

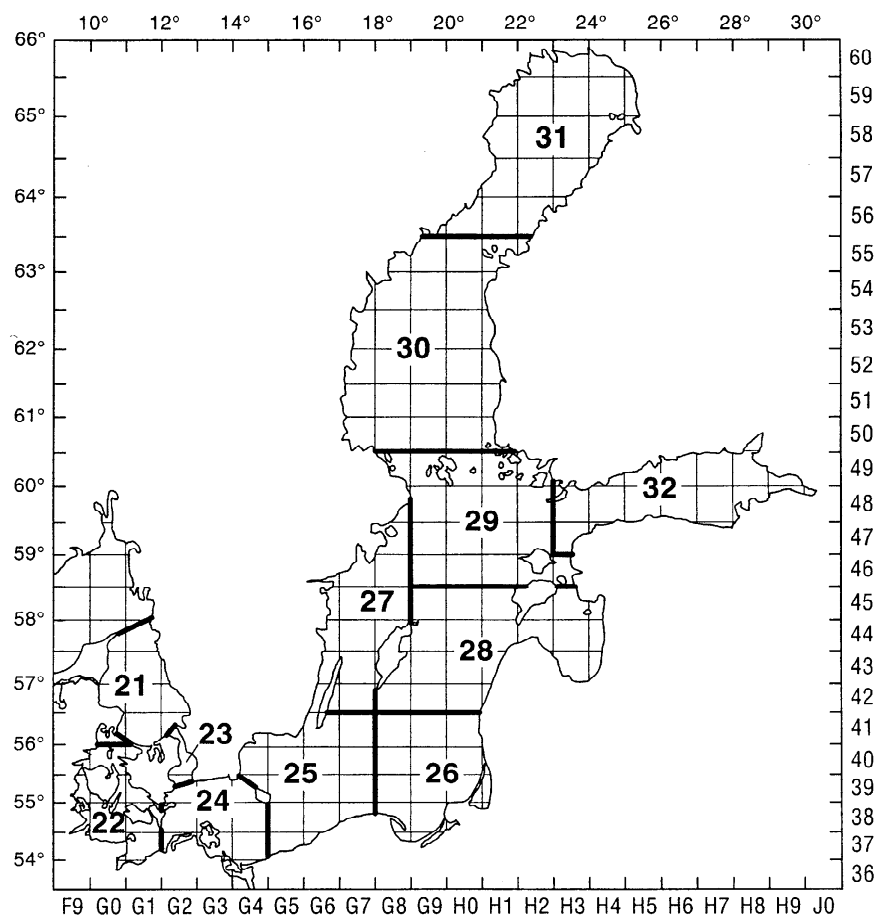
*National Data Collection Programme under  
Council Regulation (EC) N° 199/2008,  
Commission Regulation (EC) N° 655/2008 and  
Commission Decision N° 2010/93/EU*

# Annual Report 2012

21.3.2014

Ministry of Agriculture and Forestry  
Finnish Game and Fisheries Research Institute

## FINLAND



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## I General framework

This is the Annual Report 2012 (AR 2012) reporting the achieved national data collection in 2012 based on the Finnish National Programme 2011-2013 (NP 2011-2013). The work has been done under the DCF: Council Regulation (EC) N° 199/2008, Commission Regulation (EC) N° 655/2008 and Commission Decision N° 2010/93/EU.

The data collection under the NP 2011-2013 has been carried out solely in the Baltic Sea region (IIIb-d).

### List of Derogations

| Short title of derogation                     | NP proposal section | Type of data - Variables | Region     | Derogation approved or rejected | Year of approval or rejection | Reason / Justification for derogation                                                                                                                                                                                                                           |
|-----------------------------------------------|---------------------|--------------------------|------------|---------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discard sampling of herring and sprat catches | III.C.5             | Biological               | Baltic Sea | Approved                        | 2003                          | According to the catch statistics, the Finnish commercial catch of Baltic herring in 2009 was 90 377 tonnes and, as reported by the fishermen, total discards of herring 45 tonnes (0.05%).<br><br>Derogation for the has been requested and accepted annually. |
| Sampling of cod landings                      | III.C.5             | Biological               | Baltic Sea | Approved                        | 2003                          | Small share of quota and landings (less than 1 %) Commission Decision 2010/93/EU Ch II.B2.5.1                                                                                                                                                                   |
| Discard sampling of cod catches               | III.C.5             | Biological               | Baltic Sea | Approved                        | 2004                          | Pilot study carried out in NP 2003                                                                                                                                                                                                                              |

|                                                                    |         |            |            |          |                 |                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------|---------|------------|------------|----------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    |         |            |            |          |                 | showed discards to be negligible. Derogation for the has been requested and accepted annually.                                                                                                                                                      |
| Discard sampling of salmon and sea trout catches                   | III.C.5 | Biological | Baltic Sea | Approved | 2003            | Discards are mainly salmon and trout partly eaten by seals. It is not possible to obtain samples from half-eaten carcasses. Derogation for the has been requested and accepted annually.                                                            |
| Sampling of landings on metier 'OTM_SPF_16-31_0_0' targeting sprat | III.C.5 | Biological | Baltic Sea | Approved | 2009 or earlier | The metier 'OTM_SPF_16-31_0_0' is targeting sprat in the southern parts of Baltic sea (ICES subdivisions 25 – 28) but the first sales of the landings take place entirely in other MS. Derogation for the has been requested and accepted annually. |
| Participation in sprat spring survey                               | III.G   | Biological | Baltic Sea | Approved | 2003            | The springtime sprat-survey covers only the southern-middle parts of Baltic main basin.<br><br>Derogation for the non-participation has been requested and accepted annually.                                                                       |
| Sampling of                                                        | III.E.6 | Biological | Baltic     | Approved | 2013            | Small share of                                                                                                                                                                                                                                      |

|                                                                       |  |                   |     |  |  |                                                                                                   |
|-----------------------------------------------------------------------|--|-------------------|-----|--|--|---------------------------------------------------------------------------------------------------|
| stock-related<br>variables for<br>sprat from<br>commercial<br>catches |  | stock-<br>related | Sea |  |  | quota and<br>landings (less<br>than 10 %)<br>Commission<br>Decision<br>2010/93/EU Ch<br>II.B2.5.1 |
|-----------------------------------------------------------------------|--|-------------------|-----|--|--|---------------------------------------------------------------------------------------------------|

## **II National data collection organisation**

### **II.A National correspondent and participating institutes**

#### **National correspondent**

The administration of this national data collection programme is in the responsibility of the Ministry of Agriculture and Forestry (MAF), which designates a national correspondent in charge of the implementation of this programme and the DCR.

The contact information of the Ministry of Agriculture and Forestry and the national correspondent are as follows:

#### **Ministry of Agriculture and Forestry**

Department of Fisheries and Game

Mr. Heikki Lehtinen

Mariankatu 23

P.O. Box 30

FI-00023 Government

Helsinki

FINLAND

E-mail: [heikki.lehtinen@mmm.fi](mailto:heikki.lehtinen@mmm.fi)

Tel. +358-9-1605 2902

Fax. +358-9-1605 2640

#### **Participating institutes**

The MAF was assisted by the Finnish Game and Fisheries Research Institute (FGFRI, [www.rktl.fi](http://www.rktl.fi)), which designates two contact persons responsible for attending practical issues between the Ministry and the Research Institute.

The contact information of the FGFRI and the contact persons are as follows:

Dr. Ari Leskelä

Finnish Game and Fisheries Research Institute

Yliopistokatu 6

FI-80100 Joensuu

Finland

E-mail: [ari.leskela@rktl.fi](mailto:ari.leskela@rktl.fi)

Tel. +358 295 327 404

Mr. Timo Myllylä (on leave until 1 July 2013)

Finnish Game and Fisheries Research Institute

Itäinen Pitkäkatu 3

FI-20520 Turku

Finland

E-mail: [timo.myllyla@rktl.fi](mailto:timo.myllyla@rktl.fi)

Tel. +358 295 327 686

Mr. Anssi Ahvonen  
 Finnish Game and Fisheries Research Institute  
 P.O. Box 2 (Viikinkaari 4)  
 FI-00791 Helsinki  
 Finland  
 E-mail: anssi.ahvonen@rktl.fi  
 Tel. +358 295 327 248

### **National DCF website**

A short description of DCF is given in the Finnish Game and Fisheries Research Institutes web-site ([www.rktl.fi](http://www.rktl.fi)). At that address there is also an online service, which allows any customer to build interactive statistical presentations on e.g. fisheries catches and effort, aquaculture, fish processing industry et.c. Even if this data is available to any customer, service is available only in Finnish at the moment. Data is aggregated data, due to privacy protection reasons.

Primary data, which contains confidential information, is stored in a database which is accessible to all persons who take part in the data collection, but it is accessible only via user registration and password. Parts of the collected data are also sent to other databases e.g. survey data is sent to Baltic Acoustic Databases (BAD1 and BAD2)

Furthermore, detailed or low-level aggregated data is sent from Finnish database to Baltic regional database, which allows customers to use data on a regional (stock) level.

### **National co-ordination meetings**

Two national co-ordination meetings were organised in 2012 as planned.

The 1<sup>st</sup> meeting was convened at FGFRI premises in Helsinki, 20.-21.3.2011. The main emphasis of this meeting was on the general co-ordination of the implementation of the DCF. The NC from MAF and the FGFRI personnel responsible for carrying out specific data collection tasks (a total of 29 persons) took part in this meeting whose agenda consisted of following items: Status of implementation of NP 2011-2013; Practical issues of 2012 data collection; International coordination and attendees in the international coordination meetings; Review of status of the database development; New CFP and the possible changes in data collection.

The 2<sup>nd</sup> meeting was organized as a video meeting in 17.10.2012. FGFRI offices in Helsinki, Turku, Vaasa, Oulu, Jyväskylä, and Taivalkoski, altogether 23 persons, took part in the meeting via video system. The main focus of the meeting was on preparations of implementation of the data collection in 2013. The agenda consisted of following items: Status of implementation of NP 2011-2013 in 2012; Planning and scheduling the actions under 2013; Reform of the EU Common Fisheries Policy and planning of the new data

collection framework from 2014 onwards. A special session on ageing issues was kept for those participants, who work with ageing of different species.

## II.B Regional and International co-ordination

### II.B.1 Attendance of international meetings

An overview of the international co-ordination meetings under the NP 2011-2013 is presented in Standard table II.B.1.

There were some changes in our attendance in the international co-ordination meetings in 2012 compared to the updated list of eligible meetings which we sent to commission in March 1<sup>st</sup> 2010:

- No participant (economist) in the RCM North Atlantic.
- No participant in the WKMSYREF due to workload of scientists involved.
- No participant in WKADS2
- No participant in SGCAL, WGFAST, WKFLABA, WGEEO, SGPIDS, WGEEL due to workload of scientists involved

Otherwise our attendance of international meetings was realised as planned.

