaculture sectors.

The Finnish Annual Report for data collection in the fisheries and aquaculture sectors

2020

Version 2 – 2021

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CONTENTS

Text Box 1C: Sampling intensity for biological variables

General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, of the Annex of the Delegated Decision (EU) 2019/910 and Chapter I of the Implementing Decision (EU) 2019/909 on the multiannual Union programme; and Article 2, Article 4 paragraph 1 and Article 8 of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is applicable to the Annual Report.

Member State should provide by Region/RFMO/RFO/IO:

1. Evidence of data quality assurance

Herring and Sprat in the Baltic Sea: All FIN commercial catches of herring and sprat are collected by port sampling program following 4S procedure. Basic data quality checks are carried out automatically in measurement phase (by digital measurement device), e.g. with condition factors and in this way errors can be eliminated/corrected. More quality checks and cross-checks are carried out when data is uploaded to the database. Data processing is carried out according to common standard criteria agreed with other MS and WGBFAS. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed. Samples from BIAS -survey are collected and processed according to IBAS manual (https://www.luke.fi/wp-content/uploads/2020/05/IBAS 2019_manual.pdf).

Pike-perch, perch, and whitefish in the Baltic Sea: The fisheries of common whitefish, as well as perch and pike-perch, and other fisheries on freshwater species) are typically small-scale fisheries, where fishermen operate with small boats close to the coast. Main gears are gillnets and trap-nets, and the sampling is carried out in SD's 29, 30 and 31. Sampling is weighed according to volume of commercial catches and quarterly stratified. Samples are bought from selected fishermen, which instructed to collect whole catch of one fishing day as a sample.

All biological sampling and aging of fish (from scales or operculum) is carried out by professional personnel in Luke according to detailed instructions. Basic data quality checks are carried out automatically in measurement phase (by digital measurement device), e.g. with condition factors and in this way errors can be eliminated/corrected. More quality checks and cross-checks are carried out when data is uploaded to the national database (SUOMU).

Sampling program of pikeperch, perch and whitefish is designed for support national fisheries management. Possibilities to develop sampling towards statistically sound sampling design will be studied.

Eel in the Baltic Sea: There is no harmonized catch sampling scheme for eel in the Baltic Sea. Biological sampling of eel is carried out from bycatch of commercial (fyke net) and recreational fisheries (longline) from coastal area of Baltic Sea (SD 32). Measuring of length, weight, colour of the fish, eye diameter and the length of the pelvic fin and otolith collection are carried out by professional personnel in Luke according to detailed instructions. Life-stage of each individual is determined followed by protocol described by Durif et. al. 2009.

Fish are aged using otolith grinding, polishing, and staining in toluidine blue, method described in ICES 2009. Storing and processing of collected data is carried out according to scientific practices. For improving documentation of eel data collection, we wait for further instructions from WGEEL.

Durif, Caroline & Guibert, A. & Elie, Pierre. (2009). Morphological discrimination of the silvering stages of the European eel.

ICES. 2009. Workshop on Age Reading of European and American Eel (WKAREA), 20-24 April 2009, Bordeaux, France. ICES CM 2009\ACOM: 48. 66 pp

Salmon in the Baltic Sea: Biological samples from salmon are collected by self-sampling program conducted by designated fishers (13 persons in 2020). For each sampled fish, length, weight, sex and the presence of adipose fin are written to the designated fields on the standardized scale sampling envelope. Fishers are also instructed in detail how to collect scale samples, which are sent to Luke (institute responsible for data collection in Finland). Scale samples are aged by the professional personnel in Luke. Also, the origin of the salmon (wild/reared) is determined by age reading. Data on aged samples are recorded to the national databases (Lohi, SUOMU). At this phase logical error checking will take place (length vs. weight, size vs. age, min & max boundaries for certain parameters).

Aged data is used to derivate the age composition of the catches (age groups 1-3 sea winter represent >95 % of the catch). There is no harmonized catch sampling scheme for the Baltic salmon. Assessment model is a Bayesian full life history model utilizing the various data sets apart from catch sampling data (tagging, parr densities, number of smolts, number of spawners, fishing efforts etc.) and ICES Baltic salmon and trout assessment working group (WGBAST) has given general guidelines for sampling protocol for all these data (ICES 2016, ICES 2017, ICES 2020).

ICES. 2016. Report of the Baltic Salmon and Trout Assessment Working Group (WGBAST), 30 March–6 April 2016, Klaipeda, Lithuania. ICES CM 2016/ACOM:09.257 pp.

ICES. 2017. Report of the Benchmark Workshop on Baltic Salmon (WKBALTSalmon), 30 January–3 February 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:31. 112 pp.

ICES. 2020. Baltic Salmon and Trout Assessment Working Group (WGBAST). ICES Scientific Reports. 1:23. 313 pp. http://doi.org/10.17895/ices.pub.4979

Sea trout in the Baltic Sea: There is no harmonized catch sampling scheme for Baltic sea trout. Sea trout is caught as a bycatch in fyke nets fishery for salmon and catches are marginal (about 25 tonnes annually in recent years). National regulation allow only landing of fin clipped sea trout (i.e.originate from stocking). Sampling is conducted by the same fishers as for salmon and the similar sampling, ageing and data recording protocol is followed.

Vendace in the Baltic Sea: Trawl fisheries targeting Vendace (*Coregonus albula*) in the Bay of Bothnia (SD 31) was sampled for the 1st time under DCF in 2018. All FIN vendace samples are collected from SD 31, which is the only area with commercial vendace catches in the Baltic Sea. Samples are collected by port sampling program following 4S procedure from 2020 onwards. Basic data quality checks are carried out automatically in measurement phase (by digital measurement device), e.g. with condition factors and in this way errors can be eliminated/corrected. More quality checks and cross-checks are carried out when data is uploaded to the national SUOMU database. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed.

2. Deviations from the Work Plan

Herring in SD 31 – Port Sampling: The Gulf of Bothnia herring quota has continuously gone down since 2016. The 2020 catches were only 67% of the reference years' 2016-2018 catches. Therefore, the sampling for length measurements did not reach the acceptable 90 % level (being only 70 %) of the planned.

Herring in SD's 25-29, 32 - Acoustic survey: The pelagic trawl samples from survey are taken from mixed stocks of herring and sprat. The catches of herring in the 2020 survey was more than double the amount of the average of the reference years 2016-2018, because the number of successful trawl hauls was also one third bigger than in the reference years. Following the BIAS sampling protocol that leads into much more stock-related samples. The total sampling effort onboard the Research Vessel is not usually divided by nation, but samples are processed together with Swedish scientific team. However, due to Covid19 -pandemia Swedish scientific team was not attending onboard Finnish research vessel, and therefore the regional achievement for lengths is 100% Finnish in 2020 BIAS survey.

Salmon in the Baltic Sea: In SD22-31 74% of planned sampling was achieved. Collecting of salmon catch samples in Finland is mainly based on self-sampling by fishers. Fishers were not able to collect more samples in given circumstances (regulations, individual quota system, quota etc.); Consequently, it is difficult to predict number of samples collected by the fishermen. The planned number of samples can be considered as a guideline. Needed accuracy of estimates in age and sex-specific length and weight were met.

Sea trout in the Baltic Sea: Sea trout maturity samples are determined only from fish caught as bycatch of coastal gillnet fishery (B4) targeting pike-perch, perch, and common whitefish. Only these harbour samples were maturity determined by Luke personnel. Reliable maturity determination is impossible for fishers in self-sampling. No. of sea trout caught as a bycatch in the fishery concerned is difficult to predict. Three sea winter fish can be considered mature. Maturity data is not used in the assessment.

Sprat in SD's 22-32- Acoustic survey: Finnish acoustic survey covers SD 30 and partly SD's 29 and 32. Most of the sprat is distributed to SD's 29 and 32. The amount of sprat in the catch has been usually low and measured individuals have rarely reached the target of 150 measurements/sample. In 2020 the share of sprat in the SD 29 survey catches was exceptionally high, as well as the number of realized trawl stations in the whole survey was higher than in reference years 2016-2018 causing the total number of samples for stock related individuals rise above 150% of the target.

3. Actions to avoid deviations.

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

Herring in SD 31 – Port Sampling:

Length measurements of herring did not reach the acceptable 90 % level (being only 70 %) of the planned. Annual achievement depends on the TAC and realization of fishery in year in question. Therefore, planned number of measurements determined by reference years (2016-2018) does not always match. In the future, more timely monitoring of ongoing fisheries and accumulation of samples will be conducted.

Herring in SD's 25-29, 32 - Acoustic survey: The high annual variance in survey-sample numbers cannot be avoided. The annual achievement depends highly on conditions that are beyond control (e.g. distribution of the fish during the survey, herring and sprat year-class strengths and length distributions, weather, vessel's performance, etc.).

Salmon in the Baltic sea: In order to achieve planned number of samples, more fishers have to be persuaded to participate in self-sampling.

Sea trout in the Baltic Sea: No action planned. No. of sea trout caught as a bycatch in the fishery concerned is difficult to predict and increasing the number of samples of pike-perch, perch, and common whitefish for this purpose is not meaningful.

Sprat in SD's 22-32 – Acoustic survey: The high annual variance in survey-sample numbers cannot be avoided. The annual achievement depends highly on conditions that are beyond control (e.g. distribution of the fish during the survey, sprat and herring year-class strengths and length distributions, weather, vessel's performance, etc.).

(max. 1000 words per Region/RFMO/RFO/IO)

Text Box 1D - Recreational fisheries

General comment: This box fulfills paragraph 2 point (a) (iv) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 3 and Article 4 paragraph 1 of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is applicable to the Annual Report. This box is intended to provide information on the design, implementation and analysis of all components of sampling schemes/ surveys that are listed in Table 1D.

1. Description of the target population

Recreational fisheries in the Baltic Sea: The data on recreational marine fishing is collected by a postal survey using a sample drawn from the population register maintained by the Finnish Population Register Centre. The whole recreational catch is surveyed, but a special attention is drawn to marine catches of salmon, trout, cod and eel for instance in terms of sample allocation. The Finnish population register is the frame population, because there is no covering and usable register on the recreational fishermen. On the other hand, one cannot predestinate, whether the fishermen who are contacted have been fishing at the sea, in inland waters or both. The statistical unit in the recreational fishing statistics is the household-dwelling. The term recreational fishing includes all the fishing carried out by Finnish household-dwellings with the exception of professional fishermen and their household-dwellings.

Recreational salmon catches in the Rivers Tornionjoki and Simojoki: Recreational salmon catches in Rivers Tornionjoki and Simojoki are estimated on the basis of surveys directed to fishermen who purchased fishing license in those rivers. Expected number of license holders in River Tornionjoki is less than 15 000 (12 686 in the record year 2015), out of which 1500 Finnish license holders will be randomly selected and the enquiry will be sent to them by mail. The catch estimate for the rather few foreign fishermen fishing in Tornionjoki is derived by assuming similar fishing among them as among Finnish fishing tourists (i.e. the group "rest of Finland"; see explanation below under "Type of survey"). However, Swedish fishermen are excluded here because their catches are estimated by Sweden. For Simojoki, expected number of license holders is less than 3000 (2520 in 2020).

The target populations of the recreational fishers in the rivers Tornionjoki and Simojoki are fishing license holders in those rivers. The number of angling license holders in 2020 was 11 247 (excluding Swedish licence holders) in River Tornionjoki and 2520 in River Simojoki. In Simojoki one-day mobile licences without any information about the number of buyers were not anymore sold since 2019. In addition to angling, small-scale subsistence fisheries by nets is allowed in designated fishing sites of River Tornionjoki; the households having access to this fishing is considered as a separate additional target population.

Salmon in the rivers Tenojoki and Näätämönjoki: Following the work plan, the DCF monitoring in North Sea and Eastern Arctic is restricted only to the River Utsjoki, a tributary of the River Tenojoki. Only Salmo salar is included in the monitoring because the catch of the other species is negligible. No data is collected of released salmon catch in the River Utsjoki as releasing salmon is very occasional in this system. Therefore the catches of other species than S. salar or the annual percentage of released catch are not provided.

The target population of the recreational fishers in the River Utsjoki are fishing right owners and fishing license buyers. There are several different license selling organizations and the fishing right owners can also distribute/sell their personal license to other fishers, which makes the system very complicated. In addition to angling, part of the fishing right owners are allowed to fish salmon with nets.The estimated number of fishing right owner licenses in 2020 was c. 450 including both season

licenses and shorter day/week licenses. In addition at least 2400 fishing days were sold to fishers without personal fishing rights.

2. Type of survey

Recreational fisheries in the Baltic Sea: When surveying recreational marine catches in 2018 the sample comprised 7 500 household-dwelling units. One household-dwelling unit consists of the persons living permanently in the same dwelling. The sampling was targeted at persons aged 18-74 years. The sample design was stratified sampling. The strata were formed taking into account the payment of fisheries management fee, the location of the person's municipality of residence, the type of municipality and the location of the municipality in relation to the sea. The questionnaire had four pages, and the focus of the questions was on the age and gender of the persons participating in fishing, the importance of fishing as a hobby, fishing activity by fishing area, and catch sizes. The survey is biennial, and the next survey will be conducted in the beginning of 2021.

Recreational salmon catches in the Rivers Tornionjoki and Simojoki: PSU's in the catch surveys of Tornionjoki and Simojoki are river specific populations of fishing license holders. Postal enquiries were sent to subset (n=1 500 in the R. Tornionjoki) of angling license holders randomly selected from the registers covering the whole target populations. In River Simojoki the catch estimate is based on internet webropol enquiries to all licence holders having email (n=1985 in 2020). In Tornionjoki, the sampling is stratified in three units based on licence holder's permanent address (river valley, other Lapland, rest of Finland). Two reminders were sent to the fishers who had not responded to the enquiries in both rivers. All contact persons organizing small-scale net fishing in R. Tornionjoki were interviewed by phone and site-specific total catch estimates were provided by them.

Salmon in the rivers Tenojoki and Näätämönjoki: Following the work plan, the DCF monitoring in North Sea and Eastern Arctic is restricted only to the River Utsjoki, a tributary of the River Tenojoki. PSU's in the catch surveys of the River Utsjoki are fishing right holders and fishing license holders. Log books, postal enquiries and phone calls were used in the catch estimation of the Utsjoki system to cover the whole target population. In 2017 the catch reporting became mandatory in the River Teno system (including Utsjoki), based on the new fishing agreement between Finland and Norway.

3. Data Quality

Recreational fisheries in the Baltic Sea: The response rate in the marine recreational survey conducted at the beginning of 2019 was 33%. After the postal query was done post-sampling for non-respondents and 1107 household-dwellings were intervieved The post-sampling for non-respondents helps to correct the bias resulting from the differences between respondents and non-respondents. If the bias is not taken into account, the catch and number of fishermen would be overestimated.

Recreational salmon catches in the Rivers Tornionjoki and Simojoki: Non-response/refusal rates are recorded in the surveys covering riverine recreational fishing. In 2020 the response rate was 55% in R. Tornionjoki and 59% in R. Simojoki. Response rate among contact persons organizing net fishing in R. Tornionjoki was 100%.

