Ministry of Agriculture and Forestry (MAF)

Natural Resources Institute Finland (Luke)

Council Regulation (EC) No 199/2008 of 25 February 2008

concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy

Commission Regulation (EC) No 665/2008 of 14 July 2008

laying down detailed rules for the application of Council Regulation (EC) No 199/2008

Commission Implementing Decision (EU) 2016/1251 of 12 July 2016

adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019

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

2019

Version 1 – 2018

Helsinki, 31.10.2018

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

General comment: This Box fulfills paragraph 4 of Chapter V of the multi-annual Union programme and Article 2 and Article 4 paragraph (3) point (a) of this Decision.

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 2014 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 2019 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 2019, which collects data on recreational fishery during 2018.

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 (12 686 in 2015), 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 (1 560 in 2015), out of which 400 postal enquiries will be sent to randomly selected license holders. The response rate to the enquiries was 65% (Tornionjoki) and 58% (Simojoki) in 2015. 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, will be included in DCF.

(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 multi-annual Union programme and Article 2 of this Decision.

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. Monitoring in the two Baltic salmon rivers has been a part of Finnish data collection since the beginning of the EU data collection.

Concerning smolt trapping in the Rivers Tornionjoki and Simojoki there is consideration to change from annual into a biennial pace in medium term. The annual smolt trapping, however will continue at least until year 2019 in both of these rivers and the possible shift to the biennial system will be considered at earliest from 2020 on. In the River Simojoki year 2017 was, as planned, a gap year in terms of smolt trapping. In biennial system each year's smolt trapping will take place in one of these two rivers. This change has been discussed in ICES WGBAST and it does not risk the Baltic salmon stock assessment or advice.

In addition, the genetic analysis will focus on the catch samples collected from the Gulf of Finland in order to explore the present migration patterns of different salmon stocks in the region. These data are needed in merging the Gulf of Finland salmon stocks to the full life history model in the ICES Baltic salmon stock assessment.

Eel in the Baltic Sea: Finnish eel catches are very low and there are no fisheries targeting eel. Annual catch estimates are available for professional and biennial for recreational fisheries. Earlier studies suggest, that most eel in Finland originates from restocking programs. It is possible to get limited number of eel samples from the fyke-net fisheries bycatch. In recent years, there has been eel marking programs going on to shed some light into migratory behaviour of restocked eels.

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.

An index for the abundance of yellow eels and silver eels along the Finnish coast is obtained from fisheries statistics. Both yellow and silver eels are caught as bycatch in professional and 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). Samples are collected in two locations in inland waters as well: Vesijärvi (Kymijoki watershed) and Kulovesi (Kokemäenjoki watershed), where all eel are supposed to be of restocked origin due to migration barriers.

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.

Salmon in the rivers Tenojoki and Näätämönjoki: 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 Näätämönjoki. 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. One of the large tributaries of the River Tenojoki, namely Utsjoki, is located solemnly on the Finnish territory. At this point, Finland plans to continue data collection in that tributary as a 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. Other data collection in the Rivers Tenojoki and Näätämönjoki 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.

SECTION 1: BIOLOGICAL DATA

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 multi-annual Union programme and Article 2 and Article 4 paragraph (3) point (b) of this Decision.

1. Aim of pilot study

No pilot study on the level of fishing and impact of fisheries on biological resources and marine ecosystems was planned for 2017. A pilot study concerning bycatch data of sea birds will be planned during 2018. 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 2018-2019 and will be analyzed and reported in 2019.

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 2018 will be sent to randomly selected commercial fishermen (20% of the total amount of fishermen in the vessel register data) by e-mail in 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 reveal 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)

Text Box 1G: List of research surveys at sea

General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which reseach surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.