### II.B.2 Follow-up of regional and international recommendations

The regional co-ordination takes place within the framework of Regional Coordination Meeting for Baltic Area (RCM Baltic), including one annual meeting. The elements of regional and international co-ordination and co-operation are given in the relevant NP Proposal sections.

| <b>6<sup>th</sup> Liaison meeting:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Responsive action</b>                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>6<sup>th</sup> Liaison meeting recommendation:</b> For the purposes of ranking metiers to sample, national data on effort, landings and value by metier and fishing ground should be compiled regionally in advance of the next meeting. To enable this, participants from MS should strictly respect the agreed naming conventions of fishing ground, metiers and units of the variables as well as the deadline for submission of the national data. The Chair is responsible for requesting the data and compiling it on a regional level..                              | <b>Finland:</b><br>National data on effort, landings and value by métier and fishing ground were compiled before the RCM 2010 meeting. |
| <b>6<sup>th</sup> Liaison meeting recommendation:</b> For the purposes of understanding the heterogeneity of metiers and the consequences for task sharing and discard sampling, national descriptions of the regionally ranked metiers should be compiled using the format in Annex 9. To enable this, participants from the MS should strictly respect the agreed naming conventions of fishing ground and metiers as well as the deadline for submission of the information. Appointed persons are responsible for requesting the data and compiling it on a regional level | <b>Finland:</b><br>National descriptions of the regionally ranked métiers were provided for the RCM 2010.                              |
| <b>6<sup>th</sup> Liaison meeting recommendation:</b> In order to use the time of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Finland:</b> The tables                                                                                                             |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| the RCM more efficient and for the harmonisation of the NPs, including the quality checks, the exchange data tables from all Response to Technical Comments on AR 2010 - FINLAND 3<br><br>NPs, namely planned number of individuals to be sampled for age, length, weight, sex and maturity should be compiled before the next RCM.                                                                                                                                                                                                                                                                                                                         | were compiled before RCM 2010.                                                                                                                             |
| <b>7<sup>th</sup> Liaison meeting recommendation:</b> LM recommend MS to use COST tools and encourage MS to report on the implementation of these tools in analyzing their data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Finland:</b> Since the COST tool package lacks user support, it's use in Finland is limited. Most of the data analysis is made with other applications. |
| <b>7<sup>th</sup> Liaison meeting recommendation:</b> LM endorses the recommendations from the RCM Baltic regarding métier variables. LM would like to widen the scope to all regions by recommending that before the RCMs in 2011, MS should look at their transversal data (landings, effort, value), review their métier ranking, and in the in case of significant changes, bring these to the attention of RCMs. As the RCMs had noted that some MS had used the reference years 2008-2009, instead of the reference years 2007-2008 agreed at the 2009 RCMs, the consistent use of the same reference years among MS can be critical in this respect. | <b>Finland:</b> We made this preparatory work before the RCM Baltic                                                                                        |
| <b>7<sup>th</sup> Liaison meeting recommendation:</b> LM would like to recall that MS participation in the relevant RCMs is mandatory. Furthermore, LM considers that RCMs should continue their efforts in inviting third countries with fisheries in the relevant regions                                                                                                                                                                                                                                                                                                                                                                                 | <b>Finland:</b> We have participated the RCM Baltic.                                                                                                       |
| <b>8<sup>th</sup> Liaison meeting recommendation:</b> LM recommends that all MS respond to the data call in 2012. MS will be requested to upload their data into FishFrame or make data available to the RCMs in the FishFrame format. This data call will include Commercial Landings(CL), Commercial Effort (CE) and Commercial Samples (CS) records for 2010 and 2011. Data call will be launched in February 2012 and with a deadline 4 months late                                                                                                                                                                                                     | <b>Finland:</b> We have uploaded all requested data to FishFrame by the deadline.                                                                          |
| <b>8<sup>th</sup> Liaison meeting recommendation:</b> In order for all MS to gain the knowledge concluded in the Lot 2 project on VMS and logbook data, the RCM recommends a training workshop on how the different appropriate tools can be used. LM supports this approach and recommends that MS gain experience with the VMS tools during 2012, before reporting to a workshop in 2013                                                                                                                                                                                                                                                                  | <b>Finland:</b> We sent a scientist to VMS-tools training and workshop                                                                                     |
| <b>8<sup>th</sup> Liaison meeting recommendation:</b> MS are requested to submit the recreational fishery available data (total removals; any biological data) to the next meeting of WGBFAS, WGBAST and WGEEL in 2012.                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Finland:</b> Because recreational herring- and sprat catches are negligible and                                                                         |

|  |                                                                                                                                                              |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | because there are no recreational cod catches in Finland, they were not submitted to WGBFAS. Recreational fisheries data were submitted to WGEEL and WGBAST. |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------|

### **III Module of evaluation of the fishing sector**

#### **III.A General description of the fishing sector**

In the end of 2012, the Finnish fishing fleet numbered 3241 registered vessels. Most of the vessels (3168) were less than 12 meter (LOA), and they were used in coastal fishing. The overall capacity of the vessels was 16 400 GT and power 171 000 kW. A big part of the vessels are used seasonally only. One should keep in mind too, that depending on the winter and latitude, the coastal waters in Finland are ice covered over several months, and then fishing vessels are not in use. Regardless that, fishing can be conducted under ice cover. Then fishing vessels can be replaced for instance by snowmobiles.

The total fish catch level in Finland has been 120-160 000 tons in the previous years. In 2012 commercial marine catch was about 133 000 tons. The bulk of the catch consisted of Baltic herring, 117 000 tons, followed by sprat, 9 000 tons. Commercial catch in inland waters in 2010 was 4 600 tons, of which half was vendace. Total catch of recreational fishermen in 2010 was 29 000 tons, of which 5 100 tons was caught in the Baltic Sea and the rest in the inland waters.

### **III.B Economic variables - Baltic Sea (ICES areas III b-d)**

#### **III.B.1 Achievements: results and deviation from NP proposal**

##### **Data sources**

Economic data collection was based on hierarchical multi-stage survey that combines information from different data sources. Main sources were the central control register on commercial fishery (includes fishery catch data, fishing vessel register, first hand sales of quota species), financial database in Statistic Finland (SF) and account survey. Starting from 2009, there were new account data available for the coastal fishermen collected by Ministry of Agriculture and Forestry in connection to seal damage compensation applications.

##### **Target frame population**

The evaluation of the economic situation in the fishing sector covers all fishing vessels in the fishing vessel register on the 1<sup>st</sup> of January. Each vessel is owned by fishing unit: fishing unit can be a company, a fisherman or a household. These fishing units comprise the target population of economic data collection.

Catch data is linked to vessels to divide them into active or inactive vessels.

All vessels were segmented with auxiliary information from fishing vessel register and catch data.

##### **Sampling and data collection**

Economic data collection was conducted with hierarchical multi-stage survey. Information on catches by species, value of landings by species, effort data and vessel capacity information was collected by vessel. This data was collected exhaustively for all vessels. Economic data was collected by fishing unit: company or fisherman (including family members). Financial statements data for fishing firms with income over a threshold level of € 10 340 were obtained from the database of Statistics Finland (SF) on Financial statements of Industry. This group of firms produce about 60% of total turnover of Finnish fishing fleet. The coverage of the financial statements for this group is good. 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. 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 the cost and earnings data needs to be collected with an additional account survey on larger fishing firms (in practice trawlers).

Account data for the coastal fishermen is available from the sources of Ministry of Agriculture and Forestry. Fishermen who have suffered catch damages and losses caused by seals have an opportunity to apply for compensation for the economic loss. The compensation is paid by Ministry of Agriculture and Forestry. For the application, the fishermen need to attach detailed account data. The data is presented according to the cost and earnings structure

defined by the DCF regulations. The number of vessels/fishing units in this account data was about 230 in 2011.

### **Estimation**

Cost and earnings estimates were done by design-based and model assisted regression and ratio estimation. First the total revenue was estimated with regression using the total value of catches. Then total costs were estimated (with regression) for total population per segments from the total revenue. The cost variables were estimated as ratio estimates from the total costs.

PIM method was used for the calculation of the capital value and the depreciation costs for fleet. Price per capacity unit is based on the book values of the vessels. Balance sheet data of coastal vessels was combined with the vessel register data by vessel code. Then cumulated depreciation costs were calculated from the gross book value of the vessels. Cumulated depreciation costs were added to the gross book value to get historical values by vessel. Then heavy machinery producer price index was applied to get the replacement value of the total fleet with 2011 price level. Price per GT was then calculated from the replacement value. This price/GT was used to calculate the depreciated replacement value for the Finnish fleet.

Employment was estimated based on previous activity survey and log book information. Employment was presented in number of employees and FTE. FTE was estimated based on the FTE from Statistics Finland. Opportunity costs for unpaid labour were estimated based on annual amount of unpaid work and the average wage of the enterprise.

Fuel costs were estimated based on financial statements and account survey. Fuel consumption was estimated based on the costs by fleet segments and average fuel prices in 2011.

The price data on fish subject to quota (Baltic herring, sprat, salmon, and cod) were 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 were checked and complemented with the book keeping of fish wholesalers in coastal areas. The prices of other fish species were 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 were calculated by species, size-class, degree of processing, and by month.

### **Reference year**

The reference year of economic data collection is the preceding year. Preliminary financial statements data are available on the 4th quarter after the reference year. Therefore information on the economic situation of fishing sector will be provided earliest one year after the reference year investigated.

### **III.B.2 Data quality: results and deviation from NP proposal**

Capacity and landings and effort data covers all vessels. Financial statements are collected for all firms with income over a threshold level of € 10 340 in the database of Statistics Finland

(SF) on Financial statements of Industry and Business register. This register gives good coverage in number of firms and share of production.

However, there is under-coverage in the Business Register (compared to target population) that needed to be estimated with regression estimation and additional cost structure analysis. Accuracy of these estimates was as planned in the NP. For coastal vessels (activity less than the threshold) more detailed account data was obtained from the Ministry of Agriculture and Forestry.

As the asset value is calculated with PIM method for all vessels, there is no sampling variation. Therefore the CV for financial statements refers only to the CV of debt.

### III.B.3 Follow-up of regional and international recommendations

|                                     |                                                                                                                                             |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RCM Baltic 2011 and earlier:</b> | <b>Finland:</b> There were no direct or relevant recommendations from RCM Baltic 2011 for the Finnish data collection on economic variables |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|

### III.B.4 Actions to avoid shortfalls

Fuel consumption was estimated based on fuel costs and annual average fuel prices. Offshore vessels use same fuel type (light fuel oil) and fuel consumption can be estimated. Coastal vessels are equipped with various engines that use various fuel types. Therefore these estimates should be considered uncertain.

### **III.C Metier-related variables - Baltic Sea (ICES areas III b-d)**

#### **III.C.1 Achievements: results and deviation from NP proposal**

The data collected during the sampling year has been updated into Standard tables III.C.3, III.C.4, III.C.5 and III.C.6.

##### **Metier FYK\_ANA\_0\_0\_0**

This fishery is targeting salmon (*Salmo salar*) and sea trout (*Salmo trutta*).

Amount of sampled fishing trips for this metier was 135 (104% of planned 130 trips).

The achieved number of length measurements for *Salmo salar* was 1876 and 666 specimens were collected from other metiers (from the river catches of the River Tornionjoki), increasing the total to 2542 specimens (100%). In addition 987 specimens were collected in Denmark and Poland from the southern Main Basin off-shore fishery for the DNA analysis, but these samples were excluded from the precision level calculations.

The achieved number of length measurements for *Salmo trutta* was 428 specimens (86%).

##### **Metiers GNS\_FWS\_0\_0\_0 COREG and FYK\_FWS\_0\_0\_0 COREG**

These fisheries are targeting Common whitefish (*Coregonus lavaretus*).

Amount of sampled fishing trips for metier FYK\_FWS\_0\_0\_0 COREG was 11 (122% of planned 9 trips) and for metier GNS\_FWS\_0\_0\_0 COREG 23 trips (100% of planned 23 trips).

The achieved number of length measurements for *Coregonus lavaretus* from these metiers was 1972. In addition, 37 specimens were collected from other metiers increasing the total to 2009 specimens (110%).

##### **Metiers GNS\_FWS\_0\_0\_0 PERCIF and FYK\_FWS\_0\_0\_0 PERCIF**

These fisheries are targeting pike-perch (*Sander lucioperca*) and perch (*Perca fluviatilis*).

Amount of sampled fishing trips for metier FYK\_FWS\_0\_0\_0 PERCIF was 11 (100% of planned 11 trips) and for metier GNS\_FWS\_0\_0\_0 PERCIF 40 trips (138% of planned 29 trips). This 'over-sampling' in the case of gill-nets is related to the decreasing professional catch of *Sander lucioperca* and *Perca fluviatilis* in recent years and the observed change of the behaviour of these fish (areas, depths, timings), which is possibly a part of a larger change in the coastal ecosystem, including the increased number of grey seals and cormorants, and has made the fishery less predictable and thus less successful. To achieve the adequate number of individuals, we had to sample more trips than planned. Nevertheless, we were able to decrease the number of samples from the previous year.