Salmon in the rivers Tenojoki and Näätämönjoki: Following the work plan, the DCF monitoring in North Sea and Eastern Arctic is restricted only to the River Utsjoki, a tributary of the River Tenojoki: Non-response/refusal rates are recorded in the surveys covering the River Utsjoki recreational fishing. In 2020 the estimated response rate in the River Utsjoki system varied between c. 34-82 % depending on the fishermen group. Overall the response rates in Utsjoki were slightly higher than in 2017-2018, but the accuracy of the data is only moderate because of the complicated lisence selling system and information deficiency on persons fishing with nets.

4. Data Analysis and processing

Recreational fisheries in the Baltic Sea: In the marine recreational fishing survey the estimation proedure follows the survey design. For the computation, a weighting factor was formed for each statistical unit, or household-dwelling. The survey data (e.g. catch size) for the household-dwelling were then multiplied by that factor. The weighting factor was formed from the inverses of the inclusion probability and response probability of the sampling unit, that is, household-dwelling unit, and from the calibration weight. The bias caused by non-response was corrected using the homogeneous response group model. The sample was divided by stratum into two homogeneous response group sets within which the probability of responding was considered to be constant. The first group comprised those responding to the questionnaire at first and second contacts, and the second group those responding at the third contact. In the calibration, the distributions to be calculated from the sample can be made to correspond to the marginal distributions. Such marginal distributions were the number of household-dwellings in six household-dwelling groups and the number of household-dwellings by the Fishing Industry Unit obtained from Statistics Finland, the age distribution of men and women and the number of men and women by the Fishing Industry Unit obtained from population statistics, and the number of fishing household-dwellings by strata estimated using both postal questionnaire and telephone interview data. The household-dwelling groups were formed according to the size and age distribution of the household-dwelling. The calibration corrects the bias in the estimates arising from non response, as the size, structure and place of residence of the household-dwelling all have an effect on response activity. The precision of some estimates has been calculated. When needed precision can be calculated for all estimates.

Recreational salmon catches in the Rivers Tornionjoki and Simojoki: The estimation procedure follow the survey design, including stratified estimation in the R. Tornionjoki. Fishing activity among the non-respondents is assumed on average similar to that among respondents, based on the results of the special surveys conducted occasionally among non-respondents (last time carried out in Tornionjoki in 2011). Special surveys have also been used to estimate other biases like double-reporting of catch (due to more than 1 fisher fishing in the same boat/group) and bycath levels in fisheries of other species.

The precision level of the estimates have been calculated and documented for some years in national survey reports. Because river fishing, license systems and survey designs have undergone only modest changes over the years, the precision levels of estimates have been very stable.

Salmon in the rivers Tenojoki and Näätämönjoki: Following the work plan, the DCF monitoring in North Sea and Eastern Arctic is restricted only to the River Utsjoki, a tributary of the River Tenojoki. The estimation procedure of the River Utsjoki follow the survey desing and the new fishing agreement (2017) between Finland and Norway. As the catch reporting is nowadays mandatory all fishermen are being included to the catch inquiries. No special surveys has been conducted among non-respondents since the new fishing agreement (including mandatory catch reporting) between Finland and Norway in 2017. Special surveys have, however, been conducted in some earlier years among the non-respondants.

The precision level of the estimates have not been calculated after the new fishing agreement between Finland and Norway (2017).

(max. 900 words per survey)

Pilot Study 1: Relative share of catches of recreational fisheries compared to commercial fisheries

General comment: This box fulfils paragraph 4 of Chapter II of the Annex of the Implementing Decision (EU) 2019/909 on the multiannual Union programme and Article 2 and Article 4 paragraph (3) point (a) of the Implementing Decision (EU) 2016/1701 on the format of the WP.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.

1. Aim of pilot study

The importance and scale of recreational fisheries is already well-known in Finland.

In 2016, there were about 1.5 million recreational fishermen in 891 000 households in Finland (28 per cent of the total Finnish population). The total catch amounted to 29.6 million kg, of which 75 per cent was taken in inland waters. The marine recreational catch in 2016 was about 7.5 million kg. Perch and pike were the most important catch species. The recreational salmon catch in the sea area was estimated to be 96 tons and the eel catch 7 tons. The recreational cod catch in 2016 was five tons.

The share of recreational catch in total marine catches in 2016 was under 5 %. However, excluding the Baltic herring and sprat the share of recreational catches was 65 percent. Most of the anadromous fish (salmon and sea-trout) catches in inland waters is recreational.

Since the early days of DCR, Finland have produced biennial estimates of marine recreational catches and annual estimates of salmon catches in fresh waters. Biennial sampling strategy has been justified by pilot studies approved by STECF. For salmon and sea-trout, recreational catch estimates are used by ICES as input data in salmon assessments.

The aim of pilot study in 2021 is to produce up-to-date estimates of the recreational catches and their volume as compared to commercial catches

2. Duration of pilot study

Survey in 2021, which collects data on recreational fishery during 2020.

3. Methodology and expected outcomes of pilot study

The sample comprises 7 500 household-dwelling units randomly selected from Finnish population register combined with fisheries management fee register. One household-dwelling unit consists of the persons living permanently in the same dwelling. The sampling is targeted at persons aged 18-74 years. The sample design is stratified sampling. The strata are formed taking into account the payment of fisheries management fee, the location of the person's municipality of residence, the type of municipality and the location of the municipality in relation to the sea.

The questionnaire has four pages, and the focus of the questions is on the age and gender of the persons participating in fishing, the importance of fishing as a hobby, fishing activity by fishing area, and catch sizes. The survey are conducted at the beginning of the year following the reference year.

The results of the pilot studies have proved that, the accuracy of the catch estimates will increase, while the sample size gets larger. On the other hand, the marginal benefit will decrease while increasing the sample size. Salmon, cod and eel are caught by relatively very few fishermen, and in addition, the variation of these uncommon catches by fishermen is relatively high. Because of these facts, the confidence intervals of those catch estimates are always quite wide even in the case of large sample sizes (sample size several thousands). To check if there is over reporting in catch, all respondents reporting salmon, sea trout, cod or eel are going to be interviewed by phone, if the phone numbers can be found.

The post-sampling for non-respondents helps to correct the bias resulting from the differences between respondents and non-respondents. If the bias is not taken into account, the catch and number of fishermen would be overestimated.

Recreational salmon catches in Rivers Tornionjoki and Simojoki are estimated on the basis of surveys directed to fishermen who purchased fishing license in those rivers. Expected number of license holders in River Tornionjoki is less than 15 000 out of which 1500 license holders will be randomly selected and the enquiry will be sent to them by mail. For Simojoki, expected number of license holders is less than 2000 out of which 755 webropol enquiries were be sent to randomly selected license holders. The response rate to the enquiries was 65% (Tornionjoki) and 47% (Simojoki) in 2018. Recreational salmon catches in Rivers Tenojoki and Näätämönjoki are estimated using survey-based methods as Finnish-Norwegian co-operation outside DCF, however recreational catch in River Utsjoki, one of the tributaries in River Tenojoki, is included in DCF.

(max 900 words)

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

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

The biennial survey on recreational fishing catches, including marine recreational catches as well as annual estimates of salmon catches in fresh waters has been included in FIN DCF program since the beginning of the program (2002). The data for Pilot Study 1 is derived from these ordinary data collections. In order to fulfill the requirements of Pilot Study 1, the marine recreational and commercial cathes were compared, but also riverine recreational catches of salmon were included. The postal survey was conducted in 2019 concerning recreational fishing in 2018, and data was analysed in 2019-2020. The results of Pilot Study 1 were reported to European Commission in March 2021.

Pilot Study 1 was conducted as planned with expected results. Majority of fish biomass (97.3 % or 147 644 tonnes of total catch of 151 776 tonnes) was extracted by commercial fishermen. The fraction of the catch caught by recreational fishermen was almost nonexistent for small pelagic species, which constituted majority of the total catch in terms of biomass. On the contrary, for many coastal piscivorous species (perch, pike, pikeperch, ide and brown trout) the recreational catches were substantial, and constituted majority of total catch. Recreational fishermen also caught substantial fraction of the catch of European whitefish and roach. The salmon catch of recreational fishermen at sea areas was estimated at 40 tonnes, which was 16.1 % of total catch. If riverine

recreational salmon cathes in rivers Tornionjoki and Simojoki are included, recreational fishermen caught 116 tonnes of salmon, which was 35.8 % of total salmon catch (marine and riverine catch combined).

5. Incorporation of results from pilot study into regular sampling by the Member State.

Regular inclusion of comparison of recreational and commercial catches to FIN DCF program is being considered according to results of ongoing EU-MAP renewal and in connection with guidelines of WP 2022 onwards.

(max 900 words)

Text Box 1E: Anadromous and catadromous species data collection in fresh water

General comment: This box fulfills paragraph 2 points (b) and (c) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 of the Implementing Decision (EU) 2016/1701 on the format of the WP.

General comment: This box is applicable to the Annual Report.

Method selected for collecting data.

Salmon in the Baltic Sea: Salmon data is collected from two Finnish salmon rivers: the Rivers Tornionjoki (border river between FIN and SWE) and Simojoki. In Tornionjoki, data collection is coordinated with Sweden. Numbers of adult salmon ascending the river are counted annually by DIDSON/ARIS echo sounders. Parr densities are estimated annually by electrofishing. Smolt numbers are estimated by smolt trapping. Recreational fisheries are monitored and their catches are estimated by surveys targeted to those who have purchased salmon fishing license in one or both of the rivers. Biological samples are annually taken from recreational catches in Tornionjoki. Monitoring in these two Baltic salmon rivers has been a part of Finnish data collection since the beginning of the EU data collection.

In addition, the genetic analysis will focus on the catch samples collected from commercial catches in order to explore the present migration patterns of different salmon stocks in the region. These data are needed for the ICES Baltic salmon stock assessment.

Eel in freshwater: Finnish eel catches are very low and in freshwaters there are no commercial fisheries targeting eel. Biennial catch estimates are available for recreational fisheries. Earlier studies suggest, that most eel in freshwaters in Finland originates from restocking programs. It is possible to get limited number of eel samples from the fyke-net and long-line fisheries bycatch. Samples for biological data are collected in two locations in inland waters: Vesijärvi (Kymijoki watershed) and Kulovesi (Kokemäenjoki watershed), where all eel are supposed to be of restocked origin due to migration barriers.

No wild glass eels migrate to Finnish coast. Earlier studies have shown, that all naturally migrating eel have reached yellow-eel stage when arriving to Finnish waters. Instead, glass eels captured elsewhere are restocked to Finnish waters. Stocking numbers are reported to ICES. All restocked glass eels are labelled with strontium chloride since 2009. During 2020 and 2021 need for a monitoring program for recruitment of natural yellow eels in small freshwater watercourses in the Gulf of Finland is studied and planned.

An index for the silver eels migrating from Finland is obtained 1) from eel trap in the river running from Lake Vesijärvi. The eels caught in this trap are marked and released on the coast at Kymijoki estuary (below hydro-power dams) 2) from echosounder in Kokemäenjoki under the lowest hydro-power dam. During 2020 and 2021 need for a monitoring program for studies on hydropower mortality on silver eels is studied and planned.

Salmon in the rivers Tenojoki and Näätämöjoki: New DC-MAP broadens salmon data collection obligations to rivers running from Finland through Norway to Arctic Ocean. There are two such salmon

rivers, Tenojoki and Näätämöjoki. Both waterways are shared between Finland and Norway. There is a well-established co-operation between Finland and Norway in data collection and monitoring of these rivers. Data is used by ICES which produces yearly advice on Atlantic salmon. Even if DCF brings new obligatons and possibilities to Atlantic salmon data collection, any changes in data collection in the two rivers has to be based on common understanding between Finland and Norway in order to quarantee continuous time-series.

At this point Finland plans to continue data collection in the River Utsjoki (the largest tributary of the River Tenojoki on Finnish side) as part of DCF. Data collection of the River Utsjoki includes estimating adult and smolt numbers with video-equipment, estimating parr densities with electro-fishing, collecting statistics and biological samples from recreational fisheries catch. Additionally counting of ascending adult salmon numbers in the River Teno mainstem will be included in the DCF. The counting will be conducted by two ARIS echo sounders in the lower Teno area on Norwegian territory Other data collection in the Rivers Tenojoki and Näätämöjoki continues as Finnish-Norwegian co-operation, financed and enforced outside DCF, which produces the data needed by the end-user (ICES WGNAS) in order to produce the scientific advice on salmon stocks in these rivers.

Monitoring of sea trout parr densities (Pilot Study 1B in WP 2020-2021)

1. Aim of pilot study

Monitoring of the trout parr densities by electrofishing in three rivers holding native sea-run trout stocks. Parr density data are used as model input in ICES WGBAST sea trout assessment for evaluation of stock status and trends by assessment units. In addition the same data is used by HELCOM for assessing the ecological status of sea trout stocks by sub-areas. In Finland these data have been collected in various projects by national funding. In order to better ensure sufficient data supply for ICES and HELCOM assessments the electrofishing surveys in Isojoki, Ingarskilanjoki and Mustajoki will be introduced in our national program first by pilot study and in future potentially as regular monitoring. During 2020 and 2021 need for a monitoring program in Isojoki to estimate smolt production of sea-run trout is studied. Currently South Ostrobothnia ELY Centre is planning to conduct a smolt count in 2020 by using a smolt wheel.

2. Duration of pilot study

Two years in 2020-2021.

3. Methodology and expected outcomes of pilot study

Electrofishing surveys will be carried out by a standard method which produce data that is comparable with the data collected in other Baltic Sea riparian countries by electrofishing surveys (following the guidelines by Bohlin et al. 1989). Electrofishing will be carried out in 21 sites in the main stem of Isojoki (ICES subdivision 30), 11 sites in Ingarskilanjoki (western part of ICES sub-division 32) and 10 sites in Mustajoki (eastern part of ICES sub-division 32). The pilot study will contribute in data supply for evaluating the stock status in two ICES assessment units and three HELCOM sub-areas. There are also several other rivers in Finland with native sea-run trout stocks, the information from which are used in ICES assessment. After two

years of piloting it will be evaluated in which coverage and frequency the sea trout electrofishing surveys will be taken into regular activities of the national program.

ref.

Bohlin, T., Hamrin, S., Heggberget, T.G. et al. 1989. Electrofishing — Theory and practice with special emphasis on salmonids. Hydrobiologia (1989) 173: 9. https://doi.org/10.1007/BF00008596

2. Were the planned number achieved? Yes/ No

Salmon in the Baltic Sea: The smolt trapping in the R. Tornionjoki failed because of the exceptionally high and late spring flood; the trap was set up and data collection was started in the early season when the water level was still low enough, but soon the trap had to be taken up to avoid the rising water to seriously damage the trap. Otherwise the data was collected as planned, despite restrictions in border-crossing caused by COVID-19.