1. Objectives of the survey

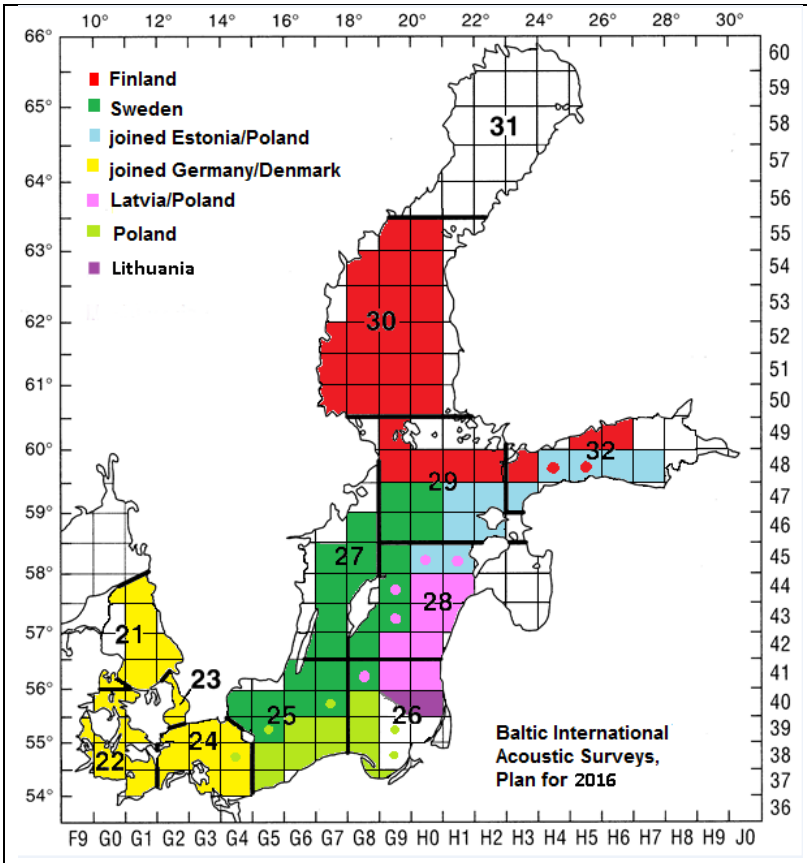
Baltic International Acoustic Survey (BIAS): The objective of the BIAS survey is monitoring of the spatial distribution and abundance of herring and sprat year-classes in the pelagic of the Baltic Sea. Survey design, acoustic measurements, fishing method and data analysis are standardized and data produced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

Baltic International Trawl Survey (BITS): The objective of the BITS survey is monitoring of the spatial distribution and abundance of cod, flounder, sprat and herring recruiting year-classes, and other less numerous fish species spatial distribution in a bottom zone of Baltic Sea.

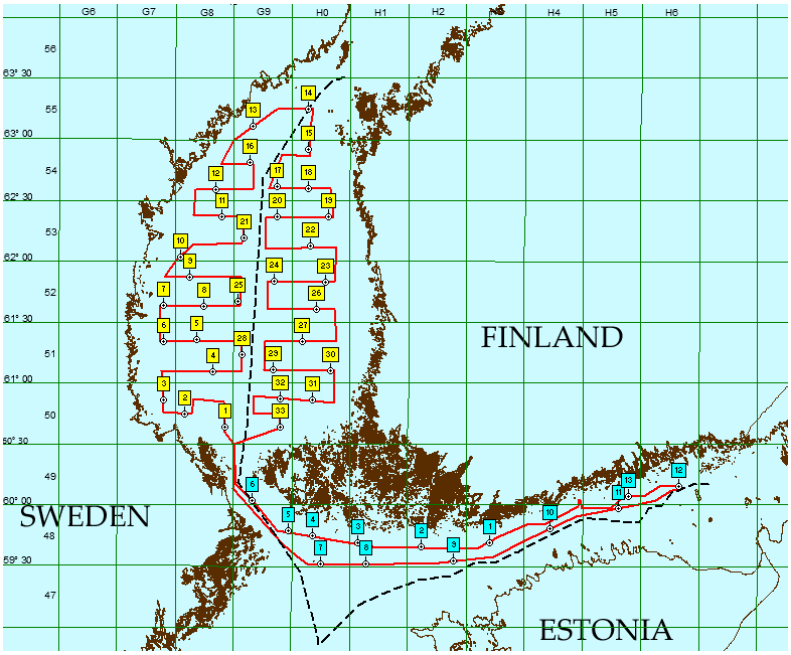
2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

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, with exception of year 2017, R/V Aranda has been chartered to cover the whole area within the remit of Finland. In 2017, due to docking of R/V Aranda, the survey was carried out by R/V DANA.



Map 1. International BIAS 2016 planned



Map 2. Finnish survey track-trawl stations

BITS: National parts of the international coordinated BITS surveys should be carried out in the first quarter (Q1) between 15 February and 31 March and in the fourth quarter (Q4) between 1 and 30 November. In year 2017, one Finnish scientist and/or technician will take part in Danish survey on R/V DANA. Further information and details of the survey are to be found in Danish Work Plan. During years 2018-2019 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 (see 5. Thresholds).

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 Dana, 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 also BITS 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

According to earlier bilateral agreement between Finland and Sweden, Sweden sends two technicians to BIAS-survey in SD30 and is responsible for age reading of 50% of herring otoliths collected in that survey. New survey participation and cost sharing rules are discussed in regional level. If RCG Baltic will agree on them before survey 2019, then they are applied in 2019 BIAS.

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.

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)

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 multi-annual Union programme and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of this Decision. 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.

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)

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

General comment: This Box fulfills paragraph 5 points (a) and (b) of Chapter III of the multi-annual Union programme and Article 2, Article 4 paragraphs (1), (2) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Tables 5(A) and 6 of the multi-annual Union programme.