The achieved number of length measurements for *Sander lucioperca* from these metiers was 1549. In addition, 60 specimens were collected from other metiers increasing the total to 1609 specimens. Due to reasons listed above, the number was lower than planned (74%).

The achieved number of length measurements for *Perca fluviatilis* from these metiers was 2833. Additionally 149 specimens were collected from other metiers increasing the total to 2982 specimens (129% of planned).

#### **Metiers FYK\_SPF\_0\_0\_0 and OTM\_SPF\_16-31\_0\_0**

Both of these fisheries are targeting on herring (*Clupea harengus*) and the latter also on sprat (*Sprattus sprattus*).

Amount of sampled fishing trips for metier FYK\_SPF\_0\_0\_0 was 14 (70% of planned 20 trips) and for metier OTM\_SPF\_16-31\_0\_0 78 trips (93% of planned 84 trips).

The achieved number of length measurements for *Clupea harengus* from these metiers was 31 356. In addition, 187 specimens were collected from other metiers increasing the total to 31 543 specimens (128%).

The achieved number of length measurements for *Sprattus sprattus* from these metiers was 7 689 specimens (95%). As sprat sampling is based only on the sampling of mixed landings of herring and sprat, the realization in the number of planned sprat length measurements is usually a consequence of variation in the share of sprat in the landings.

### **III.C.2 Data quality: results and deviation from NP proposal**

#### **Precision estimates**

Finland has been granted a derogation on discard sampling of herring, sprat, salmon, and sea trout. Therefore, the precision estimates on discards were not calculated for these species. The precision estimates on volume of discards were not calculated for any of the sampled species.

Pikeperch (*Sander lucioperca*) and perch (*Perca fluviatilis*) were not targets for sampling stock-related variables in 2012. For pikeperch (*Sander lucioperca*) stock-related data was sampled in 2011 but as the age-reading process was not completed until now the results are presented in this report as well as results for whitefish (*Coregonus lavaretus*) sampled in 2012.

#### **Herring (*Clupea harengus*)**

The CV for length sampling of landings (1.1%) was below the target value 12.5%.

#### **Sprat (*Sprattus sprattus*)**

The CV for length sampling of landings (0.7%) was below the target value 12.5%.

**Salmon (*Salmo salar*)**

The CV for length sampling of landings (0.43%) was below the target value 12.5%.

**Whitefish (*Coregonus lavaretus*)**

The CV for length sampling of landings (0.5%) was below the target value 12.5%.

**III.C.3 Follow-up of regional and international recommendations****RCM Baltic Recommendations**

| <b>RCM recommendation</b>                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Responsive action</b>                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RCM Baltic 2011 recommendation:</b> MS are requested to submit the recreational fishery available data (total removals; any biological data) to the next meeting of WGBFAS, WGBAST and WGEEL in 2012.                                                                                                                                                                                                                              | <b>Finland:</b> Because recreational herring- and sprat catches are negligible and because there are no recreational cod catches in Finland, they were not submitted to WGBFAS. Recreational fisheries data were submitted to WGEEL and WGBAST. |
| <b>RCM Baltic 2010:</b><br><i>For the purposes of regional understanding of sampling activities, National information on sampling should be compiled regionally in advance of the next meeting.</i>                                                                                                                                                                                                                                   | <b>Finland:</b><br>We prepared and delivered our data in advance of the RCM                                                                                                                                                                     |
| <b>RCM Baltic 2009:</b><br><i>For the purposes of ranking métiers to sample, National data on effort, landings and value by métier and fishing ground should be compiled regionally in advance of the next meeting. To enable this, participants from MS should strictly respect the agreed naming conventions of fishing ground, métiers and units of the variables as well as the deadline for submission of the national data.</i> | <b>Finland:</b><br>We are already using the agreed naming and we do respect the deadlines as well.                                                                                                                                              |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <p><b>RCM Baltic 2009:</b></p> <p><i>For the purposes of regional understanding of sampling activities, National information on sampling should be compiled regionally in advance of the next meeting. To enable this, participants from MS should strictly respect the agreed naming conventions of fishing ground and métiers as well as the deadline for submission of the data.</i></p>                                                                                                                                                                           | <p><b>Finland:</b></p> <p>See above.</p>                                                                                         |
| <p><b>RCM Baltic 2009:</b></p> <p><i>For the purposes of understanding the heterogeneity of métiers and the consequences for task sharing and discard sampling, national descriptions of the regionally ranked métiers should be compiled using the format in annex 3. To enable this, participants from the MS should strictly respect the agreed naming conventions of fishing ground and métiers as well as the deadline for submission of the information. Appointed persons are responsible for requesting the data and compiling it on a regional level</i></p> | <p><b>Finland:</b></p> <p>We produced the descriptions of metiers using the format in annex 3 for the RCM Baltic 2010.</p>       |
| <p><b>RCM Baltic 2008:</b></p> <p><i>In the NP proposals, a short description of all métiers selected by the 90% ranking procedure should be provided. Such a table would enable RCM to identify whether a métier with the same name covers the same or different fisheries in different NPs.</i></p>                                                                                                                                                                                                                                                                 | <p><b>Finland:</b></p> <p>Actions have been taken e.g. Finland attached the metier descriptions in the NP 2011-2013 proposal</p> |

### III.C.4 Actions to avoid shortfalls

#### Metiers GNS\_FWS\_0\_0\_0 PERCIF and FYK\_FWS\_0\_0\_0 PERCIF

Shortfalls were only found in pike-perch sampling. The continuously low cpue for pike-perch (*Sander lucioperca*) was the main reason for this. This resulted in low number of specimens in spite of the high number of trips sampled. The number of trips planned to be sampled was already adjusted according to the actual situation in each metier and the shortfalls in the number of measured landed fish should have been avoided. However the adjustment was not enough and in order to get enough samples the number of trips should be increased again in the future.

#### Metiers FYK\_SPF\_0\_0\_0

The shortfall of 30% (6 trips) is due to diminished effort in the spawning fishery with these métiers in 2012.

#### Metier OTM\_SPF\_16-31\_0\_0

Although the Baltic stock of sprat (*Sprattus sprattus*), as well as Finnish sprat quota have diminished in recent years, the share of sprat in mixed catches in future cannot be foreseen. In NP 2011-2013 the planned number of sprat samples is based on three years (2007-2009) average landings and as the share of species in mixed landings did not match the average, the achievement is below the plan by 5%. The 28% oversampling in herring (*Clupea harengus*) length measurements is mainly a consequence of a large amount of small overruns (in 80 samples out of 106 samples) in numbers of measurements per sample.

### **III.D Recreational fisheries - Baltic Sea (ICES areas III b-d)**

#### **III.D.1 Achievements: results and deviation from NP proposal**

In 2010, there were about 1.7 ( $\pm 0.1$ ) million recreational fishermen in one million households in Finland. Of those, about 215 000 fishermen participated in fishing only by rowing or steering a boat. The proportion of recreational fishermen of the total Finnish population was 32 ( $\pm 2$ ) per cent. The total catch amounted to 29.2 ( $\pm 4.9$ ) million kg, of which 82 per cent was taken in inland waters. The marine recreational catch in 2010 was about 5.1 ( $\pm 1.9$ ) million kg. Perch and pike made up over half of the catch. The salmon catch in the sea area was estimated to be 20 ( $\pm 22$ ) and the eel catch 1 ( $\pm 2$ ) tons. The cod catch in 2010 was only 11 ( $\pm 20$ ) ton.

Data on recreational fisheries in Finland is collected by postal surveys, separately for recreational marine catches and for recreational salmon catches in rivers.

#### **Recreational marine catches**

The data on recreational marine fishing is collected as planned in the NP proposal - 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, 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 can not 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.

The process of collecting catch data of recreational fishing in 2012 started in the end of 2012 by planning and a preparatory work of the survey. This included planning the enquiry forms, commissioning the frame register and designing and extracting the sample. The postal inquiries were sent in the beginning of 2013. There were no deviations in the data collection compared to what was planned in the NP proposal. The quarterly catches for the year 2012 were estimated with the help of external catch composition data. The biennial sampling strategy has been in use since the early days of DCR, and the strategy has been justified by pilot studies approved by STECF.

#### **Recreational salmon catches in rivers**

A register of sold licences for recreational fisheries in the River Tornionjoki was created. The register included 8260 fishermen as a target population, out of which 1500 fishermen were randomly selected to receive a postal questionnaire. The response rate was 61% after two reminders. All data were stored into databases and analysed. A census to a small group (less than ten fishing teams) of local fishers who have right for fishing with traditional fishing methods was conducted and the data was stored into a database.

The postal query concerning rod fishery was carried out in the River Simojoki. An on-line register of licence sales, including about 1000 licences, was recorded to internet during the year 2012 fishing season. Slightly over 400 postal questionnaires were sent to a random sample of the fishermen. The response rate was slightly over 50% after two reminders. Moreover, about 15 fishermen had returned voluntarily the question form soon after their fishing trip was over. All data were stored into databases and analysed.

Catch statistics were/will be reported in several national and international reports and working groups, like in the ICES WGBAST.

### **III.D.2 Data quality: results and deviation from NP proposal**

#### **Recreational marine catches**

The sample comprised 6000 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 location of the person's municipality of residence, the type of municipality and the location of the municipality in relation to the sea. There were six strata in all.

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 was conducted at the beginning of 2013. Contact was made three times.

For those who did not respond to the postal questionnaire, post-sampling was conducted as a telephone interview. The purpose of the post-sampling is to establish the proportion of fishing households among non-responders. For the computation, a weighting factor is formed for each statistical unit, or household-dwelling. The survey data (catch size) for the household-dwelling is multiplied by that factor. The weighting factor is 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 item non-response is taken into account using hierarchical imputation. The catches of cod, salmon and eel are allocated to annual quarters by the distributions of commercial catches or tagging experiments data.

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).

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.

There were no deviations in the achieved accuracy compared to what was planned in the NP proposal.

### **Recreational salmon catches in rivers**

The fishers who will receive mailed questionnaires are sampled from the registers at a rate making it possible to estimate salmon catches at level 1 precision (a precision of  $\pm 25\%$  for a 95% confidence level):

- River Tornionjoki: sampling rate about 1:6,
- River Simojoki: sampling rate over 1:3.

The length distribution estimates of the catch will be acquired by catch samples (see chapter III.E).

Although originally planned for 2011 and postponed to 2012, a special survey regarding the effects of non-responding and potential erroneous reporting by the respondents in the River Tornionjoki could not be carried out due to inadequate resources for planning and preparation of the survey. The survey is proposed to be postponed again.