Salmon in the rivers Tenojoki and Näätämönjoki: Following the work plan, the DCF monitoring in North Sea and Eastern Arctic is conducted in the River Utsjoki, a tributary of the River Tenojoki and in the River Tenojoki mainstem (sonar count, added to FIN DCF program in 2020). Monitoring activities in the River Utsjoki were mostly conducted as planned. The reason for adding four cameras (total 12 cameras, compared to planned 8) was to increase the count accuracy as a reaction to extremely high discharges. The number of catch samples collected was, however, only 11 % of the planned number (n=250). This deficiency may have affected the age composition estimation accuracy of the salmon catch but is not estimated to seriously affect the Utsjoki stock status evaluation, as other sources of information were readily available (e.g. video monitoring data). The amount of catch samples which can be collected from this recreational fishing depends largely on the annual variation in the total riverine salmon catch.

In 2020 the salmon catch of the River Utsjoki (and Teno) was extremely poor and reached all-time low. The starting of the River Tenojoki sonar count was slightly delayed because of high water levels. This did not have a major effect on the results. As a result of low number of ascending salmon, all salmon fishing in the River Tenojoki watercourse was prohibited for the 2021 season.

Eel in freshwater: Samples for biological data were collected and monitoring of silver eel migration was done as planned. Achieved sample numbers of silver and yellow eel in lakes Vesijärvi and Kulovesi exceeded planned number of samples (69 vs. 50). Achieved NoS are dependent of recreational eel bycatch, and thus 1:1 ratio of planned and achieved NoS is extremely difficult to achieve. According to WP 2020-2021 a need for studies of monitoring program for recruitment of natural yellow eels, and a monitoring program for studies on hydropower mortality on silver eels were evaluated. For that, recruitment of natural yellow eels was ascertained through strontium/calcium analysis of adult eel otoliths at six sites across the coast of southern Finland. In total, the origin of 150 eels were studied, younger of which were also examined for strontium chloride labeling. In order to plan the study of mortality caused by power plants, the detection of eels marked by ultrasonic transmitters was tested in fast-flowing water downstream the power plant of Harjavalta in the river Kokemäenjoki.

Monitoring of sea trout parr densities (Pilot Study 1B in WP 2020-2021): Monitoring of sea trout parr densities in three rivers running into Baltic Sea were introduced to FIN DCF program in 2020 as a "national pilot study" as a response of expected requirements of new DCF legislation from 1.1.2022 onwards. The study was conducted as planned in 2020, and the inclusion to regular data collection program will be considered in WP 2022 onwards.

(max 500 words per Area)

Text box 1F: Incidental by-catch of birds, mammals, reptiles and fish

General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910, on the multiannual Union programme; and Article 2 of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.

1. Results

Information of the incidental by-catch has been obtained via the port observer program and from the catch reports. In Finland, commercial fishers are reporting the incidental by-catch of birds and marine mammals in the EU logbooks and the coastal fishing journals. The port observers save the bycatch information in the national database. The vast majority of the identified by-catch data are received from the reports from the fishers, and in particular, from the coastal fisheries where the operators are using the coastal fishing journal to report catches, and incidental by-catch as well.

According to the logbook and coastal fishing journal reports, in total 145 individual marine mammal or bird were incidentally killed in 2017. They were mostly marine birds. About 50% of them were cormorants (69 individuals). About 25% were mergansers (38 individuals), and almost 20% were eiders (24 individuals). 2 drowned grey seals were reported. There were no reports of harbour porpoise. The port observers got reports of three bird individuals (great cormorants and a goosander) and four mammal individuals (grey seals).

In 2018, in total 137 individual marine mammal or bird were incidentally killed and reported by fishers. The shares of the by-catch species were quite similar as in the precedent year. About one third were cormorants (47 individuals), about 20% were mergansers (25 individuals). There also have been 25 common mallards in 2018. Eight grey seals were reported as incidental by-catch. There were no reports of harbour porpoise. The port observers got reports of only 1 bird (great cormorant) and one mammal (grey seal).

The 2017 data has been reported to the ICES WGBYC in February, 2019. The 2018 data has been reported to the ICES WGBYC in February, 2020. The 2019 data has not been processed yet. These data will be processed prior the forthcoming WGBYC workshop that will be organized in September 2021.

2. Deviations from Work Plan

The work plan does not include collection of by-catch data in Finland. However, fishers are reporting the incidental by-catch of birds and marine mammals in the EU logbooks, the coastal fishing journals or to the port observers. Vessels from 10 m length and larger are using the EU-log book while smaller vessels are using the coastal fishing journals to for report by-catches.

3. Data quality

Onboard observers are not used in Finland. Information of the incidental by-catch is obtained via the port observer program and from the catch reports.

The methods in processing the log-book and coastal fishing journal data are described in the quality description that is accessible on-line at https://stat.luke.fi/en/tilasto/4472/laatuseloste/7131. Luke's statistics on Commercial marine fishery is certified as Official Statistics Finland and complies with the international standards, guidelines and best practices (http://stat.luke.fi/en/official-statistics-finland_en). The official statistics fully comply with the European Statistical System (ESS). The methodology intends to assure the quality of data collected).

The producers of Official Statistics of Finland have signed a quality assurance in which they commit to the principles that steer statistics production. The quality assurance concerns such as the contents of statistical data, production processes and service to data users.

According to the principles, the producers of Official Statistics of Finland (OSF) offer all Finnish citizens reliable official statistics that have been produced independently and describe Finnish society exhaustively. The quality of the activity is materialized, for instance, in the following:

- Statistics correspond to the needs of users
- Statistics and statistical services are reliable, and the data published in them are up-to-date, impartial and as comparable as possible
- Statistical production processes are smooth, efficient and transparent, only necessary data are collected as the basis for the statistics, and providing the data has been made as easy as possible
- Privacy protection of the data suppliers' is respected
- Statistical personnel serves data users well and the services are easy to use
- The activity is continuously improved.

The producers of Official Statistics of Finland also commit to measuring and reporting continuously on the quality of the statistical data.

All Official statistics of Finland produced by Luke follow the quality criteria described here: http://www.stat.fi/meta/svt/svt-laatukriteerit_en.html.

Quality description for statistics on commercial marine fishery and profitability of fisheries in Luke can be found on Luke's statistical webportal:

Commercial marine fishery: https://stat.luke.fi/en/quality-description-commercial-marine-fishery_en-0.

(max 900 words)

Pilot Study 2: Level of fishing and impact of fisheries on biological resources and marine ecosystem

General comment: This Box fulfills paragraph 3 point (c) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 and Article 4 paragraph (3) point (b) of the Implementing Decision (EU) 2016/1701 on the format of the WP.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.

1. Aim of pilot study

A pilot study concerning bycatch data of sea birds was planned in 2019. The aim of the pilot study is to evaluate the quality of the present bycatch data collection procedure, and the possible needs for development in the evaluation of seabird bycatches in commercial fisheries.

2. Duration of pilot study

The data is collected in 2019 and will be analyzed and reported in 2020.

3. Methodology and expected outcomes of pilot study

At the present the commercial fishermen are instructed (not required) to report the amount and species of seabirds that are caught in their fishing gears. In small vessels (<10 m), bycatch is reported monthly in coastal fishing form (internet and paper versions). Paper forms (ca. 6500 yearly) are scanned and the bycatch is recorded in the database. In quota-regulated fishing of small (<10 m) coastal vessels, bycatch is reported in landing declaration. In large vessels (≥10 m), bycatch is reported in EU-log book. To verify and specify this cumulative information, a questionnaire concerning bycatch in 2019 will be sent to randomly selected commercial fishermen (ca. 20% of the total amount of the active fishermen in the vessel register data, n≈250) by e-mail in the end of 2019, and the amount and species of seabirds that are caught in fishing gears will be asked. The results of the e-mail questionnaire will be compared to the information based on coastal fishing forms and landing declarations.

The pilot study will give information on the suitability of the present data collection procedure in the evaluation of seabird bycatches in commercial fishing and the possible needs for improvements in the data sampling.

(max 900 words)

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

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

In the research plan in WP 2020-2021, it was assumed that the pilot study would shed light on the reliability of the by-catch data collected through the current arrangements and its suitability for by-

catch monitoring, as well as indicate potential needs for improvement in the collection of data. The study achieved these goals.

Of the respondents, 37% (93 people) reported that they had caught bird by-catches and 63% (157 people) did not report any by-catches. A total of 542 birds were reported to have been caught as by-catch (an average of 2.2 per responding fisherman), of which 112 birds (21%) were released alive (Table 1). According to the survey, the number of birds that died in fishing gear was 430, 1.7 dead birds per responding fisherman. If the number of birds killed as by-catch is extrapolated to all fishermen who have reported catches with the assumption that the fishermen who did not respond represented a similar group to those who responded, an estimated 1,800 birds died as by-catch in commercial coastal fishery in 2019.

A total of 15 different bird species were reported. The two most common species caught in the fishing gear were goosander and cormorant, which together made up approximately 2/3 of the reported bird by-catches. The amount of other species was relatively low: eider 5%; razorbill, black guillemot, goldeneye, long-tailed duck and tufted duck 2–3%; and others less than 1%.

Of goosanders caught in the fishing gear, 31% were released, but of cormorants, only 2%. Due to the small amount of released individuals, cormorant was clearly the most common species reported to have died in the fishing gear, making up 41% of all birds reported dead.

Table 1. Observations of birds reported as by-catch in the survey. Status = classification of threatened status in 2019: critically endangered (CR), endangered (EN), vulnerable (VU) and near threatened (NT). Number of by-catch = the number of birds reported as by-catch (including those released); By-catch % = the share of the above in the total number; Number of released = the number of individual birds reported as released alive from by-catches; Release % for species = the share of birds reported as released in the total number of the species; Number of dead = the number of individual birds reported as dead in by-catches; Dead % = the share of the above in the total number of dead birds, Total number of dead = an estimate of the total number of birds that have died in fishing gear based

on the fisherman-specific by-catch and the total number of fishermen.

Bird species	Status	Number of by-catch	By-catch %	Number of released	Release % for species	Number of dead	Dead %	Total number of dead
Goosander	NT	186	34.3	58	31.2	128	29.8	543
Cormorant		180	33.2	3	1.7	177	41.2	751
Eider	EN	28	5.2	7	25.0	21	4.9	89
Razorbill		18	3.3	1	5.6	17	4.0	72
Black guillemot	VU	17	3.1	6	35.3	11	2.6	47
Goldeneye		15	2.8	7	46.7	8	1.9	34
Long-tailed duck	NT	11	2.0	6	54.5	5	1.2	21
Tufted duck	EN	9	1.7	3	33.3	6	1.4	25
Herring gull		5	0.9	2	40.0	3	0.7	13
Velvet scoter	VU	3	0.6	0	0.0	3	0.7	13
Great crested grebe	NT	3	0.6	0	0.0	3	0.7	13
Red-breasted merganser	NT	3	0.6	3	100.0	0	0.0	0
Common gull		2	0.4	2	100.0	0	0.0	0
Red-necked grebe	NT	1	0.2	1	100.0	0	0.0	0
Greylag goose		1	0.2	1	100.0	0	0.0	0
Merganser	NT	14	2.6	6	42.9	8	1.9	34
Pochard	CR/EN	25	4.6	1	4.0	24	5.6	102
Gull		2	0.4	0	0.0	2	0.5	8
Dabbling duck		3	0.6	0	0.0	3	0.7	13
Water bird		11	2.0	2	18.2	9	2.1	38
Bird		5	0.9	3	60.0	2	0.5	8
Total		542	100.0	112	20.7	430	100.0	1,825
Mergansers		203	37.5	67	33.0	136	31.6	577
Pochards		34	6.3	4	11.8	30	7.0	127
Gulls*		9	1.7	4	44.4	5	1.2	21
Dabbling ducks		12	2.2	3	25.0	9	2.1	38
Threatened		300.0	55.4	91	30.3	209	48.6	887

The birds reported as by-catch included 9 species that have been classified as threatened, 209 individual birds in total, accounting for half (49%) of all birds reported as dead. For birds classified as threatened, the shares of the by-catches of goosander, long-tailed duck and eider of their average population size in Finland were around 1%; of black guillemot, 0.5%; and of others, less than 0.2%. For birds not classified as threatened, the by-catch of cormorant was roughly 3% of the average size of its population in Finland, and of razorbill, 0.7%. Comparison with the Finnish stocks alone is problematic for some species. For example, the long-tailed ducks caught in nets at sea have probably been migrating to Northern Russia or back from there, and comparison with those nesting in Finnish Lapland does not provide a correct picture.

Comparison with coastal fishing forms and EU logbooks– A total of 29 commercial fishermen reported bird by-catches found dead in fishing gear on coastal fishing forms and EU-log books in 2019, accounting for 2.7% of all fishermen who reported their catches on forms (n = 1,061). This is quite a small number compared with the questionnaire survey, in which 24% of the respondents

reported that they had caught corresponding bird by-catches. A total of 399 birds were reported as by-catch on forms, which represents only 22% of the total number of dead birds in the by-catches estimated in the survey. On forms, 8 different bird species were reported, and in the survey, 15 (Table 2 vs. Table 1). Of the bird by-catches indicated on forms, 41% consisted of cormorants and 31% of mergansers (only 17% of mergansers were designated according to their exact species), which are equal proportions to those in the survey. In the reports on forms, the third most common species (24%) was "duck" (although in the catch of one fisherman only), which was not mentioned directly in the surveys at all, while the share of "dabbling ducks" was less than 1%. The share of birds classified as threatened was lower in the by-catch reported on forms than in the survey (34% vs. 49%). On fishing forms, 58% of the by-catches were reported to have been caught with gillnets and 41% with fyke nets. The share of by-catch caught with fyke nets was much greater in the survey (59%), and the share of gillnets respectively smaller (38%).

Table 2. Number and proportion of bird observations reported as by-catches on coastal fishing forms and in EU logbooks and the share of the total amount by species/group, fishing gear and sea area.

species/fishing gear/area	number	%
Cormorant	166	41.6
Merganser	102	25.6
Duck	96	24.1
Goosander	15	3.8
Eider	6	1.5
Red-breasted merganser	6	1.5
Tufted duck	5	1.3
Herring gull	1	0.3
Great crested grebe	1	0.3
Goldeneye	1	0.3
Total	399	100.0
Threatened	134	33.6
Fyke nets	165	41.4
Nets	233	58.4
Bothnian Bay	146	36.6
Bothnian Sea	19	4.8
Archipelago Sea	43	10.8
The Gulf of Finland	176	44.1
Åland Islands	15	3.8

To conclude, an email survey is a quick and simple way to obtain survey information from fishermen, and the response rate was rather high. A number of birds belonging to threatened species were reported dead in the fishing gear, but it is premature to say whether it has any impact on the recovery of the species, especially since the by-catches of recreational fishing are unknown. Surprisingly, more birds die in trap nets than gillnets, even though the fishing effort of gillnet fishing in coastal areas is twice that of trap net fishing. On the basis of the study, it was possible to point out concentrations of by-catches, such the Bothnian Bay coast. On coastal fishing forms and in catch journals, there were considerably fewer reporters of bird by-catch and a considerably smaller amount of bird by-catch than in the results of this survey. There were also clear discrepancies in the reported species, fishing gear and regional distributions.