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).

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 (including family members). Financial statements data for fishing firms with income over a threshold level of around € 11 000 are obtained from the database of Statistics Finland (SF) on structural business and financial statement statistics. 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) every 3 years.

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. Economic data is collected by fishing unit: company or fisherman (including family members). Financial statements data for fishing firms with income over a threshold level of around € 11 000 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 250 fishermen, covering around 90 % of the total turnover of coastal fishermen.

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 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.

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 25% and other equipment 5%.

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 error-query software.

Financial statements data for fishing firms with income over a threshold level of around € 11 000 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 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)

SECTION 3: ECONOMIC AND SOCIAL DATA

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 multi-annual Union programme and Article 2 and Article 3 paragraph (3) point (c) of this Decision. It is intended to specify data to be collected under Table 6 of the multi-annual Union programme.

1. Aim of pilot study

Aim of the pilot study is 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 is carried out in the end of 2016 (conserning employment data from 2015). Thereafter, the social data collection is carried out every three years, 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 exploited. 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

Natural Resources Institute Finland (Luke) calculates the social variables based on the data from official statistics of Statistics Finland and compares/cross checks the data against employment information aquired from Luke's statistical data collection. A pilot calculation of social variables is carried out in the end of 2016. Data from employment statistics is obtained from Statistics Finland and the employment estimates are calculated in the online remote service area for recearcher to demonstrate the data collection, calculation of social variables and reporting for the comission. Thereafter, the social variables are calculated every three years, beginning from 2018 data collection. As data is already available and collected by Statistics Finland, only the analysis and calculation and reporting takes some time. The first pilot is expected to be completed in 2017.

3. Methodology and expected outcomes of pilot study

Social data on employment by education level and nationality is collected by combining data from official statistics of Statistics Finland. The employment statistics data covers the whole population of the fleet, aquaculture and fish processing. The data includes information on sex, nationality, education level and employers by employee. The employment statistics is used together with the financial statements data 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 in the Statistics Finland's online remote service area for recearchers according to PGECON guidelines and using SAS software.

The first pilot calculation for the social data is carried out in the end of 2016 and is expected to be completed in 2017.

(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 multi-annual Union programme and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Tables 6 and 7 of the multi-annual Union programme.

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; former Finnish Game and Fisheries Research Institute). Main source 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 (VAHTI) 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 we enquired other business activities, employment, production costs, production value, volume and methods per species. This data was 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 (VAHTI) 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 (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 2014 there were 9 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. It produces around one third of the sector total in value. 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 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 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. 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 170 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 with income over a threshold level of around € 11 000 in the database of Statistics Finland (SF) on Financial statements of Industry and Business register. In 2014 there were 120 firms with financial statements. These financial statements were 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)

Pilot Study 4: Environmental data on aquaculture

General comment: This Box fulfills paragraph 6 point (c) of Chapter III of the multi-annual Union programme and Article 2 and Article 4 paragraph (3) point (d) of this Decision. It is intended to specify data to be collected under Table 8 of the multi-annual Union programme.

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 Table 8. As environmental data concerning aquaculture has already been collected by the Ministry of the Environment, dublication of data collection is avoided as far as possible and excisting data sources are used when possible. Collaboration between the Ministry of the Environment and the Natural Resource Institute Finland (Luke) is strengthened and new data transfer prosedures are developed. Ministry of the Environment manages an environmental permit system and database (VAHTI) (maintained by the Centre for Economic Development, Transport and the Environment), which includes data among other things, on fish mortalities and fish feed used. Also use of medicines by aquaculture producer is planned to be included in the VAHTI database. Natural Resource Institute and the Ministry of the Environment are negotiating if new environmental information for EU economic data collection could be included in the database and how the environmental data from the VAHTI database could be most suitably transferred to Luke's information systems.

2. Duration of pilot study

Data on fish mortalities and use of medicines is planned to be obtained annually from the environmental permit system and database (VAHTI) managed by the Ministry of the Environment. Ministry of the Environment is renewing its environmental permit and data collection system and Luke is working together with the Ministry to develop a database suitable for both administrative and data collection purposes. It is still unclear if the data on medicine used will be included in the ministry's database (VAHTI) or not. If the data on use of medicines is included in VAHTI database, the data is obtained annually starting from 2017 data collection. If the data on medicines will not be included in VAHTI database, Luke will collect the data every three years together with the production survey, starting from 2018 data collection.