### **III.D.3 Follow-up of regional and international recommendations**

#### **RCM Baltic Recommendations**

| <b>RCM recommendation</b>                                                                                                                                                                                                                                                                                                                                                                | <b>Responsive action</b>                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RCM Baltic 2012:</b><br><i>As the catches taken in the recreational fishery compared to the total catches for some stocks are very limited the RCM Baltic recommends that if the level of the recreational fishery by nations is below 10% of the total catch for that stock, a recreational survey on this stock can be conducted every 5 years instead of on an annually basis.</i> | <b>Finland:</b><br>No action. The recreational catch of salmon is above 10 % of the total catches. Survey is made every second year, see details in the text.                                          |
| <b>RCM Baltic 2011:</b><br><i>MS is requested to submit the recreational fishery available data (total removals, any biological data) to the next meeting of WGBFAS, WGBAST and WGEEL in 2012.</i>                                                                                                                                                                                       | <b>Finland:</b><br>Data on recreational fisheries for salmon, sea trout and eel was submitted to WGBAST and WGEEL. For WGBFAS species, share of recreational catches is negligible.                    |
| <b>RCM Baltic 2010:</b> <ul style="list-style-type: none"> <li>• <i>Discuss the possibility to include recreational fisheries data into FishFrame</i></li> <li>• <i>Compile 1-page status report of ongoing</i></li> </ul>                                                                                                                                                               | <b>Finland:</b><br>The recommendation to include recreational catch data into FishFrame was addressed to PGRFS. Actually, the topic was discussed in ICES-PGRFS Baltic sug-group meeting 16-17 Sept in |

|                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><i>recreational fisheries surveys</i></p> <ul style="list-style-type: none"> <li>• <i>RCM Baltic endorses to use annual weight estimates</i></li> </ul>                                                                                                                                                                                                                                                      | <p>Charlottenlund, Denmark (see annex 4 of ICES PGRFS 2010 report). Finland was not represented in this meeting that was mostly concerned in Baltic cod fishing in sub-divisions 22-24, where Finland has no recreational fishing</p> <p>- Finnish status report has been included in the PGRFS 2010 and later reports.</p> <p>- Finland could provide recreational information on annual catch weight basis</p> |
| <p><b>RCM NA 2010:</b></p> <p><i>RCM NA recommends MS not to wait for the outcomes of the PGRFS to revise current (when relevant) and prepare future NP Proposal on recreational fisheries, but base their planning on the DCF requirements and their own knowledge of the fisheries. RCM NA also recommends to consider the recommendations of WKSMRF, WGEEL, and the future recommendations of PGRFS.</i></p> | <p><b>Finland:</b></p> <p>Finland respects the DCF requirements for the output data as far as possible. We have experience starting from 1980s to collect recreational fishing data, and we take full use of this knowledge to provide data according to various needs and recommendations from different working and planning groups.</p>                                                                       |
| <p><b>RCM Baltic 2008:</b></p> <p><i>The RCM Baltic recommends that MS follow the request for preparation of the WKSMRF (Workshop on Sampling Methods for Recreational Fisheries), given in the ICES resolution (see <a href="http://www.ices.dk/iceswork/recs/2008recs.asp">http://www.ices.dk/iceswork/recs/2008recs.asp</a>).</i></p>                                                                        | <p><b>Finland:</b></p> <p>We have participated ICES Workshops/planning groups for recreational fishing since 2008, and the applicable recommendations of the meeting have been implemented in the survey designs.</p>                                                                                                                                                                                            |

#### III.D.4 Actions to avoid shortfalls

No shortfalls.

The pilot studies on recreational salmon fishery and cod fishery in the sea area were conducted earlier. A basic result of the pilot studies was that a cost-efficient data collection strategy, with respect to the reliability, is to collect data on recreational fishing every second year. Therefore the last surveys are conducted in 2011 and 2013 (referring to years 2010 and 2012). This practice will produce a continuous and methodologically stable biennial time-series of recreational catches.

A special survey regarding the effects of non-responding and potential erroneous reporting by the respondents in the River Tornionjoki is proposed to be postponed again until adequate resources for planning and implementation are obtained. There is no specific reason why this survey should be conducted in any particular year and therefore postponing the survey will not result in any defects to the monitoring of catches in the River Tornionjoki.

### **III.E Stock-related variables - Baltic Sea (ICES areas III b-d)**

#### **III.E.1 Achievements: results and deviation from NP proposal**

The data collected in the sea area for all the sampled species and/or stocks during year 2012 has been updated into Standard table III.E.3. However, the table was considered to be ‘not applicable’ for reporting the stock-related variables for wild salmon stocks, which results are reported in the AR text under heading ‘Monitoring of juvenile salmon and number of spawners in River Tornionjoki and River Simojoki’ (below).

Pikeperch (*Sander lucioperca*) and perch (*Perca fluviatilis*) were not targets for sampling stock-related variables in 2012. For pikeperch (*Sander lucioperca*) stock-related data was sampled in 2011 but as the age-reading process was not completed until now the results are presented in this report as well as results for whitefish (*Coregonus lavaretus*) sampled in 2012.

#### **Herring (*Clupea harengus*)**

The achieved sampling for maturities and sex-ratios as well as other stock-related variables in all sampled herring stocks realised as planned (SD’s 25-29, 32 92%, SD 30 104% and SD 31 103%).

#### **Common whitefish (*Doregonus lavaretus*)**

The number of whitefish samples for ageing in 2012 was 1861 and 102% of the planned number.

#### **Perch (*Perca fluviatilis*)**

According to our national plan, no stock related data was collected from perch in 2012 (see table III.E.2). Sampling is planned to take place next time in 2013.

#### **Pike-perch (*Sander lucioperca*)**

According to our national plan, no stock related data was collected from pike-perch in 2012 (see table III.E.2).

#### **Salmon (*Salmo salar*)**

##### **Sampling for stock-related variables in the sea area**

The number of salmon samples for stock-related variables in the area (ICES SD’s) 22-31 was 2479 and 122% of the planned number. In the area (ICES SD) 32 the achievement was 46 and 9% of the planned number. In SD32 the sampling failed because of a human mistake in self-sampling.

In order to estimate the stock composition of the catches altogether 2208 individual samples were analysed by the DNA-microsatellite techniques, which fully followed the National Plan. From the coastal catches of the Gulf of Bothnia 907 salmon (planned 800) were analysed and from the Main Basin off-shore long-line fishery 1301 salmon (planned 500) were analysed. The oversampling did not have financial implications. The coastal samples were resampled from the pooled Finnish and Swedish catches and the Main Basin samples were from the Danish, Finnish, Polish and Swedish catches.

### **Monitoring of juvenile salmon and number of spawners in River Tornionjoki and River Simojoki**

The table below indicates the realization of the data collection in the Finnish salmon rivers:

|                | River Simojoki                                        | River Tornionjoki           |
|----------------|-------------------------------------------------------|-----------------------------|
| Smolt trapping | Late May – late June, with smolt trap and smolt screw | Early June– early July      |
| Electrofishing | August–September, 35 sites                            | August–September, 126 sites |
| Echo sounding  | Mid-May - Late August                                 | Late May – late August      |

Smolt trapping was successfully carried out in the river Simojoki at the same location as in previous years. Hundreds of smolts were marked, released and recaptured to estimate the catchability of the smolt traps. Based on the smolt trapping data about 31 000 (CV 37%) wild salmon smolts migrated to the sea from the river Simojoki. The precision level of the estimates was better than normal because of the high catchability of the trap, and the estimate was successfully utilised together with the electrofishing data (below) as input for the Baltic salmon assessment (ICES 2013).

In the river Tornionjoki, smolt trapping was carried out successfully for sampling from smolt run, but the trapping could not be started early enough in order to estimate the total run size. The total catch of smolts was about 43 200. About 5500 smolts were used for the mark-recapture experiments to estimate the catchability of the trap. Based on these data 0.6 million (CV 18%) wild salmon smolts migrated to the sea during the trapping period. This low abundance estimate indicates that the early part of the migration occurred before trapping could be started. Therefore the estimate could not be utilised as an input for the Baltic salmon assessment, but instead the 2012 smolt run estimate for Tornionjoki had to be based only on the electrofishing data (ICES 2013).

Electrofishing was successfully carried out in 126 sites in the River Tornionjoki and in 35 sites in the River Simojoki to evaluate the density of juvenile salmon. In the River Tornionjoki mean densities of both one-summer old (age 0+) and older wild salmon parr decreased from the previous year, but densities were still higher than average. About 40 sites were sampled in the headwaters of river Tornionjoki, to periodically study distribution of salmon reproduction far up in the watercourse. The results indicate that salmon reproduction has increased in the headwater areas during the past 10-15 years. In the River Simojoki the

mean density of the 0+ age group decreased from 2011 reaching to moderate levels, and the density of the older group stayed about similar to previous year being on a moderate level.

To count salmon spawners in 2012, DIDSON (Dual-frequency IDentification SONar) echosounder units were mounted in the rivers Tornionjoki and Simojoki. In the both rivers, echo sounder units were mounted successfully and fish passage was monitored with few interruptions over the season of spawning migration of salmon. Total of 61 500 and 3 600 salmon sized targets migrated upstream through the sounder beams in the Tornionjoki and Simojoki, respectively. The data was used as the input in the ICES Baltic salmon assessment model (ICES 2013).

### **Sea trout (*Salmo trutta*)**

The number of salmon samples for stock-related variables in the area (ICES SD's) 29-31 was 428 and 86 % of the planned number. A slight under sampling did not cause any shortcoming in terms of precision levels.

### **Sprat (*Sprattus sprattus*)**

The sampling in stock-related variables for sprat realised with 106% achievement.

## **III.E.2 Data quality: results and deviation from NP proposal**

Table III E 3 summarizes the stock specific CV's for each stock. As can be seen, the target CV's has been reached or almost reached in each stock for variables length and weight at age, which are the most important variables for stock assessment purposes. For variables sex ratio and maturity, target values have not been reached. Increasing the sample numbers (i.e. number of individuals to be measured) to reach the target values for all variables and all stocks would increase the cost of data collection and workload remarkably, but quality of the assessments would probably not benefit as much. Even if we agree, that exact information on maturity and sex ratio is important as well, we have allocated our resources so, that at least in the most important variables target CV's are reached.

### **Herring (*Clupea harengus*)**

The CV values of stock-related variables of herring are presented in Table III.E.3 and Annex I.

### **Common whitefish (*Coregonus lavaretus*)**

The CV values of stock-related variables of whitefish are presented in Table III.E.3 and Annex I.

### **Perch (*Perca fluviatilis*)**

According to our national plan, no stock related data was collected from perch in 2012 (see table III.E.2).

### **Pike-perch (*Sander lucioperca*)**

According to our national plan, no stock related data was collected from pikeperch in 2012 (see table III.E.2). However, the CV values of stock-related variables of pike-perch in 2011 data are now presented in Table III.E.3.

### **Salmon (*Salmo salar*)**

#### **Sampling for stock-related variables in the sea area**

The CV values in 2012 for length and weight measurements were on an acceptable level but the CV value for sex ratio was high (5.5 %) in SD22-31 (see Standard table III.E.3). In SD32 the CV values for weight and sex were higher than acceptable because of the low number of samples. Anyhow, the CV values were satisfactory for the salmon assessment purposes. The required precision level criterion might not be applicable for salmon because the sampling aims also to monitor the origin (stock specifically + wild/reared) of fish in the catch during the whole fishing season (i.e. spawning migration period at the coast). In the salmon stock assessment the mean weights per age have not been used for raising the salmon catches so far. For SD32 there is no analytical assessment so far.

#### **Monitoring of juvenile salmon and number of spawners in River Tornionjoki and River Simojoki**

The stock-based variables to be monitored for Baltic salmon in the spawning rivers differ greatly from the variables monitored for the other species and areas within III.E. In the case of salmon rivers, abundance and abundance indices are the variables of interest, and this information is also utilized in non-typical ways in stock assessment (ICES WGBAST). Therefore, the precision targets required for other monitoring within III.E are not applicable for river monitoring of salmon. ICES WGBAST has not set any specific precision requirements for the salmon river data. This is mainly due to two reasons:

- The achieved precision is highly river specific and the precision achieved in one river simply cannot be achieved in another river due to extremely varying river conditions
- ICES WGBAST salmon assessment allows effective utilization of data with varying precision, thus, there are no strict, well based rules to be set for the data quality.

In case of smolt trapping, the precision level of the smolt abundance estimates for the period covered by trapping was better than average in the River Tornionjoki (CV was 18%), whilst it worse than average (CV was 37 %) in the River Simojoki.

In case of index of abundance of parr (electrofishing data), the precision of monitoring is related to the number of sampling sites and this uncertainty is incorporated by the ICES WGBAST. In the rivers Tornionjoki and Simojoki the numbers of sampling sites are amongst the highest in the Baltic rivers.

Thus far, no procedure has been established for estimating the precision on the number of ascending individuals (echo sounding data). There are, however, plans to gradually develop the study design and analysis of data to allow for estimation of the precision.

Except for the smolt run estimate of Tornionjoki, data from the rivers Tornionjoki and Simojoki were successfully utilised as input for the Baltic salmon assessment (ICES 2013).

### **Sea trout (*Salmo trutta*)**

The CV values in 2012 for length and weight measurements and also for sex ratio were on an acceptable level (see Standard table III.E.3)

### **Sprat (*Sprattus sprattus*)**

The CV values of stock-related variables of sprat are presented in Table III.E.3 and Annex I.