5. Incorporation of results from pilot study into regular sampling by the MS

Inclusion of the survey in the regular collection of data (for example, every other year) is being considered. A decision on this matter will be made in connection with WP 2022 onwards.

(max 900 words)

Text Box 1G: List of research surveys at sea

General comment: This box fulfills Chapter I of the Annex of the Implementing Decision (EU) 2019/909, on the list of mandatory surveys and thresholds, of the multiannual Union programme; and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701 on the format of the WP. It is intended to specify which reseach surveys at sea set out in the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Chapter I of the Annex of the implementing decision of the multiannual Union programme or whether it is an additional survey

General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.

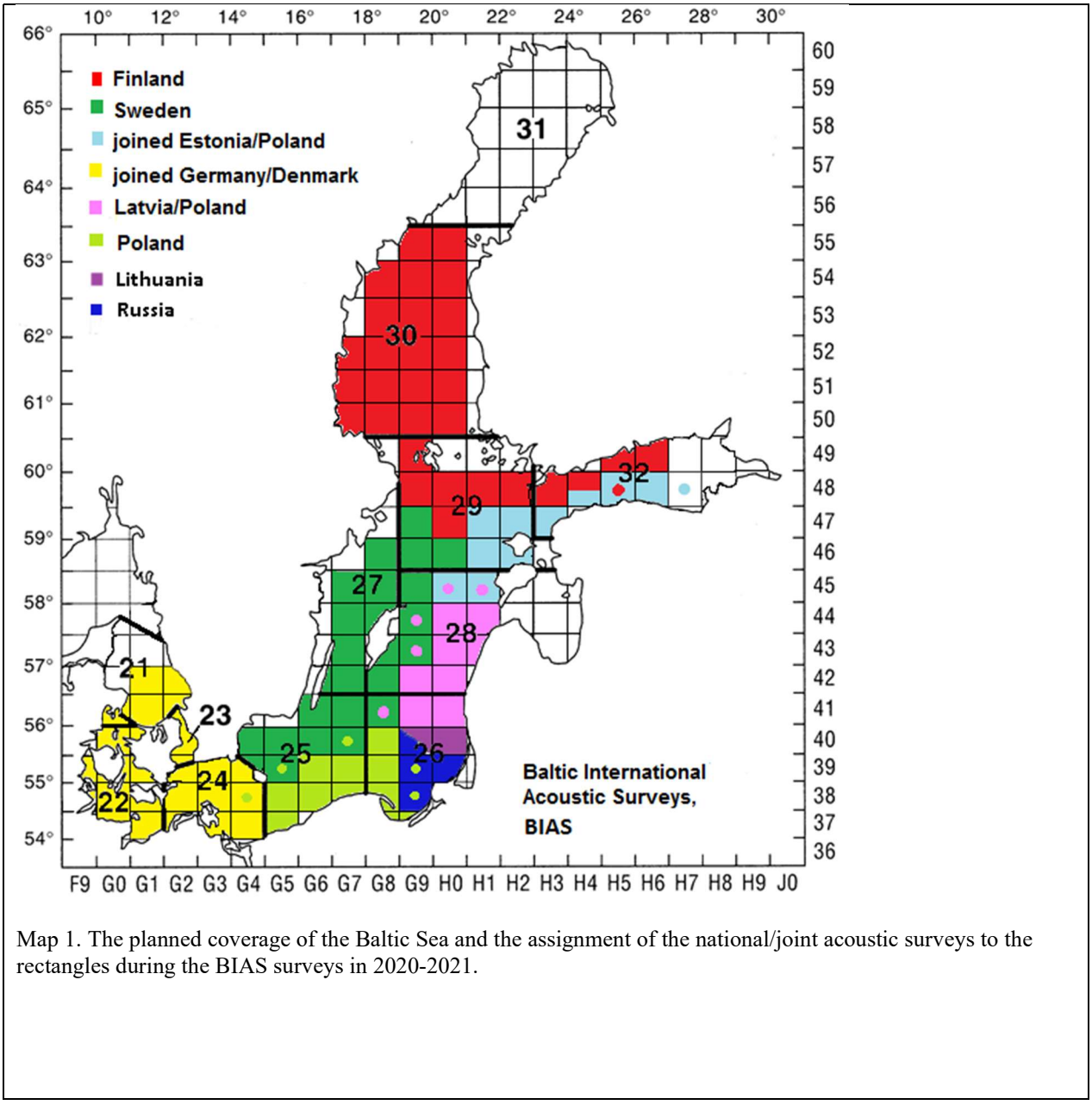
1. Objectives of the survey

Baltic International Acoustic Survey (BIAS): The objective of the BIAS survey is monitoring of the spatial distribution and abundance of herring and sprat year-classes in the pelagic areas of the Baltic Sea. Survey design, acoustic measurements, fishing method and data analysis are standardized and data produced are used as indices for Baltic herring and sprat stock assessments.

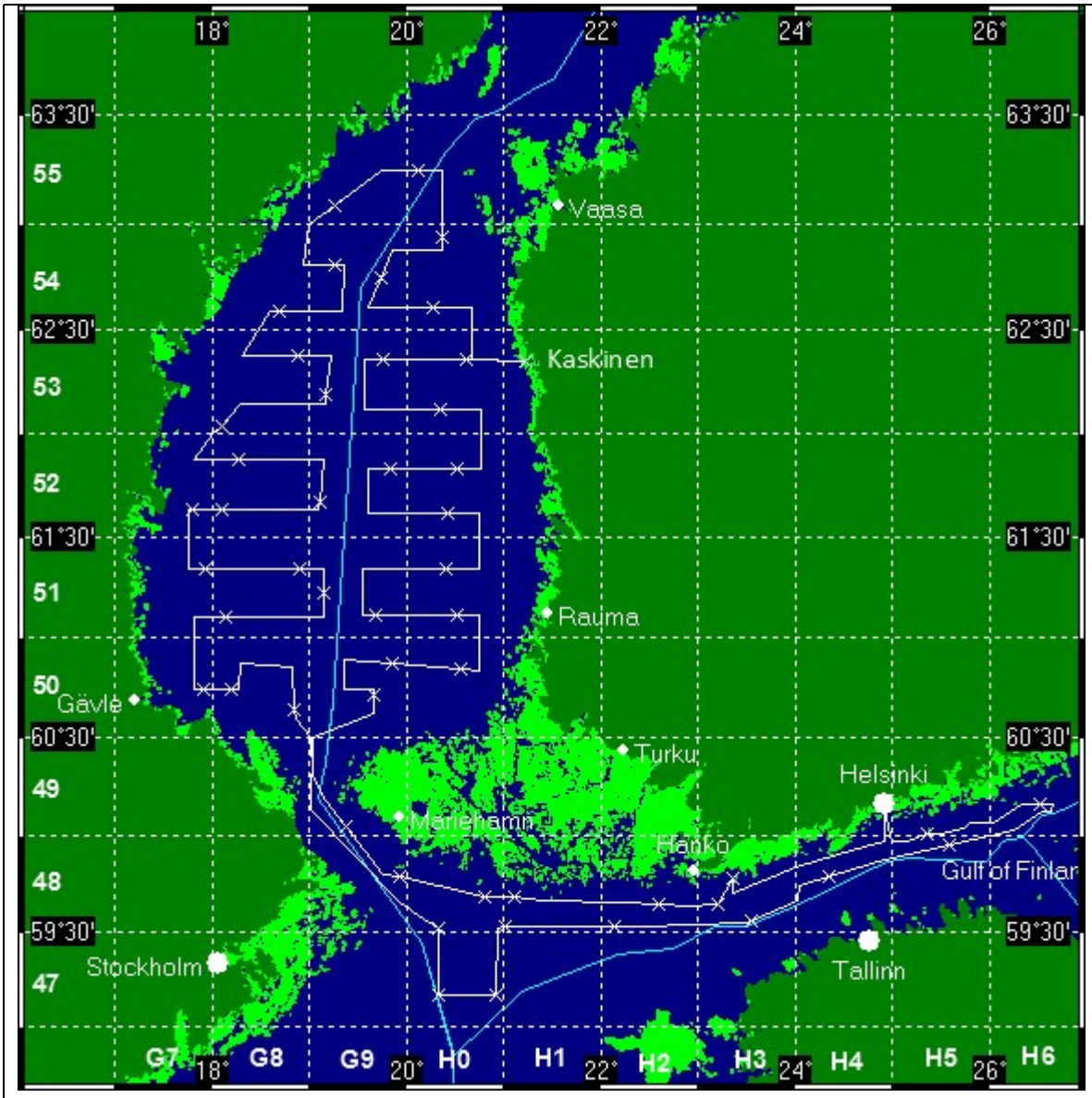
2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

BIAS: Data collection during BIAS survey have been described in the manual of International Baltic Acoustic Surveys (http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%208%20-%20Manual%20of%20International%20Baltic%20Acoustic%20Surveys%20(IBAS).pdf).

The BIAS surveys should cover the total area of ICES Division III (Maps 1 and 2). Each statistical rectangle of the area under investigation was allocated to one country during the Baltic International Fish Survey Working Group (WGBIFS) meeting, thus each country has a mandatory responsible area. The aim is to use acoustic transects spaced on regular rectangle basis at a maximum distance of 15 nautical miles and with a transect density of about 60 nautical miles per 1000 square nautical miles. It is recommended to sample a minimum of two trawl hauls per each statistical rectangle. Since 2013, R/V Aranda has been chartered to cover the whole area within the remit of Finland, and the use of R/V Aranda has already been agreed for the year 2020.



Map 1. The planned coverage of the Baltic Sea and the assignment of the national/joint acoustic surveys to the rectangles during the BIAS surveys in 2020-2021.



Map 2. The planned cruise track (solid white line) and trawl stations (white cross) during the Finnish BIAS survey in 2020-2021.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Finland-R/V Aranda, Estonia-R/V Baltica, Sweden-R/V Svea, Poland-R/V Baltica, Latvia-R/V Baltica, Lithuania-R/V Darius and Germany-R/V Solea are the participating Member States and vessels. BIAS and other Baltic international surveys are coordinated and planned yearly in the ICES WGBIFS meetings.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

On the basis of earlier bilateral agreement, presently a mutual consent between Finland and Sweden is followed, according to which Sweden sends two technicians to BIAS-survey for SD30 part and is responsible for age reading

of 50% of herring otoliths collected from that area. New survey participation and cost sharing rules are discussed in regional level.

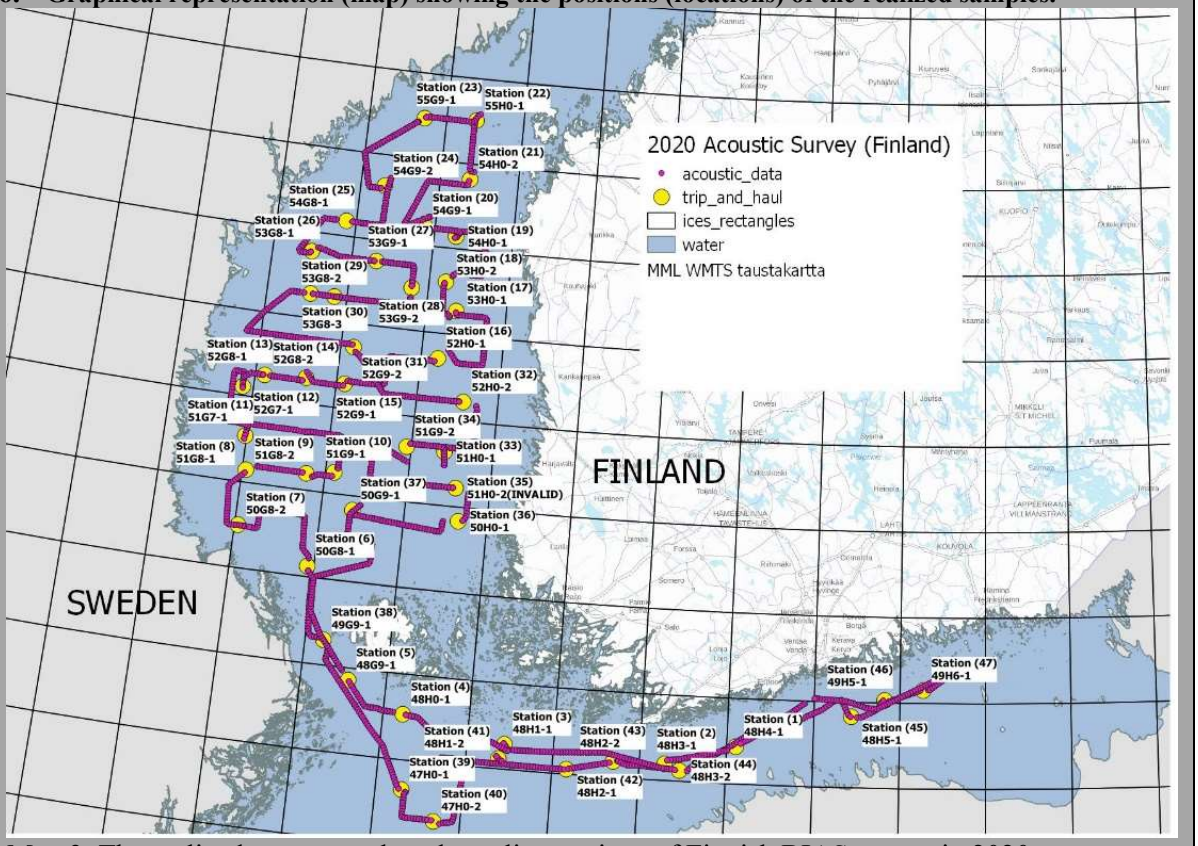
5. Explain where thresholds apply

Thresholds apply to BITS survey, Finnish share of the Baltic cod TAC for both eastern and western Baltic cod is less than 3% and therefore Finland has no legal obligation to take part in the BITS survey, even though it has been done since early 1980's until 2017. During years 2020-2021 Finland will not participate in the BITS survey, due to lack of personnel and also based on the fact that Finland has no obligation to take part in the BITS survey

No thresholds apply to BIAS SD 30, since Swedish share of herring SD 30&31 TAC is above 3 %. However, alternative thresholds may be agreed on regionally and new survey participation and cost sharing rules are discussed in regional level.

(max 450 words per survey)

6. Graphical representation (map) showing the positions (locations) of the realized samples.



Map 3. The realized survey track and trawling stations of Finnish BIAS survey in 2020.

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

This year's meeting report of ICES WGBIFS coordination group can be found from following link: http://www.ices.dk/community/groups/Pages/WGBIFS.aspx

8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

The survey results (abundance estimates) have been used as indices in the assessments of the herring and sprat stocks in the Baltic Sea. The preliminary abundance and biomass estimates have been

freshly reported to the Fisheries section of Ministry of Agriculture and Forestry and published in internet, newspapers and other publications.

9. Extended comments (Tables 1G and 1H)

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(max 450 words per survey)

SECTION 2: FISHING ACTIVITY DATA

Text Box 2A: Fishing activity variables data collection strategy

General comment: This box fulfills paragraph 4 of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under Regulation (EU) No 1224/2009 or where data collected under Regulation (EU) No 1224/2009 are not at the right aggregation level for the intended scientific use.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the data collection of fishing activity variables of Member States.