3. Methodology and expected outcomes of pilot study

All 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 phosporus the fish feed used contains as well as fish mortalities to the Finnish environmental management authorities. The ministry of the Environment maintains an

environmental permit system and database (VAHTI) which includes the information on fish feed used by aquaculture producer and the fish mortality by producer. Luke is working with the Ministry of the Environment to include also the use of fish medicine into the VAHTI database and discussing how the environmental data from the VAHTI database could be most suitably transferred to Luke's information systems. The expected outcome of the pilot is that Luke receives data from VAHTI database on the fish mortalities and medicines used by producers with and electronic data transfer annually. Luke checks the validity of the data and calculated the estimates for the environmental data on aquaculture and reports them to the commission according to the data calls. Data collection on environmental data starts in 2017.

(max 900 words)

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

General comment: This Box fulfills footnote 6 of paragraph 1.1(d) of Chapter III of the multi-annual Union programme, Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Table 11 of the multi-annual Union programme.

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; former Finnish Game and Fisheries Research Institute (FGFRI)).

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 2017 will be collected in 2018) 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 DCF.

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

Economic data collection concerning the processing industry is carried 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.

Capital costs are the actual costs (net) paid. Total value of assets is collected (as Capital value) from the balance sheets.

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. Also production survey covers all processing firms.

(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 this Decision and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multi-annual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multi-annual Union programme.

Description of the sampling plan according to Article 5 paragraph (3) of this Decision

Starting from 1.1.2017 (according to current schedule), there will be a new practice of dividing fishing rights of some TAC-regulated species (i.e. salmon, sprat and herring) in Finland. The Finnish TAC-share will be divided to individual fishermen and fishing enterprises according to their previous landing history as individual transferable quotas (ITQ). As the administrative framework changes, the fishermen's behaviour will change as well, at least that of a part of the fishermen. This complicates the planning of Finnish Data Collection.

The sampling frame for abovenamed TAC-regulated species will be the list of fishermen/enterprises which have a TAC-share. In principle, a statistically sound sampling could be executed with a draw list, where each fishing unit's probability to be drawn would be the same as its TAC share. However, it is possible that fishermen develop different fishing strategies, for example, a part of the fishermen may be fishing only during peak season to get their quota share fished in as few fishing days as possible, whereas others may be fishing only during times, when the price they get exceeds a certain level. In such a case, a partitioned random sampling would be more effective than random sampling, as it would lessen the number of unsuccessful contacts to fishermen. Furthermore, the fishermen who are more or less learning the new administrative system in 2017 may not be very responsive to new sampling practises.

Therefore, the selection of PSU will not be totally random in 2017. For herring and sprat, which are mainly fished with pelagic trawls and trap nets, we are 1) sampling the vessels which on the basis of earlier knowledge are willing to co-operate, and 2) making preparations for starting to apply statistically sound sampling scheme ("4S") on trawl fisheries in the future, possibly already from the beginning of 2019 on. Our preliminary plan is to do random sampling from a draw list, where probability of a fishing unit to be selected for sampling is equal to its TAC share. The sampling unit will be vessel x fishing trip for trawl fisheries on herring and sprat, and fisher x day in case of trap net fishery on herring. According to our earlier analysis, the Finnish pelagic trawl fleet is rather homogenous in their fishing behaviour which results in homogenous catches. On the basis of 2017 data, we will analyse if this is still the case after ITQ-reform. Samples will be taken from an unsorted catch as the vessel arrives to port. Discard in Finnish pelagic fisheries is negligible, since demand exists for all fish which is caught.

We are also going to have a continuous dialogue with the industry to clarify, how individual fishing units adjust their activities in the new administrative framework. If different strategies develop, this may create a need for

justification in sampling design.

For salmon, the situation is slightly different. The fishery consists of several trap-net fishermen which are spread all along the coast and operate with less than 10 m vessels. The average daily salmon catch of a fisherman is usually only few fish, and the most effective way to get salmon samples has been self-sampling. This practise will be continued during years 2017-2019. A total of 9 salmon fishermen (0.5% of the estimated number fishermen with a share of salmon TAC) take part in the self-sampling program. 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 into the self-sampling program are not selected randomly, but on the basis of their willingness and possibility to co-operate. Sampling unit is fishermen * fishing day. During years 2017-2019 we will continue with the fishermen with whom we already have co-operation and study possibilities for randomized sampling.

Whitefish, perch and pike-perch fisheries (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 taken when the fishermen arrives to port from selected fishermen, who are bringing the whole catch of one fishing day into the port and selling it to samplers. Sampling unit will be fishermen * fishing day. This practise will be continued during years 2017-2019, and possibilities to develop sampling towards statistically sound sampling design will be studied.

During years 2018-2019, trawl fisheries targeting vendace (*Coregonus albula*) will be sampled in the Bay of Bothnia (SD 31), where 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 by trap-nets and in mixed trawl catches with herring.

In Q4/2018 the statistically sound sampling scheme ("4S") is on a test phase in trawl fisheries targeting herring and sprat, and in trawl fisheries targeting vendace. In these fisheries, we are going to start to apply the 4S from the beginning of year 2019.

(max 900 words per Region)