## **III.E.3 Follow-up of regional and international recommendations**

| <b>RCM recommendation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Responsive action</b>                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <p><b>RCM Baltic 2010:</b> <i>For institutes collecting small volumes of age samples for certain species and when new species are to be sampled, task sharing of age reading is necessary in order to optimise the use of age reading expertise. The RCM Baltic recommends the following MS to investigate their capability to read relevant age samples of interested MS:</i></p> <p>(1) Germany: plaice<br/> (2) Denmark: plaice, dab and sole<br/> (3) Poland: flounder and turbot<br/> (4) Sweden: eel and salmon<br/> (5) Finland: salmon</p> <p><i>The suggested coordination should be discussed, agreed and decided by the National Correspondents so the first agreements could be established before December 2011.</i></p> | <p>Finland has agreed to do the aging for Danish salmon samples. No formal agreement yet.</p> |
| <p><b>RCM Baltic 2010:</b> <i>All MS should upload 2009 sprat data into Fishframe before the end of October 2010</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Finland:</b><br/> We provided this data before the end of October 2010.</p>             |
| <p><b>RCM Baltic 2009:</b><br/> <i>In order to use the time of the RCM more efficient and for the harmonisation of the NPs, including the quality checks, the</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Finland:</b><br/> We provided this data before the RCM Baltic 2010.</p>                 |

|                                                                                                                                                                                |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <i>exchange data tables from all NPs, namely planned number of individuals to be sampled for age, length, weight, sex and maturity should be compiled before the next RCM.</i> |                                                                                      |
| <b>RCM Baltic 2009:</b><br><i>MS to use the average landing figures over the years 2007-2008 as the basis for ranking métiers within the NP 2011-2013</i>                      | <b>Finland:</b><br>This has been done.                                               |
| <b>RCM Baltic 2008:</b><br><i>Member states are recommended to seek for task sharing when starting ageing new species</i>                                                      | <b>Finland:</b><br>This will be taken into account, if we start ageing a new species |

#### III.E.4 Actions to avoid shortfalls

An effort will be made to increase the number of fishermen taking part in the self-sampling of salmon in SD32 in order to make sure the achievement of planned number of samples.

### **III.F Transversal variables - Baltic Sea (ICES areas III b-d)**

#### **III.F.1 Capacity**

##### **III.F.1.1 Achievements: Results and deviation from NP proposal**

The number and characters of the vessels according to segments is available in fishing vessel register. All vessels, even non-active vessels, and auxiliary vessels are included in the vessel register. The maintenance and continuous update of the register is allocated regionally to the Centres for Economic Development, Transport and the Environment (ELY centres) and to the provincial government of the Åland islands. The fleet register data is merged with the log-book and coastal fishery data. The latter two data contain complete information on catches, effort and gears for the entire fleet. For more details, see Effort and landings.

##### **III.F.1.2 Data quality: results and deviation from NP proposal**

Information was complete.

##### **III.F.1.3 Actions to avoid shortfalls**

#### **III.F.2 Effort**

##### **III.F.2.1 Achievements: results and deviation from NP proposal**

Fishing effort data will be obtained besides the collection of catch data. Target population of fishing effort data consists of all the vessels that are used in commercial fishing and, of all professional fishermen, who have a personal reporting obligation. Fishing effort will be collected by fishing occasion-based reports (logbooks) and so called coastal fishery reports for vessels <10m. Fishing effort will be collected according to categorisation corresponding to the regulation.

Preliminary data for the reference year will be available in January-March next year. Final data will be available correspondingly by June.

##### **III.F.2.2 Data quality: results and deviation from NP proposal**

The data is basically complete and required quality will be achieved.

The procedure of catch/landings and effort data compilation contains following stages:

1. The raw data is physically collected to FGfRI from fisheries control system maintained by regional authorities.

2. The data is checked to find out logical errors, and corrected accordingly. Yearly number of the catch/landings reports is on level of 20 000.
3. The data is checked with special emphasis on the discards reporting. Especially in the salmon fishery, where seals eat a meaningful part of the catch, the fishermen often estimate the discards more in qualitative terms than with numeric data. This causes a lot of manual checking.
4. The partial non-response (of single variables in observation level; also called as item non-response) is evaluated, and corrected by statistical imputation methods. It should be noted, that errors or missing information are quite common in effort data, especially in case of non-quota species.
5. The data is crosschecked with independent data, i.e. fish first hand sales notes. The discrepancies are identified, the need for corrections is evaluated and the data is supplemented.
6. The data is complemented with the landings data from other countries.
7. The representativeness of data is evaluated against the target population. The effects of non-response are corrected by statistical estimation. For that, the data is post stratified.
8. The confidence levels (error term) of the estimates are calculated with respect to the non-response.
9. The needed tabulation and cross tabulation with background variables are calculated.
10. The principles, hypotheses and procedures are documented and the data is harmonized for the submission to the database.
11. The original data forms are returned to the regional fisheries control authorities.

### III.F.2.3 Follow-up of regional and international recommendations

| RCM recommendation          | Responsive action                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| RCM Baltic 2011 and earlier | <b>Finland:</b><br>There were no direct or relevant recommendations from RCM Baltic for the Finnish data collection on transversal variables. |

### III.F.2.4 Actions to avoid shortfalls

## III.F.3 Landings

### III.F.3.1 Achievements: results and deviation from NP proposal

Target population of catch and landings data consists of all the vessels used in commercial fishing and, of all the fishermen who have a personal reporting obligation. This means that the

data is basically complete (census), also for <10m vessels. Catches and landings will be reported according to DCF.

Catches and landings of vessels >10 meters are collected by fishing occasion-based reports (logbooks). Catches and landings of vessels <10 meters (so called coastal fishery) will be collected by monthly reports. In addition, catches and landings of salmon in coastal fishery will be collected by fishing occasion-based reports. The landings of Finnish vessels abroad, as well as foreign vessel landings to Finnish ports are surveyed by logbooks, landings declarations and sales notes, and by the crosschecking of the different data. There is a landings data exchange between the relevant foreign authorities.

The conversion factors are presented in Standard table III.F.2, and they follow the ones used in fisheries control.

Yearly data on catches and landings will be available during the 3rd quarter of the year that follows the referred statistical year. Preliminary data for the fish stock assessment is available in the 1st quarter.

### III.F.3.2 Data quality: results and deviation from NP proposal

The data is basically complete and required precision and confidence levels will be achieved.

For the data qualification procedure refer to paragraph “Effort”.

### III.F.3.3 Follow-up of regional and international recommendations

| RCM recommendation                                                                                                                                                                                                      | Responsive action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RCM Baltic 2011</b>                                                                                                                                                                                                  | <b>Finland:</b> There were no direct or relevant recommendations from RCM Baltic for the Finnish data collection on effort variables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RCM Baltic 2009:</b><br><i>In order to make analyses of the data collected within DCF and to optimise the coordination work, the developed regional database FishFrame 5.0 should be used within the RCM Baltic.</i> | <b>Finland:</b><br>FishFrame database has been developed on the basis and needs of biological data use. Transversal variables contain at the same time information on biology as well as economics or behaviour of fishermen. The socio-economic character of transversal variables has not been taken into account while expressing the needs of biological data use. With respect to EC 199/2008, Finland will not submit transversal information to FishFrame in the asked resolution, until there would be procedures (accepted aggregation protocols or similar) that could safeguard the anonymity of the legal entities. |

### III.F.3.4 Actions to avoid shortfalls

### III.G Research surveys at sea

#### III.G.1 Achievements: results and deviation from NP proposal

In the joint Estonian - Finnish survey (BIAS survey in SD's 28, 29 and 32) on hired Polish R/V *BALTICA*, 15 statistical rectangles were covered with 673 NM of echo-integration track. Due to unfavorable weather conditions, the number of achieved control hauls was only 22 of the 25 planned.

The joint Finnish – Swedish survey (BIAS survey in SD 30) was performed with hired Danish R/V *DANA*. In 2012 Sweden could not support the funding of the survey in SD30 due to economical difficulties within the DCF programme and therefore the coverage of the SD30 had to be based on Finnish funding which resulted in half the normal effort. Therefore the decision was made at WGBIFS that each statistical rectangle in SD30 should be evenly covered by half of the echo-integration distance and half of the number of hauls in statistical rectangle compared to normal coverage. This resulted to the total of 638 NM of echo-integration track and 20 control hauls.

As planned, one Finnish scientist and one Finnish technician took part in the Baltic International Trawl Survey in November (BITS Q4). The detailed description of that survey will be presented in the Danish Annual Report.

#### III.G.2 Data quality: results and deviation from NP proposal

None

#### III.G.3 Follow-up of regional and international recommendations

| RCM recommendation                                                                                                                                                                                                                                    | Responsive action                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>RCM Baltic 2011:</b> No relevant recommendations                                                                                                                                                                                                   |                                                                                 |
| <b>RCM Baltic 2010:</b><br><i>The RCM Baltic recommends that the surveys listed in Commission Decision (2010/93/EU) Appendix IX includes the relevant surveys for carrying out the stock assessment of the main fish stocks in the Baltic region.</i> | <b>Finland:</b><br>We have carried out all surveys within the remit of Finland. |

#### III.G.4 Actions to avoid shortfalls

## **IV Module of the evaluation of the economic situation of the aquaculture and processing industry**

### **IV.A Collection of data concerning the aquaculture**

#### **IV.A.1 Achievements: results and deviation from NP proposal**

Aquaculture production has a significant role in Finnish fishery sector. Aquaculture production dominates the fishery market in the primary production and also as a raw material supply for processing industry. In 2011, altogether 331 enterprises engaged in fish farming (with natural food ponds included) were in operation. Of these, 178 firms had food fish production and 103 firms were specialised in fry production. Some firms have both production lines. The number of farmers with natural food ponds was 208. However, only a small part of these firms have aquaculture as their main activity.

Food fish is produced mostly at the marine farms but also in inland farms. These firms have traditionally concentrated on rainbow trout, but during the past years increasingly on European whitefish. The food fish production in 2011 was 11 300 tons. Rainbow trout is by far most important species with about 90% of both in volume and value of food fish production.

Some of the food fish firms have integrated fry production but there are also specialised juvenile fish producers. There are two main production methods in juvenile production: tanks and natural food ponds. Hatcheries and nurseries together with natural food ponds produce numerous fish species for on-growing and stocking purposes.

There are also few farms producing crayfish fry, but the number of these farms is limited and therefore it is not possible to have separate segment.

#### **Segmentation**

The Finnish aquaculture production was divided into four main segments:

- Cages (marine aquaculture, food fish production)
- On growing (inland aquaculture, mainly food fish production)
- Hatcheries and nurseries (juvenile and fry production, including natural food ponds)
- Combined (food fish and juvenile production)

Marine aquaculture regards production in cages. Most marine farms are specialised in rainbow trout production, some produce also European whitefish. On growing segment includes both food fish production and fish for further farming. Inland food fish production is done mainly in raceways, but also in cages in lakes. Some producers have integrated production of fry with food fish production. This group forms the combined segment with natural food ponds included in the segment. Natural food pond production 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 enhance the fish production.

### **Data sources**

Economic data collection concerning the aquaculture was carried as a register approach that combines information from several data sources. Main sources are production survey (including cost data) conducted by FGRI and Structural Business Statistics of Statistics Finland (SF).

### **Target population**

The target population follows the definition in the DCF. Target population was composed of enterprises in the Business Register with aquaculture as their main activity. The final target population consisted of 132 commercial enterprises in 2011. This target frame was supplemented with information of the production survey that was collected from all farms in the Fish farm register of MAF. With the production survey information, the firms were segmented according to their main activity.

### **Sampling and data collection**

Economic data collection was conducted with hierarchical multi-stage survey. The production survey was targeted to entire population. In the production survey we enquired other business activities, employment, cost of raw material and feed, production value and methods and production per species. This data was used to divide firms into segments by fish farming techniques.