1. Description of methodologies used to cross-validate the different sources of data.

The data concerning commercial fishery is collected under Regulation (EU) No 1224/2009.

2. Description of methodologies used to estimate the value of landings.

The value of catches landed in Finland is calculated from the average prices paid to fishermen published by the Finnish Natural Resource Institute. The value of catches landed abroad or trans-shipped is calculated from the database called the central control register on commercial fishery maintained by the Centres for Economic Development, Transport and the Environment and the Provincial Government of Åland. In the case of Poland, the pricedata are obtained from local fishery authorities.

3. Description of methodologies used to estimate the average price (it is recommended to use weighted averages, trip by trip)

The first-hand commercial buyers of species regulated through fishing quotas (salmon, Baltic herring, sprat and cod) have been obliged to make purchase notifications for each batch of fish within 48 hours of purchase. The price information for these species is calculated from the purchase notifications made. The average prices of fish were calculated as averages weighted with volume purchased. The price information for species other than those covered by quotas is calculated from samples of purchasing information given by bigger fish wholesalers. The average prices of these fish were calculated as averages weighted with volume from purchasing information given by fish wholesalers.

4. Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)

The price information for species other than those covered by quotas is calculated from samples of purchasing information given by bigger fish wholesalers. The data collected from wholesalers is areally comprehensive. Monthly prices are calculated by subdivisions annually.

(max 900 words per Region)

5. Deviations from Work Plan methodology used to cross-validate the different sources of data

No deviations.

6. Deviations from Work Plan methodology used to estimate the value of landings.

No deviations.

7. Deviations from Work Plan methodology used to estimate the average price.

No deviations.

8. Deviations from Work Plan methodology used to plan collection of the complementary data

No deviations.

(max 900 words per Region)

Text Box 3A: Population segments for collection of economic and social data for fisheries

General comment: This box fulfils paragraph 5 points (a) and (b) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraphs (1), (2) and (5) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Tables 5(A) and 6 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the fleet socio-economic data collection of Member States.

1. Description of methodologies used to choose the different sources of data

Economic data collection is based on hierarchical multi-stage survey that combines information from different data sources. Main sources are the central control register on commercial fishery (includes fishery catch data, fishing vessel register, first hand sales of quota species), structural business and financial statement statistics, statistics on business subsidies and employment statistics from Statistic Finland (SF) and additional account surveys for coastal fisheries and trawlers conducted by Natural Resources Institute Finland (Luke). Additionally, data from the Ministry of Agriculture and Forestry of Finland is acquired on subsidies.

2. Description of methodologies used to choose the different types of data collection

Economic data collection is conducted with hierarchical multi-stage survey. Information on catches by species, value of landings by species, effort data and vessel capacity information is collected by vessel. This data is collected exhaustively for all vessels. Economic data is collected by fishing unit: company or fisherman. Financial statements data for fishing firms are obtained from the database of Statistics Finland (SF) on structural business and financial statement statistics. This data contains mainly firms with income over a threshold level of around € 11 000. Primary sources of financial statements data in Statistics Finland are direct inquiries and business taxation material supplemented by Business Register data. Data is based on corporate balance sheet and profit and loss account data. Financial data gives a reliable estimate for profitability of the larger vessels, but the disaggregation of cost items does not follow that in regulation. Therefore data on the cost and earnings structure is collected with an additional account survey on larger fishing firms (in practice trawlers) approximately every second year.

In addition, account survey for coastal fishermen is conducted annually by Natural Resources Institute Finland (Luke). From 2017 on, coastal fishermen are able to report their cost and earnings data through an electronic data collection system. The data is stored in database for economic data collection managed by Luke.

3. Description of methodologies used to choose sampling frame and allocation scheme

Information on catches by species, value of landings by species, effort data and vessel capacity information is collected by vessel. This data is collected exhaustively for all vessels by the fisheries management authority and Luke compiles the statistics. Economic data is collected by fishing unit: company or fisherman. Financial

statements data for fishing firms are obtained from the database of Statistics Finland (SF) on structural business and financial statement statistics. This group of firms produce about 70% of total turnover of Finnish fishing fleet. The coverage of the financial statements for this group is good.

Account survey for coastal fishermen is targeted for all those fishermen having value of annual catch more than 5 000 euros. This group is around 300 fishermen, covering around 90 % of the total turnover of coastal fishermen. The data on paid subsidies from the Ministry of Agriculture and Forestry of Finland covers the whole population.

4. Description of methodologies used for estimation procedures

Cost and earnings estimates are done by design-based and model assisted regression and ratio estimation. First, the turnover and total income per segment are estimated with regression using the total value of catches as explanatory variable. Then total costs are estimated (with regression) for total population per segments from the turnover. The cost variables are estimated as ratio estimates from the total costs.

Employment data (FTE and number of employees) is estimated with regression based on the employment data from Statistics Finland and on the employment numbers reported by the coastal fishermen in account survey. Number of employees of coastal fisheries is mainly based on log book information. Number of hours worked is estimated based on the FTE and working hour data from Statistics Finland. Opportunity costs for unpaid labour are estimated by Statistics Finland based on the annual amount of unpaid work and the average wage of the enterprise. Any missing data is imputed with weighted average by stratum.

Fuel costs are estimated based on financial statements and account survey. Fuel consumption is estimated based on the fuel costs by fleet segments and the average fuel prices.

The price data on fish subject to quota (Baltic herring, sprat, salmon, and cod) are calculated from the purchasing notifications submitted by the first hand purchasers of fish to the Centres for Economic Development, Transport and the Environment. The price data are checked and complemented with the book keeping of fish wholesalers in coastal areas. The prices of other fish species are calculated from the book keeping of fish wholesalers. The book keeping data is a non-probability sample of the biggest fish wholesale enterprises. The prices are calculated by species, size-class, degree of processing, and by month.

Perpetual inventory method for capital value and capital costs

PIM method is used for the calculation of the capital value, the depreciation and the investments for the fleet. Price per capacity unit for vessels under 12 meters is based on the book values of the vessels. Price per capacity unit for trawlers is based on the insurance values from a fishing insurance association. Account data of coastal vessels is combined with the vessel register data by vessel code. Then cumulated depreciation costs are calculated using digressive depreciation scheme from the book value of the vessels. Cumulated depreciation costs are added to the book value to get gross historical values by vessel using the following formula:

$$\text{Gross historical value}_i = \frac{\text{Book value}_i}{(1-\text{Depreciation}\%_i)^{\text{Age}_i}},$$

where i is the asset (hull, engine, electronics and other equipment). Then heavy machinery producer price index is applied to get the replacement value of the total fleet with current price level. Price per GT is then calculated from the replacement value for each vessel segment. Prices/GT are used to calculate the depreciated replacement value, depreciation and investments for the Finnish fleet.

Assumptions used in the PIM are as follows:

Depreciation rates applied: hull 14%, engine 31%, electronics 52% and other equipment 41%. Using the service life of each asset the depreciation rates were determined so that the asset would be maximally depreciated within its service life (assuming 2.5% scrapping value after 25 years). Vessel composition assumed for vessels under 12 meters: hull 35%, engine 50%, electronics 7.5% and other equipment 7.5%.

Vessel composition assumed for pelagic trawlers: hull 40%, engine 30%, electronics 5% and other equipment 25%.

Renewal times: hull never renewed, engine 10 years, electronics 5 years and other equipment 7 years.

5. Description of methodologies used on data quality

Capacity and landings and effort data covers all vessels. Fishermen submit the fishing data by using either a paper or an electronic form. The information is collected into a database called the central control register on commercial fishery which is maintained by the Centres for Economic Development, Transport and the Environment and the Provincial Government of Åland. The fishing data are put at the disposal of the Natural Resources Institute Finland for statistical and researching purposes. A big part of the catch notification forms are checked at the Natural Resources Institute Finland before the data are processed, and erroneous information is corrected according to standardised instructions. The search for illogical entries is made using errorquery- software.

Financial statements data for fishing firms are obtained from the database of Statistics Finland (SF) on structural business and financial statement statistics. This group of firms produce about 70% of total turnover of Finnish fishing fleet. The coverage of the financial statements for this group is good in number of firms and share of production. Financial data gives a reliable estimate for profitability of the larger vessels. Primary sources of financial statements data in Statistics Finland are direct inquiries and business taxation material supplemented by Business Register data. Data is based on corporate balance sheet and profit and loss account data. Statistics Finland checks for the validity of the data.

From 2017 on, coastal fishermen are able to report their cost and earnings data for account survey through an electronic data collection system. The data is stored in database for economic data collection managed by Luke. Automatic validity check for each variable is performed when the values are entered in the database.

Luke compares landings statistics against the turnover data from Statistics Finland and from account survey. Ratio between turnover and value of landings per company is calculated to spot abnormalities. Due to the under-coverage in the structural business and financial statement statistics (compared to target population) the segment totals need to be estimated with regression estimation and additional cost structure analysis. Coefficients of variation and coverage rates are calculated for each variable and for each vessel segment. Regression output results are analysed to check they are statistically valid.

(max 900 words per Region)

6. Deviations from Work Plan methodology for selection of data source

Financial statements data for fishing firms are obtained from the database of Statistics Finland (SF) on structural business and financial statement statistics. In the recent years, these data has been available for all firms without any threshold for turnover. That is, more financial statements data has been available than what was planned in the Work Plan.

Actions to avoid deviations

No actions needed.

7. Deviations from Work Plan methodology to choose type of data collection

Information on catches by species, value of landings by species, effort data and vessel capacity information is collected by vessel for vessels over 10m. Coastal fishing under 10m including winter fishing on ice (without a vessel) is declared by fishermen.

Actions to avoid deviations

No actions needed.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

No deviations.

9. Deviations from Work Plan methodology used for estimation procedures

In PIM estimation, the assumptions used for the vessel composition for pelagic trawlers are the following: hull 40%, engine 30%, electronics 5% and other equipment 25%. The assumptions for electronics and other equipment have not changed from previous years, only the work plan text had

the wrong percentages. New depreciation rates applied: hull 6.6%, engine 16.5%, electronics 40% and other equipment 23.6%.

Actions to avoid deviations

No actions needed.

10. Quality assurance

10.1 Sound methodology

The data collection follows methodologies, guidelines and best practices agreed in expert groups.

The methodological report for economic data collection of fleet, aquaculture and fish processing can be found on-line at: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf.

10.2. Accuracy and reliability

A large part of the catch notification forms are checked at the Natural Resources Institute Finland before the data are processed, and erroneous information is corrected according to standardised instructions. The search for illogical entries is made using error query- software.

Primary sources of financial statements data in Statistics Finland are direct inquiries and business taxation material supplemented by Business Register data. Statistics Finland checks for the validity of these data.

From 2017 on, coastal fishermen have been able to report their cost and earnings data (account survey) through an electronic data collection system and the data are saved into ERAPU database. In this system, automatic validity check for each variable is performed when the values are entered in the database. For returned paper questionnaires, the data is entered into the same data base and similar automatic validity checks are performed.

Luke compares landings statistics against the turnover data from Statistics Finland and from account survey. Ratio between turnover and value of landings per company is calculated to spot abnormalities. Outliers for economic data are excluded for the sample used for the estimation.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes

Are data stored in databases? Yes

Where can methodological and other documentation be found?

Methodological report: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf

Quality description: https://stat.luke.fi/en/tilasto/5642/laatuseloste/5668

(max 1000 words)

Pilot Study 3: Data on employment by education level and nationality

General comment: This box fulfills paragraph 5 point (b) and paragraph 6 point (b) of Chapter III of the Annex Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 and Article 4 paragraph (3) point (c) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Table 6 of the delegated decision on the multiannual Union programme

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).

1. Aim of pilot study

Aim of the pilot study was to collect, calculate and report the social data of fleet, aquaculture and fish processing sector as required by the multi-annual Union programme. A first pilot to collect, calculate and report the data was carried out in 2017 conserning employment in 2016. Thereafter, the social data collection is carried out every three years or more frequently, beginning from the 2018 data collection. Duplication of data collection is avoided as far as possible and data from official statistics from Statistics Finland is utilized. Statistics Finland collects comprehensive data on employees basic features (sex, age etc.), family, living area, employment status, employer, nationality, and education for the official employment statistics of Finland. When this information is used together with the financial statements data from statistics Finland, the social data variables can be estimated.

2. Duration of pilot study

A pilot calculation of social variables was carried out in 2017. Data from employment statistics was obtained from Statistics Finland and the employment estimates were calculated successfully. Method worked as expected and produced reasonable results. Finland has submitted the data on social variables first time in the fleet data call in 2019. Finland is able to provide data on social variables for all sectors in data calls from 2019 on.

3. Methodology and expected outcomes of pilot study

Social data on employment by class is collected by combining data from official statistics of Statistics Finland using employment statistics and financial statement statistics. The employment statistics data covers the whole population of the fleet, aquaculture and fish processing. The data includes information on sex, age group, nationality, education level and employment status by employee. The employment statistics is used together with the financial statements data including fte and number of employees by company to estimate the social data variables to the fisheries companies. Then the estimates of the social variables as specified in Table 6 of the multi-annual Union programme are calculated using SAS software according to PGECON guidelines. Finland is able to provide data on social variables for all sectors in data calls from 2019 on.

(max 900 words)

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

Pilot calculations were carried out successfully. Method works as expected and produces reasonable results. As social variables are derived from other variables, the type of data collection was changed to indirect survey in Tables 3A, 3B, 3C. Finland has submitted the data on social variables in the fleet data call and in the processing data call in 2019. Finland is able to provide data on social variables annually for all sectors in data calls from 2019 on.

5. Incorporation of results from pilot study into regular sampling by the Member State.

The estimation of social variables is part of our regular data collection procedure.

(max 900 words)

Text Box 3B: Population segments for collection of economic and social data for aquaculture

General comment: This box fulfills paragraph 6 points (a) and (b) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Tables 6 and 7 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.

1. Description of methodologies used to choose the different sources of data

Economic data collection concerning the aquaculture was carried as a register approach that combines information from several data sources. Main source for production data is production survey (including cost data) conducted by Natural Resources Institute Finland (Luke). Main data sources for economic and social data is Structural business and financial statement statistics, statistics on business subsidies and employment statistics of Statistic Finland (SF). In addition, data from environmental permit system and database (YLVA) administered by Ministry of Environment is utilized.

2. Description of methodologies used to choose the different types of data collection

Economic data collection is conducted with hierarchical multi-stage survey. The production survey is targeted to entire population. In the production survey other business activities, employment, production costs, production value, volume and methods per species are enquired. This data is used to divide firms into segments by fish species and fish farming techniques.

Financial statements are available in Statistics Finland (SF) for all firms in the Business Register with aquaculture as their main activity. Primary sources of financial statements data in Statistics Finland are direct inquiries and business taxation material supplemented by Business Register data. Data is based on corporate balance sheet and profit and loss account data. Statistics Finland checks for the validity of the data. Any missing data is estimated within stratum. Financial data gives a reliable estimate for the cost structure as a whole, but the disaggregation of cost items does not follow the content in the regulation. Therefore some additional data on the cost structure is queried in the production survey.