Financial statements were available in Statistics Finland (SF) for all firms in 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 was estimated within stratum. Financial data gives a reliable estimate for cost structure as a whole, but the disaggregation of cost items does not follow the content in the regulation. Therefore in the production survey the detailed cost structure was surveyed according to the regulation.

### **Estimation**

Cost and earnings estimates were done by design-based and model assisted regression and ratio estimation. The cost variables were estimated with ratio estimation from financial statements. Production survey was collected exhaustively from the producers. Any missing information was estimated by stratum.

Employment was estimated based on the FTE and number of employees from the Structural Business Statistics of Statistics Finland. Opportunity costs for unpaid labour were estimated based on annual amount of unpaid work and the average wage of the enterprise.

### Reference year

The reference year of economic data collection is the preceding year. Preliminary financial statements data are available on the 4th quarter after the reference year. Therefore information of the economic situation of aquaculture sector will be provided earliest one year after the period investigated.

### IV.A.2 Data quality: results and deviation from NP proposal

Production data (from production survey) covers all firms in the target population (132 firms). Financial statements are collected for all firms having aquaculture as the main activity with income over a threshold level of € 10 340 in the database of Statistics Finland (SF) on Financial statements of Industry and Business register. In 2011 there were 112 firms with financial statements. These financial statements were raised to the target population by segment with regression estimation using value of production.

The estimates for income and operating costs are precise. However CVs of the estimates for net capital costs and net extraordinary costs were high by nature. This is due to having a high variation of these net values and the average being close to zero.

### IV.A.3 Follow-up of regional and international recommendations

| RCM recommendation          | Responsive action                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| RCM Baltic 2011 and earlier | <b>Finland:</b><br>There were no direct or relevant recommendations from RCM Baltic for the Finnish data collection on aquaculture variables. |

### IV.A.4 Actions to avoid shortfalls

No shortfalls observed.

## **IV.B Collection of data concerning the processing industry**

### **IV.B.1 Achievements: results and deviation from NP proposal**

#### **Data sources**

Economic data collection concerning the processing industry was carried as a register approach that combines information from several data sources. The main data sources are Structural Business Statistics and Business Register of Statistics Finland and survey information on processing compiled by Finnish Game and Fisheries Research Institute (FGFRI).

#### **Target frame population**

The target population follows the definition in the DCF: all fish processing firms that have fish processing as their main activity. All operational firms, with fish processing as their main branch, should be listed in the Business Register of Statistics Finland. This target frame is complemented with information of the production survey.

#### **Sampling and data collection**

Economic data collection was based on Structural Business Statistics data of Statistics Finland. The production survey was carried out to update the target frame population and to collect data on employment. The production survey is collected exhaustively (=census). In this biennial survey (last reference year 2011) we enquire other business activities, employment, production methods and production per species.

Financial statements were 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 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 Statistics covers all cost items in the DCF.

#### **Estimation**

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. Any missing data is estimated.

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

Employment was estimated based on the FTE and number of employees from the Structural Business Statistics of Statistics Finland. Opportunity costs for unpaid labour were estimated based on annual amount of unpaid work and the average wage of the enterprise.

### Reference year

The reference year of economic data collection is the preceding year. Preliminary financial statements data are available on the 4th quarter after the reference year. Therefore information of the economic situation of processing sector will be provided no earlier than one year after the period investigated.

### IV.B.2 Data quality: results and deviation from NP proposal

Financial statements are available for all fish processing firms in Structural Business Statistics. Missing information concerning employment was complemented by information from the production survey. Also production survey covers all processing firms.

### IV.B.3 Follow-up of regional and international recommendations

| RCM recommendation          | Responsive action                                                                                                                                     |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| RCM Baltic 2011 and earlier | <b>Finland:</b><br>There were no direct or relevant recommendations from RCM Baltic for the Finnish data collection on processing industry variables. |

### IV.B.4 Actions to avoid shortfalls

No shortfalls observed.

## **V        Module of evaluation of the effects of the fishing sector on the marine ecosystem**

### **V.A      Achievements: results and deviation from NP proposal**

Data for ecosystem indicators 1, 2, 3 and 4 are collected on two BIAS surveys Finland is participating (see Standard table III.G.1). The joint Finnish-Estonian BIAS survey covers part of the ICES SD 28 and SD's 29 and 32. The joint Finnish-Swedish BIAS survey covers SD 30. Length measurements are made from a sub-sample.

VMS data (indicators 5, 6, and 7, table V 1) for Finnish fisheries is collected and used by Finnish fisheries control system. The number of vessels included in the VMS is small in the Finnish fleet. In some fleet segments there is only one vessel. Thus the expected temporal and spatial resolution of the VMS data available to end users will be relatively large.

Discarding rates of the commercially important species (indicator 8) are collected by the logbooks and coastal fishery forms [landings (net catch) + discards = catch (gross catch)] and available from the central control register on commercial fishery.

Data for fuel efficiency of fish capture (indicator 9): The value of the catches was estimated on the basis of logbooks/landings declarations and fish price statistics. The fuel costs for each fleet segment are collected.

### **V.B      Actions to avoid shortfalls**

## VI Module for management and use of the data

### VI.A Achievements: results and deviation from NP proposal

The data was delivered to various end-users according to what was planned and used in producing the ICES advice and in relevant scientific work. The estimation of the biological parameters followed the standard ICES practises. Data sets were produced and validated according to ICES instructions. Achieved data transmission is presented in Standard table VI.1. The datasets are prepared by the FGFRF according to agreed formats and procedures and handed over to concerned stock-coordinators, uploaded to the InterCatch as well as presented in relevant working groups. The main users of the data collected by Finland are the ICES WG's, especially WGBAST and WGBFAS.

The small size and low number of vessels and enterprises in the Finnish fisheries sector caused problems when answering several data calls. Due to confidentiality and privacy protection reasons we had to aggregate the data to higher level than asked in the data call.

The estimates based on transversal variables are compiled with respect to the Code of practice of European Statistics.

The development of the national database continued according to the NP. In 2012 the database of economic and transversal was developed in terms of electronic inquiries and data dissemination tools. Electronic inquiry was taken to use for aquaculture production survey, and the responses for the inquiry were directly added to the database. For the data dissemination, the economic and transversal database was partly opened for public as interactive Px-Web statistics service ([www.rktl.fi/tilastot/tietokanta](http://www.rktl.fi/tilastot/tietokanta) - until now in Finnish only).

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>RCM Baltic 2010:</b></p> <p><i>The RCM Baltic recommend that the Commission legal service assess the provision concerning data confidentially given in the DCF regulation; Council Regulation No. 199/2008, Commission Regulation No. 665/2008 and Commission Decision (2010/93/EU) or any other relevant EU legislation and that the MSs assess the legal issues in these regulation and in their national legislation. Furthermore, it is recommended that it is clarified to which extent the EU legislation is over-arching the national legislation.</i></p> | <p><b>Finland:</b></p> <p>Finland has been an active part of the discussion on data confidentiality issues both in RCM Baltic and meetings organized by the Commission.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### VI.B Actions to avoid shortfalls

## VII Follow-up of STECF recommendations

The follow-up on relevant recommendations by STECF are listed below.

| STECF recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsive action                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                  |
| <b>SGRN 10-01:</b><br><i>SGRN recommends that within RCM Sweden in correspondence with Estonia and Finland develop a common table for salmon river monitoring data by September 2010 to be agreed by STECF by correspondence.</i>                                                                                                                                                                                                                                                                                                                                         | <b>Finland:</b><br>This table has not been developed yet, but Finland is willing to take part in the development in the coming RCM.                                                                                              |
| <b>SGECA 10-03:</b><br><i>SGECA 10-03 recommended MS to increase the effort in acquiring responses from the [economic] sample or from the population, as the level of non response is affected by the methods used to carry out the survey.</i>                                                                                                                                                                                                                                                                                                                           | <b>Finland:</b><br>We are well aware of the impact of non-response in the survey studies, and make all reasonable efforts to adjust the estimations by taking in to account the effects of non-response.                         |
| <b>SGECA 10-03:</b><br><i>SGECA 10-03 recommended MS to cross-checking data coming from different sources (for instance landings coming from logbook and from surveys) and to use proposed methods to assess the coherence of estimates of different variables coming from different data sources.</i>                                                                                                                                                                                                                                                                    | <b>Finland:</b><br>Finland conducts cross checks, and takes use of different data sources in the estimation and data quality checking                                                                                            |
| <b>SGECA 10-03:</b><br><i>With regard to the processing sector, SGECA 10-03 observed that official statistics on economic data on the processing sector are already available. Nevertheless, several MS carry out specific surveys to estimate economic data required by the DCF. SGECA 10-03 considered that, according to statistical best practices, duplication of data collection should be avoided. In case official statistics cannot be used to meet the requirements of DCF, MS should clearly explain the reason and justify the use of additional surveys.</i> | <b>Finland:</b><br>Finland takes full use of official statistics on processing sector. A complementary survey is made to assess the data quality, especially the population size of the enterprises and employment of the sector |
| <b>SGECA 10-03:</b><br><i>SGECA 10-03 observed that several MS failed to comply with the [economic]data upload deadline and did not send all the required data. SGECA 10-03 recommended all MS to submit data in the given time frame and thoroughly check the data quality before submitting them.</i>                                                                                                                                                                                                                                                                   | <b>Finland:</b><br>Finland has uploaded economic data according to the official data calls. The quality of the data has been checked in advance as far as possible.                                                              |

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>SGECA 10-03:</b><br/> <i>SGECA 10-03 considered that MS should check the [processing industry] data, mainly with the available EUROSTAT data, to ensure quality and homogeneity in official sources. In case of divergences, SGECA 10-03 recommended that MS should explain and justify in the AR the reasons for these divergences.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>Finland:</b><br/>         Finland has checked the data accordingly. No mayor discrepancies were found</p>                                                                                                                                                                                                                                                                                                                          |
| <p><b>SGECA-09-02:</b><br/> <i>SGECA-09-02 recommends that MS should carefully assess the impact of non-response, especially in the case of census with low response rate.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>Finland:</b><br/>         We are well aware of the impact of non-response in the survey studies, and make all reasonable efforts to adjust the estimations by taking in to account the effects of non-response</p>                                                                                                                                                                                                                 |
| <p><b>SGECA-09-02:</b><br/> <i>SGECA-09-02 recommends that MS assess the comparability of economic variables over time, include the results in the TR and discuss inconsistencies in trends.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Finland:</b><br/>         We have now a well established, stable methodology with a fine coverage over the economic population. The inconsistencies in the trends are addressed in the Annual Report when appropriate.</p>                                                                                                                                                                                                         |
| <p><b>SGECA/SGRN 09-02:</b><br/> <b>3 ON PRECISION LEVELS</b><br/> <i>“SGRN has repeatedly recommended every MS to estimate the precision of the data obtained by sampling in order to assess the quality of the associated estimates. In SGRN opinion, the best way to explore data is to evaluate the precision with the aim of optimising the sampling design (see Section 7.2 in SGRN-06-03 report, Anon. 2006). More than the exact quantification of the level of uncertainty, the objective of calculating precision levels should be to improve the quality of the data that is collected. In parallel, SGRN has supported the idea of developing a common tool for assessing the accuracy and precision of the biological parameters estimated through sampling programmes. Such a tool has been granted financial support by the Commission through the Call for Service Contracts FISH/2006/15. (COST project) SGRN will continue to request all MS to assess the quality of the estimates even if the different methodologies used prevent the direct comparisons of the results between MS.”</i></p> | <p><b>Finland:</b><br/>         The recommendation will be followed. A Finnish scientist took part in the COST workshop in 2010. According to his experiences, the COST tool is difficult to use for those, who are not familiar with R. We would appreciate the further development of the COST tool to a more user-friendly package. At least in the AR 2010 we will use other statistical software to calculate precision levels.</p> |
| <p><b>SGECA/SGRN 09-02:</b><br/> <b>COMMENTS BY RCM's AND LIAISON MEETING (page 175/ section5.11)</b><br/> <i>The need for regional data bases has been discussed in the past and endorsed by both STECF and the Commission, but little progress has been made on the</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p><b>Finland:</b><br/>         We are concerned about the development of regional databases, as in some cases (FishFrame) transversal information is likely to be included in to the data bases with</p>                                                                                                                                                                                                                                |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><i>issue. SGRN recommends that the various RCM meetings in September and October deal with the issue of regional data bases. SGRN recommends that lead MS are identified to progress the issue of regional data bases in partnership with other MS. This will ensure a shared ownership of the regional database. SGRN recommends that RCM's agree a FISHFRAME compatible data base for the regional data bases. SGRN recommends that the work programme for developing the regional database should be included in the NP for 2011 – 2013 under the data base development.</i></p> | <p>the same resolution as biological information. Transversal variables contain often information of both biology of fish stocks and socio-economics of fishermen. There should be clear and practical guidelines for the aggregation (hierarchy of aggregation) of socio-economic/transversal information included in the databases. Otherwise the principles of safeguarding the anonymity of legal entities/fishermen would be threatened (ref EC 199/2008).</p> |
| <p><b>SGECA/SGRN 09-01:</b></p> <p><b>6.15. ON INTERNATIONAL CO-ORDINATION</b></p> <p><i>Reviewers of the NP neither found that while MS listed their bi-lateral agreements in the annexes, they did not refer to them in the report text (Section III B). SGRN recommends MS to address this in future NP submissions.</i></p>                                                                                                                                                                                                                                                        | <p><b>Finland:</b></p> <p>The bi-lateral agreements are presented in the annex of the Finnish NP 2011-2013.</p>                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>6 ON DATA BASES UNDER CONSTRUCTION</b></p> <p><i>SGRN would like to note that several MS have stated that their databases are still under construction; however a number of years have passed since the start of the data collection regulation (2002 or 2005 depending on MS). SGRN point out those databases should have been fully developed by now, except for minor updates due to new reporting obligations. MS are asked to confirm that their data bases are operational.</i></p>                                                        | <p><b>Finland:</b></p> <p>The core of the national database is operational. However, there is and there will be a need of new functions and structures in parts of the database, caused by e.g. development of the regional database. Maintenance and development of a database is a continuous work.</p>                                                                                                                                                           |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>9 TECHNICAL REPORT EVALUATION AND NP</b></p> <p><i>Technical reports are evaluated against what MS have committed to do in their National Programmes. This put emphasis on the need for SGRN to have access to the final agreed NP in the evaluation process. It also put a large responsibility on SGRN in the evaluation process of the NP to make sure that it is clear what the MS have committed themselves to do in the NP and that the NP is in accordance with the DCF and without gaps.</i></p>                                         | <p><b>Finland:</b></p> <p>Our view is that the guidelines for AR could have been updated to facilitate filling in the tables in the AR 2010.</p>                                                                                                                                                                                                                                                                                                                    |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>11 ON THE ECONOMIC DATA MODULES</b></p> <p><i>Overall, the quality of the economic modules has further improved. Some drawbacks persist. A few countries have submitted no data or insufficient data, but this number has declined. While some data elements are in</i></p>                                                                                                                                                                                                                                                                      | <p><b>Finland:</b></p> <p>Considered according to the DCF</p>                                                                                                                                                                                                                                                                                                                                                                                                       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>compliance with the regulation EC 1639/2001, there is heterogeneity of data between countries. This relates to the definition of the population. The DCF regulation does not specify a reference date or time for the determination of the population of the national fleet but only refers to the vessel register. The regulation also allows the exclusion of vessels, which are in the register but are not licensed. The countries that have defined their population have done such by using different approaches. Several MS have not defined their population by specifying the reference date or time. However in the new DCF framework regulation, these drawbacks will be eliminated.</p>         |                                                                                                                                                                              |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>12 ON FLEET NON ACTIVE VESSELS</b></p> <p><i>In several cases parts of the fleet have been excluded from the collection of all data or for some parameters. The MS argue that it is unclear how to assign non active vessels to a fleet segment covered under the regulation. This is a valid point but this problem will be overcome with the new regulation being effective. The naming of fleet segments is not always in compliance with the regulation. In some cases, even the segmentation itself did not follow the rules. This causes problems when compiling data of several MS, MS are requested to follow the rules in relation to fleet definition.</i></p> | <p><b>Finland:</b></p> <p>The inclusion of non active vessels is done according to the DCF. Finland is following the segmentation rules in relation to fleet definition.</p> |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>13 ON EMPLOYMENT PARAMETERS</b></p> <p><i>The definition of parameters remains insufficient in many cases. This relates particularly to employment parameters. Again more attention has to be paid by MS in order allow for comparison and compilation of data.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                  | <p><b>Finland:</b></p> <p>Considered according to the DCF</p>                                                                                                                |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>14 ON ESTIMATION OF POPULATIONS FROM SAMPLES</b></p> <p><i>The procedure of estimation of data for the population from samples is in many cases not provided. This is not explicitly requested by the regulation, but would be very beneficial in order to compare and finally harmonise methods and results.</i></p>                                                                                                                                                                                                                                                                                                                                                    | <p><b>Finland:</b></p> <p>Considered according to the DCF. The procedure of estimation of data for the population from samples is provided in the NP.</p>                    |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>15 ON PROCESSING INDUSTRY</b></p> <p><i>The definition of the population of the processing industry is often missing. In the regulation, there is no standard definition in terms of activity levels, turnover shares or processing levels. However, MS must have applied some approach to define the target population and should</i></p>                                                                                                                                                                                                                                                                                                                               | <p><b>Finland:</b></p> <p>Considered according to the DCF. The definition of the population of the processing industry is given in the NP and AR.</p>                        |

|                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <i>therefore provide it.</i>                                                                                                                                                                                                                                                                                                                                                         |                                                                                                           |
| <p><b>SGECA/SGRN 09-02:</b></p> <p><b>16 ON ECONOMIC DATAS REFERENCE YEAR</b></p> <p><i>The reference year is not defined by the regulation EC 1639/2001. However, there seems to be a common understanding that data should refer to the year antecedent to the NP year. There might be reasons why the reference year is two years before. This should be explained by MS.</i></p> | <p><b>Finland:</b></p> <p>Considered according to the DCF. The reference year is explained in the AR.</p> |

## **VIII List of acronyms and abbreviations**

|                     |                                                                                                                                                                                                             |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ACFM</b>         | <b>Advisory Committee on Fisheries Management</b>                                                                                                                                                           |
| <b>ACOM</b>         | <b>ICES Advisory Committee</b>                                                                                                                                                                              |
| <b>AR 2012</b>      | <b>Finnish Annual Report 2012 (this report)</b>                                                                                                                                                             |
| <b>BITS</b>         | <b>Baltic International Trawl Survey</b>                                                                                                                                                                    |
| <b>COM</b>          | <b>EU Commision</b>                                                                                                                                                                                         |
| <b>DCF</b>          | <b>Data Collection Framework i.e. Council Regulation (EC) N° 199/2008, Commission Regulation (EC) N° 655/2008 and Commission Decision N° 2010/93/EU)</b>                                                    |
| <b>DCR</b>          | <b>Data collection regulation i.e. (“old DCR” 1639/2001, 1584/2004, etc.; “new DCR” Council Regulation (EC) N° 199/2008, Commission Regulation (EC) N° 655/2008 and Commission Decision N° 2008/949/EC)</b> |
| <b>FGFRI</b>        | <b>Finnish Game and Fisheries Research Institute</b>                                                                                                                                                        |
| <b>ICES</b>         | <b>International Council for the Exploration of the Sea</b>                                                                                                                                                 |
| <b>MAF</b>          | <b>Ministry of Agriculture and Forestry</b>                                                                                                                                                                 |
| <b>NP 2008</b>      | <b>Finnish National Programme 2008</b>                                                                                                                                                                      |
| <b>NP 2009-2010</b> | <b>Finnish National Programme 2009-2010</b>                                                                                                                                                                 |
| <b>NP 2011-2013</b> | <b>Finnish National Programme 2011-2013</b>                                                                                                                                                                 |
| <b>SAP</b>          | <b>Salmon Action Plan</b>                                                                                                                                                                                   |
| <b>SD</b>           | <b>ICES Sub-division</b>                                                                                                                                                                                    |
| <b>SF</b>           | <b>Statistics Finland</b>                                                                                                                                                                                   |
| <b>STECF</b>        | <b>Scientific, Technical and Economic Committee for Fisheries</b>                                                                                                                                           |
| <b>STECF-SGRN</b>   | <b>STECF Subgroup on Research Need</b>                                                                                                                                                                      |
| <b>WGBAST</b>       | <b>ICES Working Group on Baltic Salmon and Trout</b>                                                                                                                                                        |
| <b>WGBFAS</b>       | <b>ICES Working Group on Baltic Fisheries Assessment</b>                                                                                                                                                    |
| <b>WGBIFS</b>       | <b>ICES Working Group on Baltic International Fish Surveys</b>                                                                                                                                              |

## **IX        Comments, suggestions and reflections**

None

## **X       References**

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## **XI     Annexes**

### **Annex I**

#### **Precision estimates for biological metier-related and stock-related variables**

#### **Biometrical Report**

**29.5.2012**

**Ministry of Agriculture and Forestry  
Finnish Game and Fisheries Research Institute**

## **1. INTRODUCTION**

Commission Regulation requests member states to collect biological data of catches. Variables, which should be estimated, are length, weight, maturity stage and sex of fish. The Data Directive requires EU member countries to calculate precision levels for these estimates. Precision levels are needed to ensure that sample sizes are large enough, but resources are not wasted for over-sampling (sampling in excess what is required). This report will discuss estimating distributions of these variables by age.

## **2. MODEL**

### **2.1. VARIABLES**

Target variables were length, weight, maturity stage and sex of fish. Length and weight are continuous variables, whereas maturity stage and sex are binary.

Explanatory variable used in the model was age of fish. Age was measured in years. Nine years old fishes and fishes older than that were merged to same group, which was denoted '9+'.

Length of Baltic fish was reported in millimeters, and weight in grams. Maturity stage was defined on a five-grade scale, and then rescaled so that '0' means no maturity and '1' means maturity. Age was specified using otolith thin slices, which is more accurate way than traditional methods. Sex of fish was thought to be a binary variable which is '0', if fish is female, and '1', if fish is male.

### **2.2 MODEL SELECTION**

Continuous target variables, length and weight, were estimated by design based approach and estimates were simply calculated using program SAS 9.1 and procedure PROC SURVEYMEANS. To get standard errors and coefficients of variation for estimates the bootstrap method was applied.

Because maturity stage was recoded as binary variable, estimates for maturity at age were calculated by logistic regression. This was done by PROC LOGISTIC.

Sex at age was estimated by PROC SURVEYMEANS. Bootstrap method was applied to get standard errors and coefficients of variation for estimates.

Bootstrap method and SAS procedures, which were used in estimations, are described more extensive in appendix 1.