Statistics on business subsidies and employment is obtained from Statistic Finland (SF). Data on fish feed consumption comes from environmental permit system and database (YLVA) administered by Ministry of Environment.

3. Description of methodologies used to choose sampling frame and allocation scheme

Economic data collection concerning the aquaculture is carried as a register approach that combines information from several data sources. The production survey is targeted to entire population (all farms in

Aquaculture Register) and the response rate has been quite high in the recent years (over 90 %). Economic data is obtained from Statistics Finland by company. Financial statements are available in Statistics Finland (SF) for all firms in the Business Register with aquaculture as their main activity.

Segmentation

The Finnish aquaculture production are divided into five main segments:

- Trout/ Cages (marine aquaculture, food fish production)
- Trout/ Tanks and raceways (inland aquaculture, food fish production)
- Other fresh water fish/ Recirculation systems
- Other fresh water fish/ Ponds (natural food ponds)
- Trout/ Hatcheries and nurseries (juvenile and fry production)

Marine aquaculture regards production in cages. Most marine farms are specialized in rainbow trout production, some produce also European whitefish.

Inland food fish production is done mainly in tanks and raceways, but also in cages in lakes. Main species in inland food production is rainbow trout, but inland farming includes also some European whitefish production. In inland there are some closed recirculation aquaculture systems. The total production of recirculation aquaculture systems is still quite small and comprised of many different fish species. In 2017 there were 7 companies having recirculation systems in operation. It is expected that the production of recirculation systems will grow fast in the future. Juveniles produced at artificial feed facilities in inland hatcheries and nurseries are mainly rainbow trout juveniles for food fish production. Natural food pond production includes several species (most whitefish and pikeperch) and is very heterogeneous and fragmented. Most of the production is considered small scale and subsidiary business mainly for agriculture. Only commercial natural food pond production is considered.

Juvenile production is important part of the sector. The major part of the juvenile production in number is released to natural waters to strengthen fish stocks and to enhance commercial and recreational catch.

Aquaculture companies are allocated into the above segments based on the main technique and the main species cultivated. The main species/technique is selected based on the value of production. Some producers have integrated production of fry with food fish production. In these cases the segmentation reflects the main technique/species based on the production value but is not exclusive.

4. Description of methodologies used for estimation procedures

Production survey is collected exhaustively from the producers. Any missing information is estimated by post stratification. Unit level data are raised to the total population using weights by strata.

Cost and earnings estimates are done by design-based and model assisted regression and ratio estimation. First, the turnover and total income per segment are estimated with regression using the total value of

production as explanatory variable. Then total costs are estimated (with regression) for total population per segments from the turnover. The cost variables are estimated as ratio estimates from the total costs.

Employment data (FTE and number of employees) is estimated with regression based on the employment data from Statistics Finland. Number of hours worked is estimated based on the employment and financial statement statistics data from Statistics Finland. Opportunity costs for unpaid labour are estimated by Statistics Finland based on the annual amount of unpaid work and the average wage of the enterprise. Any missing data is imputed with weighted average by stratum.

5. Description of methodologies used on data quality

Production data (from production survey) covers all firms in the target population (around 190 firms).The target population is verified by using Finnish Aquaculture Register (managed by EVIRA) and KASSI aquaculture database managed by Natural Resource Institute. Occurrence of measurement error is monitored by comparing the results with those of previous years. If necessary, the results are verified by contacting the people who answered the survey. Financial statements are collected for all firms having aquaculture as the main activity in the database of Statistics Finland (SF) on Structural business and financial statement statistics and Business register. These financial statements are raised to the target population by segment with regression estimation using value of production.

Luke compares production statistics against the turnover data from Statistics Finland. Ratio between turnover and value of aquaculture production per company is calculated to spot abnormalities. Due to the small under-coverage in the structural business and financial statement statistics (compared to target population) the segment totals need to be estimated with regression estimation and additional cost structure analysis. Coefficients of variation and coverage rates are calculated for each variable and for each segment. Regression output results are analysed to check they are statistically valid.

(max 1000 words)

6. Deviations from Work Plan methodology for selection of data source

Financial statements data for aquaculture firms are obtained from the database of Statistics Finland (SF) on structural business and financial statement statistics. In the recent years, these data have been available for all firms without any threshold for turnover. That is, more financial statements data has been available than what was planned in the Work Plan.

Actions to avoid deviations

No actions needed.

7. Deviations from Work Plan methodology to choose type of data collection

No deviations.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

No deviations.

9. Deviations from Work Plan methodology used for estimation procedures

No deviations.

10. Quality assurance

10.1 Sound methodology

The data collection follows methodologies, guidelines and best practices agreed in expert groups.

The methodological report for economic data collection of fleet, aquaculture and fish processing can be found on-line at: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf.

10.2. Accuracy and reliability

For the production data, occurrence of measurement error is monitored by comparing the results with those of previous years. If necessary, the results are verified by contacting the people who answered the survey.

Luke compares production statistics against the turnover data from Statistics Finland. Ratio between turnover and value of aquaculture production per company is calculated to spot abnormalities. Outliers are excluded from the sample used in the regression estimation. Due to the small under-coverage in the structural business and financial statement statistics (compared to target population) the segment totals need to be estimated with regression estimation and additional cost structure analysis. Coefficients of variation and sample rates are calculated for each variable and for each segment. Regression output results are analysed to check they are statistically valid.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes

Are data stored in databases? Yes

Where can methodological and other documentation be found?

Methodological report: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf.

Quality descriptions: https://stat.luke.fi/en/tilasto/5642/laatuseloste/5668

https://stat.luke.fi/en/tilasto/4478/kuvaus/4773

(max 1000 words)

Pilot Study 4: Environmental data on aquaculture

General comment: This box fulfills paragraph 6 point (c) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 and Article 4 paragraph (3) point (d) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Table 8 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).

1. Aim of pilot study

The aim of the pilot study is to collect, calculate and report the environmental data on aquaculture as defined in the multi-annual Union programme. As environmental data concerning aquaculture has already been collected by the Ministry of the Environment, duplication of data collection is avoided as far as possible and excisting data sources are used. Collaboration between the Ministry of the Environment and the Natural Resource Institute Finland (Luke) is strengthened and new data transfer prosedures are explored. Ministry of the Environment manages an environmental permit system and database YLVA (maintained by the Centre for Economic Development, Transport and the Environment). It contains data on fish feed, fish mortalities and medicines used in aquaculture. Luke receives these YLVA data annually from the Ministry of the Environment. Environmental data on aquaculture production in Åland is not included in the YLVA database, but Luke receives these data from the Provincial Government of Åland. Also natural food ponds are not included in the data from YLVA as they are not obliged by the same environmental legislation.

2. Duration of pilot study

Luke has received the data for 2017 and is negotiating for ongoing annual data transfer from YLVA database. Data on environmental variables were obtained as planned first time in 2018 from the environmental permit system and database (YLVA) managed by the Ministry of the Environment. Ministry of the Environment renewed its environmental permit and data collection system in 2016 and Luke worked together with the Ministry to develop a database suitable for both administrative and data collection purposes.

3. Methodology and expected outcomes of pilot study

Finnish aquaculture producers are obliged to have a license for aquaculture production and to report the use of fish feed and the amount of nitrogen and phosphorus the fish feed used, fish mortalities and use of medicine to the Finnish environmental management authorities. The ministry of the Environment maintains an environmental permit system and database (YLVA) which includes all these information by producer. Luke is discussing with the Ministry of the Environment how the environmental data from the YLVA database could be most suitably transferred to Luke's information systems. Luke checks the validity of the data and reports the environmental data on aquaculture according to the guidelines of EU-MAP. Finland is able to provide data on environmental variables since aquaculture data call in 2020.

(max 900 words)

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

The ministry of the Environment maintains an environmental permit system and database YLVA (formerly called VAHTI) which includes the information on fish feed used by aquaculture producer and the fish mortality by producer. Ministry of the Environment have included also the use of fish medicine into the YLVA database and have agreed to transfer the data from their database to Luke (Natural Resources Institute Finland). Thus, the expected outcome of the pilot has been accomplished, where Luke receives annually data from YLVA database on the fish mortalities and medicines used by producers. Luke have checked the validity of the data and calculated indicators for the environmental data on aquaculture for 2017 and 2018. These data have been reported along with the final report of the pilot study. YLVA data does not include environmental information from the Åland Islands.

5. Incorporation of results from pilot study into regular sampling by the Member State.

See above.

(max 900 words)

Text Box 3C: Population segments for collection of economic and social data for the processing industry

General comment: This box fulfils footnote 6 of paragraph 1.1(d) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Table 10 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.

1. Description of methodologies used to choose the different sources of data

Economic data collection concerning the processing industry is carried as a register approach that combines information from several data sources. The main data sources are Structural business and financial statement statistics and Business Register of Statistics Finland and survey information on processing compiled by Natural Resources Institute Finland (Luke).

2. Description of methodologies used to choose the different types of data collection

Economic data collection is based on Structural business and financial statement statistics data of Statistics Finland. The production survey is carried out biannually to update the target frame population and to supplement the data from Statistics Finland. The production survey is collected exhaustively (=census). In this biennial survey (next reference year 2019 will be collected in 2020) data on other business activities, employment, production methods, production per species and use of raw materials is collected.

Financial statements are available in SF for all firms in Business Register with fish processing as their main activity (=census). Primary sources of financial statements data in Structural business and financial statement statistics of Statistics Finland are direct inquiries and business taxation material supplemented by Business Register data. Data is based on corporate balance sheet and profit and loss account data. Data in Structural business and financial statement statistics covers all cost items in the EU-MAP.

3. Description of methodologies used to choose sampling frame and allocation scheme

Economic data collection concerning the processing industry is carried out as a register approach that combines information from several data sources. The production survey is targeted to all fish processing firms and response rate in the recent years has been from 50 to 70 %. Financial statements are available for all firms in the Business Register having fish processing as the main activity. This basically means that the coverage rate for financial statements is 100%.

4. Description of methodologies used for estimation procedures

Production survey is collected exhaustively from the producers. Any missing information is estimated by post stratification. Unit level data are raised to the total population using weights by strata.

Financial statements are available for all firms in the Business Register having fish processing as the main activity. Statistics Finland checks for the validity of the data.

As financial statements are available exhaustively from all companies having fish processing as their main activity in business register, no imputation is needed. The totals per segment are calculated basically just summing up the data from unit level.

5. Description of methodologies used on data quality

The target population is verified by using Business Register from Statistics Finland.

Financial statements are available for all fish processing firms in Structural Business Statistics. Statistics Finland checks for the validity of the data with automatic data check procedure. In addition Luke checks the data against the production survey to spot any abnormalities. Missing information concerning employment is complemented by information from the production survey.

(max 1000 words)

6. Deviations from Work Plan methodology for selection of data source

No deviations.

7. Deviations from Work Plan methodology to choose type of data collection

No deviations.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

No deviations.

9. Deviations from Work Plan methodology used for estimation procedures

No deviations.

10. Quality assurance

10.1 Sound methodology

The data collection follows methodologies, guidelines and best practices agreed in expert groups.

The methodological report for economic data collection of fleet, aquaculture and fish processing can be found on-line at: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf.

10.2. Accuracy and reliability

Production survey is collected exhaustively from the producers. Any missing information is estimated by post stratification. Unit level data are raised to the total population using weights by strata. The target population is verified by using Business Register from Statistics Finland.

Financial statements are available for all firms in the Business Register having fish processing as the main activity. Statistics Finland checks for the validity of the data.

As financial statements are available exhaustively from all companies having fish processing as their main activity in business register, no imputation is needed.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes

Are data stored in databases? Yes

Where can methodological and other documentation be found?

Methodological report: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf.

Quality desription: https://stat.luke.fi/en/tilasto/5642/laatuseloste/5668.

https://stat.luke.fi/en/tilasto/4480/kuvaus/5653

(max 1000 words)

Text Box 4A: Sampling plan description for biological data

General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Implementing Decision (EU) 2016/1701 on the format of the WP and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.

1. Description of the sampling plan according to Article 5 paragraph (3) of the Implementing Decision (EU) 2016/1701 on the format of the WP.

Sampling plan description for biological data in the sea areas.

Finland is implementing biological sampling of commercial catches only in the Baltic Sea. The selected fish species for the sampling are European Eel (*Anguilla anguilla*), Herring (*Clupea harengus*), Common whitefish (*Coregonus lavaretus*), Vendace (*Coregonus albula*), Perch (*Perca fluviatilis*), Salmon (*Salmo salar*), Sea trout (*Salmo trutta*), Pikeperch (*Sander lucioperca*) and Sprat (*Sprattus sprattus*). All of these species are sampled for following biological variables: length, age, weight, sex ratio and sexual maturity (in case of salmon, maturity determination is purposeless, since sampled coastal salmon fishery targets on spawning migrants). The sampling plan for biological data for each of these species is described below.

European Eel (*Anguilla anguilla*)

An index for the abundance of eels (yellow and silver altogether) along the Finnish coast is obtained from fisheries statistics. Both yellow and silver eels are caught entirely as bycatch in commercial and partly in recreational fisheries. Samples are collected to estimate the share of yellow/silver eels and restocked/wild eels (on the basis of strontium chloride label, only for individuals from year-class 2009 and later). In commercial fisheries eels are caught as a bycatch in fyke net fisheries targeting pike-perch, perch, common whitefish and other freshwater fish. The catch per fishermen is extremely low. Selected fishermen sample their eel catch until a total amount of 100 samples is achieved. Sampling is carried out mainly in SD 32 but occasionally if necessary also in SD 29 and 30 because of the great variation of eel bycatch among the fishermen and locations and years.

Herring (*Clupea harengus*)

List of required stocks for sampling are Central Baltic Herring (SD 25-29,32), Gulf of Bothnia Herring (SD 30, 31) – the latter two SD's have always belonged to same management unit and to same assessment unit since 2017.

Biological data are collected mostly from sampling of commercial trawl fisheries (OTM_SPF_16-104_0_0/ PTM_SPF_16-104_0_0) and trap net fisheries (FYK_SPF_>0_0_0 and FPN_SPF_>0_0_0), and also from the BIAS survey in the Autumn (see Text Box 1G) (see strata descriptions below). Sampling of Herring (and sprat) is based on length stratified sub-sampling scheme, where target number of specimen for biological data is 10/ 0.5 cm length-class/SD/quarter (the number of specimen is increased for maturity sampling in spring before spawning time).

Finland has moved to statistically sound sampling scheme (4S) from the trawl fisheries targeting herring and sprat, where it has been in force from the beginning of year 2019. The selection of PSU for herring (and sprat) is to do random sampling from a draw list, where probability of a fishing unit to be selected for sampling in certain SD and quarter is weighted by its previous years' combined catch of herring and sprat in the same SD and Q. During each quarter the sampling personnel go through the draw list in free order, recording all relevant info (sampling, refusal, out of area, etc.) of the interaction into our sampling database SUOMU, which also has the lottery function needed in the process. Additional draw of vessel/-s will be done to reach the sampling target. In trap net fisheries the effort has decreased a great deal in recent years, and therefore the technicians have been basically sampling the metiérs that are available. However, there are plans to extend the 4S also to trapnet fisheries, and start implementing it in 2021.

Stratum	Sampling frame	Sampling unit	Stratification	Selection method	Comments
B3	List of fishers active previous year	Fisher x day	Quarterly	The fishermen are selected by the local technicians from those few that are still using this métier.	Fyke/ Pound nets targeting herring : FYK_SPF_>0_0_0; FPN_SPF_>0_0_0 (These are combined in sampling because they cannot be separated from each other in the Finnish landings statistics)
B5	List of fishing vessels active previous year in the same SD and Q to be selected for sampling in certain SD and Q	Vessel x trip	Quarterly	Quarterly draw list of vessels	Midwater trawlers targeting herring and sprat: OTM_SPF_16-104_0_0; PTM_SPF_16-104_0_0

Common whitefish (*Coregonus lavaretus*)

Biological data for Common whitefish are collected from sampling of commercial fyke net and gillnet fisheries (FYK_FWS_>0_0_0, GNS_FWS_>0_0_0; see strata descriptions below) and the sampling is carried out in SD's 29, 30 and 31.

The fisheries of Common whitefish, as well as Perch and Pike-perch, and other fisheries on freshwater species) are typically small-scale fisheries, where fishermen operate with small boats close to the coast. Main gears are gill-nets and trap-nets. The sampling frame will be the list of individual fishermen / enterprises, which have caught more than 250 kg of the targeted species/ species assemblage to be sampled

during the most recent reference year. As the coastal fisheries are small-scale fisheries with small boats, there are no possibilities for observer-program. Samples are bought from selected fishermen, when they arrive to port bringing the whole catch of one fishing day. Sampling unit will be fishermen * fishing day. This practise will be continued during years 2020-2021, and possibilities to develop sampling towards statistically sound sampling design will be studied.

Stratum	Sampling frame	Sampling unit	Stratification	Selection method	Comments
B2	Active fishers whose previous year's catch of Common whitefish Perch and/or Pike-perch over 250 kilograms	Fisher x day	Quarterly	The fishermen are selected based on spatial extent and sufficient yearly catch (>250 kg)	Fyke nets targeting freshwater species, with bycatch of eels (FYK_FWS_>0_0_0).
B4	Active fishers whose previous year's catch of Common whitefish Perch and/or Pike-perch over 250 kilograms	Fisher x day	Quarterly	The fishermen are selected based on spatial extent and sufficient yearly catch (>250 kg)	Gillnets targeting freshwater species (FYK_FWS_>0_0_0).

Vendace (*Coregonus albula*)

Biological data for Vendace are collected from commercial trawl fisheries (OTM_FWS_>0_0_0/ PTM_FWS_>0_0_0; see strata descriptions below) in the Bay of Bothnia (SD 31) and the sampling is carried out as length stratified sub-sampling scheme, where target number of specimen for biological data is 10/ 0.5 cm length-class/quarter. The samples will be taken from an unsorted catch as the vessel arrives to port. The sampling unit will be vessel x fishing trip. Vendace is caught also in smaller amounts by trap-nets and in mixed trawl catches with herring.

The statistically sound sampling scheme (4S) from the trawl fisheries of Vendace has been in force from the beginning of year 2019. 4S sampling in trawl fisheries targeting Vendace (*Coregonus albula*) in the Bay of Bothnia (SD 31) has also been in force from the beginning of year 2019, albeit the lottery function is not finished yet and therefore the draw list is produced manually.

Stratum	Sampling frame	Sampling unit	Stratification	Selection method	Comments
B8	List of fishing vessels active previous year in the same quarter	Vessel x trip	Quarterly	Random selection from quarterly vessel list weighted by their previous years' catch of Vendace	Midwater trawlers targeting Vendace: OTM_FWS_>0_0_0, PTM_FWS_>0_0_0

Perch (*Perca fluviatilis*)

Biological data for Perch are collected from sampling of commercial fyke net and gillnet fisheries (FYK_FWS_>0_0_0, GNS_FWS_>0_0_0; see strata descriptions below) and the sampling is carried out in SD's 29 and 30.

See description of sampling plan and strata under the chapter of Common whitefish.

Salmon (*Salmo salar*)

In the Baltic Sea, the commercial catches of Salmon are taken from two management units, the Gulf of Bothnia – Baltic Main Basin (SD 22-31) and the Gulf of Finland (SD 32), both having their own annual TACs. In the sea areas, biological data of Salmon are collected from sampling of coastal fyke net fisheries (FYK_ANA_>0_0_0; see strata description below) in the SD's 29-32, and the catch is solely mature salmon returning to home rivers in summer (catch sampling from recreational fishery in the R. Tornionjoki is presented in Text Box 1E).

The Salmon fishery consists of several trap-net fishermen which are spread all along the coast and operate with shorter than 10 m LOA vessels. The average daily salmon catch of a fisherman during a rather short fishing season is about 10 fish, and the most effective way to get salmon samples has been self-sampling. Selected fishers are given instructions to sample during the whole fishing season their daily catch every second day at maximum 20 samples per day representing size distribution of the catch. This practise has been followed in previous program periods and will be continued during years 2020-2021. A total of 12 salmon fishermen (0.6% of the fishermen with a share of salmon TAC) take part in the self-sampling program and they hold (by individual quotas) about 15% of the total salmon TAC. These fishers use the same type of trap-nets that are regularly used at the coastal salmon fishery and their gears as well as fishing sites can be assumed to have similar catchability as other fishers. The fishermen are not selected into the self-sampling program randomly, but on the basis of their willingness and possibility to co-operate. Age composition of the catch varies little between fishers between areas since spawning migration population consists of mainly three age groups. About 95 % of the catch is 1SW-3SW (sea winter) salmon. Stock composition varies depending on the fishing area. The fyke nets used in the fishery are non-selective in terms of age/size of the fish. Sampling unit is fishermen * fishing day. During years 2020-2021 we will continue with the fishermen with whom we already have co-operation and study possibilities for randomized sampling.

Stratum	Sampling frame	Sampling unit	Stratification	Selection method	Comments
B1	Selected fishers sampling throughout the spawning migration	Fisher x day	-	Self-sampling by fishers who are given instructions to sample daily catch every second day	Fyke nets targeting salmon (FYK_ANA_>0_0_0)

Sea trout (*Salmo trutta*)

Sea trout is caught as a bycatch in fyke net fisheries targeting Salmon (FYK_ANA_>0_0_0; see stratum B1) and Common whitefish (FYK_FWS_>0_0_0; see stratum B2), and also in gillnet fishery targeting Common whitefish (GNS_FWS_>0_0_0; see stratum B4). Selected fishers sample their all sea trout catch (above BMS), which accumulates annually in total about 100 samples.

Pike-perch (*Sander lucioperca*)

Biological data for Pike-perch are collected from sampling of commercial fyke net and gillnet fisheries (FYK_FWS_>0_0_0, GNS_FWS_>0_0_0; see strata descriptions below) and the sampling is carried out in SD's 29, 30 and 32.

See description of sampling plan and strata under the chapter of Common whitefish.

Sprat (*Sprattus sprattus*)

Sprat is caught in Finnish trawl fishery targeting herring or in mixed trawl fishery for pelagic species in the Baltic in ICES sub-divisions 29, 30 and 32, which are also covered by BIAS survey, where the data for biological variables is collected. Length measurements for catch composition are carried out from port sampling of herring trawl fisheries (OTM_SPF_16-104_0_0/ PTM_SPF_16-104_0_0; see description of stratum B5 under Herring).

(max 900 words per Region)

Deviation from the sampling plan according to Article 5 paragraph (3) of the Decision (EU) 2016/1701:

2. Deviations from the Work Plan

Central Baltic Herring (SD 25-29,32): The maturity sampling for the Central Baltic Herring stock was cancelled for 2021 after RCG Baltic small pelagics ISSG decision of maturity sampling being not necessary for this stock. The effort will be transferred to maturity determinations from Trapnet catches in GoB Herring stock to find out to what extent 2-year-olds take part into spawning. This question raised up in 2021 WGBFAS meeting when a maturity expert was commenting the observed high variance in the 2-year-olds' maturities over the years.

Pike-perch, perch, and whitefish in the Baltic Sea: The coastal fishery of pike-perch, perch, and whitefish in Finland is small scale, where and it is often difficult to achieve planned number of PSU (fisher x day). In 2020, 85 % of planned PSU was achieved. With small PSU (34 in 2020), even small amount of refusals may decrease achieved number of PSU. Fishermen of these species also land their catches in irregular schedule, which makes it more difficult to collect samples

Salmon in the Baltic sea: In SD22-32 in 2020, PSU (sampled fishing trips, n=256) was 171 % of planned PSU (n=150), because areal and temporal coverage of sampling was extended to achieve planned number of samples (See also Table 1C). Also, the renewed fishing regulation have extended the fishing season. The planned number of PSU is a guideline, that is based on magnitude of the realised number of PSU before 2017. At that time salmon fishing season was shorter because of regulation at the time and also the number of fishers participating in sampling was smaller.

3. Action to avoid deviations

Pike-perch, perch, and whitefish in the Baltic Sea: The monitoring of accumulation of achieved/planned PSU will be monitored more intensively on quarterly basis. However, the irregular nature of small-scale fishery makes this difficult.

Salmon in the Baltic sea: Planned number of PSUs will be reconsidered in future WP submissions.

(max. 1000 words per region OR fishing ground)

Text Box 5A: Quality assurance framework for biological data

General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme. Use this box to provide additional information on Table 5A of the Annual Report.

1. Evidence of data quality assurance

See Table5A Quality assurance frame and Textbox 1C.

2. Sampling design

Vendace in the Baltic Sea: Biological data for vendace (Coregonus albula) are collected from commercial trawl fisheries (OTM_FWS_>0_0_0/ PTM_FWS_>0_0_0; see strata descriptions below) in the Bay of Bothnia (SD 31) and the sampling is carried out as length stratified sub-sampling scheme, where target number of specimen for biological data is 10/ 0.5 cm length-class/quarter. The samples are taken from an unsorted catch as the vessel arrives to port. The sampling unit will be vessel x fishing trip. Vendace is caught also in smaller amounts by trap-nets and in mixed trawl catches with herring.

The statistically sound sampling scheme (4S) in trawl fisheries targeting vendace (*Coregonus albula*) in the Bay of Bothnia (SD 31) has been in force from the beginning of year 2019, and the lottery function was fully in use in year 2020.

Stratum	Sampling frame	Sampling unit	Stratification	Selection method	Comments
B8	List of fishing vessels active previous year in the same quarter	Vessel x trip	Quarterly	Random selection from quarterly vessel list weighted by their previous years' catch of Vendace	Midwater trawlers targeting Vendace: OTM_FWS_>0_0_0, PTM_FWS_>0_0_0

Salmon in freshwater: For Rivers Tornionjoki and Simojoki, sampling design is documented in the national LUKE/FGFRI reports (https://jukuri.luke.fi/bitstream/handle/10024/520109/rkts2013_2.pdf?sequence=1&isAllowed=y). Tornionjoki and Simojoki are selected as the Finnish index rivers for salmon in the Baltic Sea, following the recommendations of the ICES expert group of Baltic salmon (e.g. https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2019/WGBAST/wgbast_2019.pdf). The expert group has also proposed, what kind of information should be collected from the index rivers; sampling designs in the Tornionjoki and Simojoki follow this proposal.

Salmon parr monitoring in rivers Tornionjoki and Simojoki (Baltic Sea) and river Utsjoki (North Atlantic) is conducted by electrofishing based on current scientific practises presented in CEN-standard: (Water quality-Sampling Fish with Electricity, SFS-EN 14011).

Sea trout in freshwater: Monitoring sea trout parr densities is conducted by electrofishing. The method is based on current scientific practises presented in CEN-standard: (Water quality-Sampling Fish with Electricity, SFS-EN 14011).

Eel in freshwaters: Silver eel escapement is monitored by two type of counters: Didson-echosounder in river Kokemäenjoki and eel trap in river Vääksynjoki.

Biological sampling of yellow eel is conducted by purchasing eel samples from bycatch of recreational (subsistence type) fyke-net and long-line fisheries. Samples for biological data are collected in two locations in inland waters: Vesijärvi (Kymijoki watershed) and Kulovesi (Kokemäenjoki watershed), where all eel are supposed to be of restocked origin due to migration barriers.

3. Sampling implementation

Salmon in the Baltic Sea: FYK_ANA_0_0_0 (Table 5A Fyke nets targeting salmon, B1) takes practically all (>95%) commercial salmon catch in Finland. Catch is recorded both in numbers and in weights in the logbooks and consequently catch samples are not used for raising the catch in weight to the catch in numbers. Ageing data is used to derivate the age composition of the catches (age groups 1-3 sea winter represent >95 % of the catch). Also, the origin of the salmon (wild/reared) is determined by age reading. Stock compositions are analyzed from scale samples by phenotyping (fishery in focus varies temporally Finnish sampling bases on the self-sampling by fishers (about 10-15 fishers; fishing season is 1-2 months in summer). There is no harmonized catch sampling scheme for the Baltic salmon. Assessment model is a Bayesian full life history model utilizing the various data sets apart from catch sampling data (tagging, parr densities, number of smolts, number of spawners, fishing efforts etc.) and ICES Baltic salmon and trout assessment working group has given general guidelines for sampling protocol for all these data (ICES 2016, ICES 2017, ICES 2020).

ICES. 2016. Report of the Baltic Salmon and Trout Assessment Working Group (WGBAST), 30 March–6 April 2016, Klaipeda, Lithuania. ICES CM 2016/ACOM:09.257 pp.

ICES. 2017. Report of the Benchmark Workshop on Baltic Salmon (WKBALTSalmon), 30 January–3 February 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:31. 112 pp.

ICES. 2020. Baltic Salmon and Trout Assessment Working Group (WGBAST). ICES Scientific Reports. 1:23. 313 pp. http://doi.org/10.17895/ices.pub.4979

Salmon discards (about 10% of the total catch) consists solely on the seal damaged salmon that are not obligated to land, and they are consequently not sampled. It's assumed that age composition of the discarded catch is similar to the landed catch. BMS salmon are allowed to release back to sea from trap nets (all one sea winter old). Proportion of undersized salmon in catch is estimated trough separated journals from selected fishers (about 10-15 fishers).

Pike-perch, perch, and whitefish in the Baltic Sea: Biological data for perch are collected from sampling of commercial fyke net and gillnet fisheries (FYK_FWS_>0_0_0, GNS_FWS_>0_0_0; and the sampling is carried out in SD's 29 and 30.

Biological data for Common whitefish are collected from sampling of commercial fyke net and gillnet fisheries (FYK_FWS_>0_0_0, GNS_FWS_>0_0_0; and the sampling is carried out in SD's 29, 30 and 31.

Biological data for pike-perch are collected from sampling of commercial fyke net and gillnet fisheries (FYK_FWS_>0_0_0, GNS_FWS_>0_0_0; and the sampling is carried out in SD's 29, 30 and 32.

Fisheries of these (as well as other freshwater species) are typically small-scale fisheries, where fishermen operate with small boats close to the coast. Main gears are gillnets and trap-nets. The sampling frame will be the list of individual fishermen / enterprises, which have caught more than 250 kg of the targeted species/ species assemblage to be sampled during the most recent reference year. As the coastal fisheries are small-scale fisheries with small boats, there are no possibilities for observer-program. Samples are bought from selected fishermen, when they arrive to port bringing the whole catch of one fishing day. Sampling unit will be fishermen * fishing day. This practise was used in 2019, and will be continued during years 2020-2021, and possibilities to develop sampling towards statistically sound sampling design will be studied.

Herring in the Baltic Sea:

The traditional coastal Fyke / Pound net fisheries for herring are targeting the spawning components of the stocks during a limited time frame in spring and early summer. In this metier the 4S system has been in force from the beginning of year 2020. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed.

Eel in freshwaters:

Silver eel escapement: An index for the silver eels migrating from Finland is obtained 1) from eel trap in the river Vääksynjoki running from Lake Vesijärvi. The trap is situated at the regulating dam and it captures all eels migrating downstream. The eels caught in this trap are marked and released on the coast at river Kymijoki estuary below hydro-power dams (trap and transport) 2) from echosounder in Kokemäenjoki under the lowest hydro-power dam. The echosounder is mounted on a floating platform as the water level fluctuation at the site is almost three meters. The trap and the echosounder are in operation during the ice-free period.

Biological sampling of yellow eel: Eel samples have been bought from recreational fishermen in lake Vesijärvi and lake Kulovesi. In Vesijärvi they have been caught in May-June with fyke nets and in lake Kulovesi with a longline in June-July.

Salmon in freshwater: PSU's in the recreational catch surveys of Tornionjoki and Simojoki are river specific populations of fishing license holders. Postal enquiries were sent to subset (n=1 500 in the R. Tornionjoki) of angling license holders randomly selected from the registers covering the whole target populations. In River Simojoki the catch estimate is based on internet webropol enquiries to all licence holders having email (n=1985 in 2020). In Tornionjoki, the sampling is stratified in three units based on licence holder's permanent address (river valley, other Lapland, rest of Finland). Two reminders were sent to the fishers who had not responded to the enquiries in both rivers. All contact persons organizing small-scale net fishing in R. Tornionjoki were interviewed by phone and site-specific total catch estimates were provided by them.

For river Utsjoki, PSU's in the catch surveys are fishing right holders and fishing license holders. Log books, postal enquiries and phone calls were used in the catch estimation of the Utsjoki system to cover the whole target population. In 2017 the catch reporting became mandatory in the River Teno system (including Utsjoki), based on the new fishing agreement between Finland and Norway.

4. Data capture

Salmon in the Baltic Sea: for catch samples, quality of the sampled data is checked routinely at age reading (all scaled from same individual) and when recording the data into the datasets (outliers in length and weight etc.). Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed

Pike-perch, perch, and whitefish in the Baltic Sea: In Finland, an electronic fish measuring system is used for processing the fish samples, which enables quality assurance during the data capture. Basic data quality checks are carried out automatically in measurement phase, e.g. with condition factors and in this way errors can be eliminated/ corrected. More quality checks and cross-checks are carried out when data is uploaded to the database. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed

The quality of the sampled data in age reading is checked occasionally (pike-perch, perch) or regularly (whitefish) by comparing the results from age determinations from scales (pike-perch, whitefish) or bones (perch) with those from stained otoliths of the same specimens, as ageing from otoliths is known to be the most reliable. But in the back-calculation of growth, scales and bones are preferable. In addition, indirect ways to check the quality are used, e.g. the mean temperature of summer months affects the recruitment and growth of these species, and this is also seen in the sampled fish.

Herring in the Baltic Sea: In Finland, an electronic fish measuring system is used for processing the fish samples, which enables quality assurance during the data capture. Basic data quality checks are carried out automatically in measurement phase, e.g. with condition factors and in this way, that errors can be eliminated/ corrected. More quality checks and cross-checks are carried out when data is uploaded to the database. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed.

The process in herring age-reading (slicing and staining the otoliths) is considered the most accurate age reading method for slow-growing Baltic herring. There are also regularly inter-calibrations in herring age reading both nationally and internationally in the Baltic area to ensure the quality. The data in the database is checked for outliers in age-length relations and errors in data recording and corrected (revised or deleted) before it is used.

Sprat in the Baltic Sea: In Finland, an electronic fish measuring system is used for processing the fish samples, which enables quality assurance during the data capture. Basic data quality checks are carried out automatically in measurement phase, e.g. with condition factors and in this way, that errors can be eliminated/ corrected. More quality checks and cross-checks are carried out when data is uploaded to the database. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed

Finland has derogation in sampling for stock-related variables from commercial catches of sprat due to low share of quota and catches from the Baltic sprat stock. Therefore, age readings are done only for few hundreds of individuals from survey-samples. The otoliths are read whole. In last two years the age reading of sprat has been carried out by an Estonian expert. As with herring, the data in the database is checked for outliers in age-length relations and errors in data recording and corrected (revised or deleted) before it is used.

Vendace in the Baltic Sea: The midwater trawl fisheries targeting Vendace (*Coregonus albula*) in the Bay of Bothnia (SD 31) was sampled for the first time under DCF during Autumn 2018. In Finland, an electronic fish measuring system is used for processing the fish samples, which enables quality assurance during the data capture. Basic data quality checks are carried out automatically in measurement phase, e.g. with condition factors and in this way, that errors can be eliminated/ corrected. More quality checks and cross-checks are carried out when data is uploaded to the database. Documentation of quality checks will be updated as a part of work with WP and AR 2022 onwards, in which quality assurance section is renewed.

Salmon in freshwater: Documentation on quality checks for data capture in salmon smolt and spawner counts are under development work. For recreational catch samples from River Tornionjoki, quality of the sampled data is checked routinely at age reading (all scales from same individual) and when recording the data into the datasets (outliers in length and weight etc.).

Part of the salmon parr electrofishing data (from designated sites) are stored to national database (Koekalastusrekisteri), which include quality checks for input data. Besides that, data quality of all salmon parr count by electrofishing is monitored and checked by expert judgement.

Eel in freshwaters:

Silver eel escapement: In Kokemäenjoki the echosounder data has been collected and saved in external hard drives. The hard drives have been changed and duplicated weekly. Eels have been observed manually fast forward on the screen of the subsamples of the data. Every second hour of the night (18:00-06:00) and every fourth hour of the day (06:00-18:00) are checked for eels. In Vääksynjoki a remote surveillance camera inside the trap is used. When eels are detected in the trap in the morning, they are instantly fetched to the nearby holding station. Biological measurements are carried out when there was a minimum of 30 eels in hand. Length, weight, colour of the fish, eye diameter and the length of the pelvic fin are measured. After tagging eels were transported to the sea.

Biological sampling of yellow eel: Eel samples from Vesijärvi are examined fresh just after capture, in Kulovesi eels are frozen after capture and examined later according to detailed instructions by professional personnel in Luke. Length, weight, colour of the fish, eye diameter and the length of the pelvic fin are measured and the otoliths are removed and stored in standardized sampling envelopes. Life-stage of each individual is determined followed by protocol described by Durif et. al. 2009. Ageing of the fish is done using otolith grinding, polishing and staining in toluidine blue, method described in detail by ICES 2009. For improving documentation of eel data collection, we wait for further instructions from WGEEL.

Durif, Caroline & Guibert, A. & Elie, Pierre. (2009). Morphological discrimination of the silvering stages of the European eel.

ICES. 2009. Workshop on Age Reading of European and American Eel (WKAREA), 20-24 April 2009, Bordeaux, France. ICES CM 2009\ACOM: 48. 66 pp

5. Data Storage

See Table5A Quality assurance frame.

6. Data processing

Salmon in the Baltic Sea: No imputation of missing data is carried out for data collection at sea. The coverage of samples is good in terms of time and fishing areas and number of samples (short fishing season, same salmon schools are fished in different part of the coast, rather homogenous catchability low number of age groups in population). Documentation of quality assurance will be updated as a part of work with WP and AR 2022 onwards.

Pike-perch, perch, and whitefish in the Baltic Sea: The coverage of samples is good or satisfactory in terms of time and fishing areas and number of samples. Documentation of quality assurance will be updated as a part of work with WP and AR 2022 onwards.

Herring and sprat in the Baltic Sea: The coverage of sampling is good in terms of all herring and sprat fisheries, stocks, areas, seasons and number of samples. See Annex I of the Finnish Annual Report 2008 (file "Finland_Technical-Report_2008_Amended-Annex-I_18-June-09"). Documentation of quality assurance will be updated as a part of work with WP and AR 2022 onwards.

Vendace in the Baltic Sea: The midwater trawl fisheries targeting Vendace (*Coregonus albula*) in the Bay of Bothnia (SD 31) was sampled for the first time under DCF during Autumn 2018 and

again in 2019, and fully in use in 2020. Assurance of accuracy in data processing is included in 4S sampling system. Documentation of quality assurance will be updated as a part of work with WP and AR 2022 onwards.

Eel in freshwaters: Results and summary of the silver eel escapement and biological sampling of yellow eel have been used when replying to ICES annual Data Calls. For improving documentation of eel data collection, we wait for further instructions from WGEEL.

Salmon in freshwater: Documentation of salmon monitoring in freshwater is under way. For salmon spawner counting, some imputation is needed to fill the gaps created by occasional short breaks in the data collection (breaks in electricity supply, periodic cleaning of echo sounders). Part of the salmon parr electrofishing data (from designated sites) are stored to national database (Koekalastusrekisteri), which include quality checks for input data. Besides that, data quality of all salmon parr count by electrofishing is monitored and checked by expert judgement.

Ror Rivers Tornionjoki and Simojoki, data processing is described by Mäntyniemi and Romakkaniemi (2002). For River Utsjoki, data processing is described in Orell et. al. (2007).

Mäntyniemi, S. and Romakkaniemi, A., 2002. Bayesian mark–recapture estimation with an application to a salmonid smolt population. *Can. J. of Fish. and Aquat. Sci.*, 2002, 59:1748-1758, https://doi.org/10.1139/f02-146.

Orell, P., Erkinaro, J., Svenning, M., Davidsen, J., and Niemelä, E. 2007. Synchrony in the downstream migration of smolts and upstream migration of adult Atlantic salmon in the sub-Arctic River Utsjoki. *J. Fish. Biol*. 71: 1735–1750.

Sea trout in freshwaters: Monitoring of sea trout parr densities is conducted by electrofishing based on current scientific practises presented in CEN-standard: (Water quality-Sampling Fish with Electricity, SFS-EN 14011). Quality control of data in input is controlled by national database, Koekalastusrekisteri (https://wwwp2.ymparisto.fi/koekalastus_sahko/). Data quality is finally monitored and checked by expert judgement.

(max. 900 words per Region/RFMO/RFO/IO OR sampling scheme)

Text Box 5B: Quality assurance framework for socioeconomic data

General comment: This box fulfills Article 5 paragraph (2) point (b) of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is intended to specify data to be collected under Tables 5(A), 6 and 7 of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme. Use this box to provide additional information on Table 5B of the Annual Report.

1. Evidence of data quality assurance

The methodology for socioeconomic data collection of Finland by each sector (Fishing fleet, Aquaculture, Fish processing) has been described in the Methodological report which is accessible online: https://stat.luke.fi/sites/default/files/methodological_report_2020.pdf. The methodology to assure the quality of data collected for Fishing fleet, Aquaculture and Fish processing are described in the methodological report separately for each sector under the heading Quality assessment.

In addition, Luke's statistics on Commercial marine fishery, producer price for fish, aquaculture and fish processing are all part of Official Statistics Finland and follow the international standards, guidelines and best practices: http://stat.luke.fi/en/official-statistics-finland_en.

The producers of Official Statistics of Finland have signed a quality assurance in which they commit to the principles that steer statistics production. The quality assurance concerns such as the contents of statistical data, production processes and service to data users.

According to the principles, the producers of Official Statistics of Finland (OSF) offer all Finnish citizens reliable official statistics that have been produced independently and describe Finnish society exhaustively. The quality of the activity is materialized, for instance, in the following:

- Statistics correspond to the needs of users
- Statistics and statistical services are reliable, and the data published in them are up-to-date, impartial and as comparable as possible
- Statistical production processes are smooth, efficient and transparent, only necessary data are collected as the basis for the statistics, and providing the data has been made as easy as possible
- Privacy protection of the data suppliers' is respected
- Statistical personnel serves data users well and the services are easy to use
- The activity is continuously improved.

The producers of Official Statistics of Finland also commit to measuring and reporting continuously on the quality of the statistical data.

All Official statistics of Finland produced by Luke follow the quality criteria described here: http://www.stat.fi/meta/svt/svt-laatukriteerit_en.html.

Quality description for statistics produced by Luke can be found at Luke's statistical webportal:

Commercial marine fishery: https://stat.luke.fi/en/quality-description-commercial-marine-fishery_en-0

Producer price for fish: https://stat.luke.fi/en/tilasto/4484/laatuseloste/7918

Aquaculture (in Finnish): https://stat.luke.fi/tilasto/4425/laatuseloste/4692

Fish processing (in Finnish): https://stat.luke.fi/tilasto/4427/laatuseloste/4722

Profitability of fishery: https://stat.luke.fi/en/quality-description-profitability-fisheries-industry_en

Financial statements, Employment statistics, Statistics on business subsidies and Business register from Statistics Finland are used as data sources for compiling the socioeconomic data. All statistics used from Statistics Finland are Official Statistics of Finland and they follow the international standards, guidelines and best practices: http://tilastokeskus.fi/meta/svt/svt-laatukriteerit_en.html.

In addition to data sources mentioned above, Luke receives data on subsidies (investment subsidies, seal damage compensation and fuel refunds) paid to fisheries sector. Ministry data on subsidies is registry based administrative data and it is not published as statistics and do not follow the international standards, guidelines and best practices for official statistics. However, this data is census data and considered accurate as it is based on the actual payment transfers.

2. Section P3 Impartiality and objectiveness

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3. Section P4 Confidentiality

-

4. Section P5 Sound methodology

Ministry data on subsidies is registry based administrative data and it is not published as statistics and do not follow the international standards, guidelines and best practices for official statistics. However, this data is census data and considered accurate as it is based on the actual payment transfers.

5. Section P6 Appropriate statistical procedures

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6. Section P7 Non-excessive burden on respondents

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7. Section P8 Cost effectiveness

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8. Section P9 Relevance

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9. Section P10 Accuracy and reliability

Ministry data on subsidies is registry based administrative data, which is very sensitive. As Luke does not collect these subsidies data, it is not possible to provide any information on how errors are measured and documented.

10. Section P11 Timeliness and punctuality

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11. Section P12 coherence and comparability

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12. Section P13 Accessibility and Clarity

Ministry data on subsidies is registry based administrative data, which is very sensitive. As Luke does not collect these subsidies data and due to the sensitive nature of the data, it is not possible to provide any documentation on the Ministry data collection.

(max. 900 words per Region/RFMO/RFO/IO/NSB OR sector)