## **3 RESULTS**

**Table 1. The mean and CV of length, weight, maturity and sex of Baltic herring in ICES subdivisions 29 - 32**

| Year | SD     | Parameter | Mean | CV   |
|------|--------|-----------|------|------|
| 2012 | 29, 32 | length    | 150  | 1.3  |
|      | 30     | length    | 158  | 0.8  |
|      | 31     | length    | 149  | 1.1  |
|      | 29, 32 | weight    | 24   | 4.3  |
|      | 30     | weight    | 30   | 2.7  |
|      | 31     | weight    | 24   | 3.4  |
|      | 29, 32 | sex       | 49   | 10.6 |
|      | 30     | sex       | 51   | 9.0  |
|      | 31     | sex       | 51   | 13.8 |
|      | 29, 32 | maturity  | 78   | 5.1  |
|      | 30     | maturity  | 73   | 5.0  |
|      | 31     | maturity  | 74   | 9.7  |

**Table 1. Length at age of Baltic herring in ICES subdivisions 29 and 32**

| Year | Ageslice | N   | Mean | Std  | CV  |
|------|----------|-----|------|------|-----|
| 2012 | 1        | 230 | 114  | 2.11 | 1.8 |
|      | 2        | 113 | 130  | 1.44 | 1.1 |
|      | 3        | 193 | 145  | 1.09 | 0.7 |
|      | 4        | 156 | 159  | 1.37 | 0.9 |
|      | 5        | 180 | 168  | 1.55 | 0.9 |
|      | 6        | 58  | 169  | 3.08 | 1.8 |
|      | 7        | 47  | 171  | 3.50 | 2.0 |
|      | 8        | 33  | 179  | 3.58 | 2.0 |
|      | 9        | 97  | 189  | 3.05 | 1.6 |

Ageslice 9 means 9 years and older

**Table 2. Weight at age of Baltic herring in ICES subdivisions 29 and 32**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 230      | 10          | 0.62       | 6.0       |
|             | 2               | 113      | 14          | 0.52       | 3.9       |
|             | 3               | 193      | 19          | 0.50       | 2.6       |
|             | 4               | 156      | 26          | 0.73       | 2.8       |
|             | 5               | 180      | 32          | 0.98       | 3.1       |
|             | 6               | 58       | 31          | 1.73       | 5.6       |
|             | 7               | 47       | 34          | 2.19       | 6.5       |
|             | 8               | 33       | 40          | 2.84       | 7.1       |
|             | 9               | 97       | 49          | 2.83       | 5.8       |

Ageslice 9 means 9 years and older

**Table 3. Maturity at age of Baltic herring in ICES subdivisions 29 and 32**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 175      | 15          | 2.45       | 16.6      |
|             | 2               | 91       | 82          | 3.81       | 4.6       |
|             | 3               | 117      | 99          | 0.84       | 0.8       |
|             | 4               | 92       | 100         | 0.00       | 0.0       |
|             | 5               | 122      | 98          | 1.13       | 1.2       |
|             | 6               | 46       | 98          | 2.11       | 2.2       |
|             | 7               | 31       | 97          | 3.34       | 3.5       |
|             | 8               | 24       | 100         | 0.00       | 0.0       |
|             | 9               | 77       | 97          | 1.85       | 1.9       |

Ageslice 9 means 9 years and older

**Table 4. Sex at age of Baltic herring in ICES subdivisions 29 and 32**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 127      | 53          | 5.10       | 9.7       |
|             | 2               | 109      | 48          | 5.31       | 11.0      |
|             | 3               | 193      | 36          | 3.74       | 10.3      |
|             | 4               | 156      | 54          | 4.25       | 7.9       |
|             | 5               | 179      | 56          | 4.34       | 7.8       |
|             | 6               | 58       | 51          | 7.89       | 15.4      |
|             | 7               | 47       | 33          | 7.42       | 22.8      |
|             | 8               | 33       | 55          | 9.55       | 17.4      |
|             | 9               | 95       | 51          | 5.37       | 10.6      |

Ageslice 9 means 9 years and older

**Table 5. Length at age of Baltic herring in ICES subdivision 30**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 256      | 111         | 1.08       | 1.0       |
|             | 2               | 150      | 136         | 1.04       | 0.8       |
|             | 3               | 115      | 152         | 0.99       | 0.7       |
|             | 4               | 95       | 161         | 1.31       | 0.8       |
|             | 5               | 53       | 168         | 1.59       | 0.9       |
|             | 6               | 49       | 175         | 1.94       | 1.1       |
|             | 7               | 40       | 181         | 2.81       | 1.6       |
|             | 8               | 37       | 187         | 2.49       | 1.3       |
|             | 9               | 295      | 202         | 1.15       | 0.6       |

Ageslice 9 means 9 years and older

**Table 6. Weight at age of Baltic herring in ICES subdivision 30**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 256      | 9           | 0.27       | 2.9       |
|             | 2               | 150      | 16          | 0.44       | 2.8       |
|             | 3               | 115      | 22          | 0.47       | 2.1       |
|             | 4               | 95       | 27          | 0.64       | 2.4       |
|             | 5               | 53       | 30          | 0.91       | 3.0       |
|             | 6               | 49       | 33          | 1.22       | 3.7       |
|             | 7               | 40       | 39          | 2.16       | 5.5       |
|             | 8               | 37       | 41          | 1.87       | 4.5       |
|             | 9               | 295      | 56          | 1.05       | 1.9       |

Ageslice 9 means 9 years and older

**Table 7. Maturity at age of Baltic herring in ICES subdivision 30**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 256      | 13          | 1.87       | 14.1      |
|             | 2               | 150      | 72          | 3.52       | 4.9       |
|             | 3               | 115      | 97          | 1.43       | 1.5       |
|             | 4               | 95       | 98          | 1.46       | 1.5       |
|             | 5               | 53       | 100         | 0.00       | 0.0       |
|             | 6               | 49       | 98          | 2.06       | 2.1       |
|             | 7               | 40       | 98          | 2.30       | 2.4       |
|             | 8               | 37       | 97          | 2.69       | 2.8       |
|             | 9               | 295      | 91          | 1.48       | 1.6       |

Ageslice 9 means 9 years and older

**Table 8. Sex at age of Baltic herring in ICES subdivision 30**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 183      | 55          | 3.65       | 6.6       |
|             | 2               | 147      | 45          | 4.19       | 9.3       |
|             | 3               | 115      | 41          | 4.73       | 11.4      |
|             | 4               | 95       | 50          | 5.32       | 10.7      |
|             | 5               | 53       | 56          | 6.73       | 12.1      |
|             | 6               | 49       | 55          | 7.21       | 13.2      |
|             | 7               | 40       | 48          | 8.00       | 16.5      |
|             | 8               | 36       | 45          | 8.09       | 18.2      |
|             | 9               | 283      | 54          | 2.89       | 5.4       |

Ageslice 9 means 9 years and older

**Table 9. Length at age of Baltic herring in ICES subdivision 31**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 128      | 108         | 1.44       | 1.3       |
|             | 2               | 126      | 135         | 0.86       | 0.6       |
|             | 3               | 107      | 156         | 0.88       | 0.6       |
|             | 4               | 14       | 166         | 5.39       | 3.2       |
|             | 5               | 16       | 171         | 1.59       | 0.9       |
|             | 6               | 67       | 179         | 1.58       | 0.9       |
|             | 7               | 38       | 183         | 2.60       | 1.4       |
|             | 8               | 16       | 188         | 3.83       | 2.0       |
|             | 9               | 43       | 186         | 3.75       | 2.0       |

Ageslice 9 means 9 years and older

**Table 10. Weight at age of Baltic herring in ICES subdivision 31**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 128      | 8           | 0.31       | 3.7       |
|             | 2               | 126      | 16          | 0.33       | 2.0       |
|             | 3               | 107      | 25          | 0.50       | 2.0       |
|             | 4               | 14       | 32          | 4.02       | 12.6      |
|             | 5               | 16       | 31          | 1.11       | 3.5       |
|             | 6               | 67       | 39          | 1.05       | 2.7       |
|             | 7               | 38       | 41          | 1.72       | 4.2       |
|             | 8               | 16       | 44          | 2.87       | 6.5       |
|             | 9               | 43       | 45          | 2.60       | 5.8       |

Ageslice 9 means 9 years and older

**Table 11. Maturity at age of Baltic herring in ICES subdivision 31**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 124      | 6           | 1.99       | 35.9      |
|             | 2               | 126      | 85          | 3.15       | 3.7       |
|             | 3               | 107      | 100         | 0.00       | 0.0       |
|             | 4               | 14       | 100         | 0.00       | 0.0       |
|             | 5               | 16       | 100         | 0.00       | 0.0       |
|             | 6               | 67       | 100         | 0.00       | 0.0       |
|             | 7               | 38       | 100         | 0.00       | 0.0       |
|             | 8               | 16       | 94          | 5.96       | 6.3       |
|             | 9               | 43       | 79          | 6.37       | 8.0       |

Ageslice 9 means 9 years and older

**Table 12. Sex at age of Baltic herring in ICES subdivision 31**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 100      | 57          | 5.68       | 10.0      |
|             | 2               | 126      | 47          | 4.95       | 10.5      |
|             | 3               | 107      | 48          | 5.22       | 10.9      |
|             | 4               | 14       | 65          | 15.50      | 23.8      |
|             | 5               | 16       | 43          | 14.36      | 33.0      |
|             | 6               | 67       | 56          | 7.46       | 13.3      |
|             | 7               | 38       | 55          | 10.98      | 19.8      |
|             | 8               | 16       | 37          | 15.04      | 41.2      |
|             | 9               | 40       | 55          | 8.13       | 14.8      |

Ageslice 9 means 9 years and older

**Table 13. Length at age of Sprat**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 324      | 89          | 0.61       | 0.7       |
|             | 2               | 158      | 103         | 0.50       | 0.5       |
|             | 3               | 36       | 117         | 1.29       | 1.1       |
|             | 4               | 165      | 119         | 0.62       | 0.5       |
|             | 5               | 54       | 125         | 1.09       | 0.9       |
|             | 6               | 53       | 126         | 1.05       | 0.8       |
|             | 7               | 37       | 125         | 1.45       | 1.2       |
|             | 8               | 20       | 128         | 1.94       | 1.5       |
|             | 9               | 137      | 134         | 0.74       | 0.6       |

**Table 14. Weight at age of Sprat**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 324      | 5           | 0.14       | 2.9       |
|             | 2               | 158      | 7           | 0.13       | 1.7       |
|             | 3               | 36       | 10          | 0.47       | 4.6       |
|             | 4               | 165      | 11          | 0.18       | 1.7       |
|             | 5               | 54       | 13          | 0.37       | 2.9       |
|             | 6               | 53       | 12          | 0.32       | 2.5       |
|             | 7               | 37       | 12          | 0.43       | 3.7       |
|             | 8               | 20       | 12          | 0.56       | 4.8       |
|             | 9               | 137      | 14          | 0.23       | 1.7       |

**Table 15. Maturity at age of Sprat**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 251      | 64          | 2.93       | 4.5       |
|             | 2               | 132      | 100         | 0.00       | 0.0       |
|             | 3               | 23       | 100         | 0.00       | 0.0       |
|             | 4               | 117      | 100         | 0.00       | 0.0       |
|             | 5               | 36       | 100         | 0.00       | 0.0       |
|             | 6               | 46       | 100         | 0.00       | 0.0       |
|             | 7               | 22       | 100         | 0.00       | 0.0       |
|             | 8               | 14       | 100         | 0.00       | 0.0       |
|             | 9               | 119      | 100         | 0.00       | 0.0       |

**Table 16. Sex at age of Sprat**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 273      | 48          | 2.88       | 6.0       |
|             | 2               | 155      | 45          | 3.82       | 8.5       |
|             | 3               | 36       | 44          | 7.59       | 17.2      |
|             | 4               | 164      | 57          | 3.81       | 6.7       |
|             | 5               | 53       | 63          | 6.22       | 9.8       |
|             | 6               | 53       | 51          | 6.24       | 12.3      |
|             | 7               | 37       | 68          | 7.38       | 10.8      |
|             | 8               | 20       | 60          | 10.22      | 16.9      |
|             | 9               | 137      | 67          | 3.75       | 5.6       |

**Table 17. Length at age of Whitefish**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 3               | 323      | 333.83282   | 2.827462   | 0.8469694 |
|             | 4               | 753      | 364.12616   | 2.3440253  | 0.6437399 |
|             | 5               | 400      | 348.7725    | 3.3714584  | 0.9666641 |
|             | 6               | 151      | 347.17219   | 5.2512071  | 1.5125656 |
|             | 7               | 88       | 305.85227   | 5.6806604  | 1.8573216 |
|             | 8               | 44       | 305.95455   | 5.986056   | 1.9565181 |

**Table 19. Weight at age of Whitefish**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 3               | 323      | 351.29102   | 8.990065   | 2.5591502 |
|             | 4               | 753      | 471.08765   | 10.073732  | 2.1383987 |
|             | 5               | 400      | 405.88      | 13.175163  | 3.2460735 |
|             | 6               | 151      | 385.33113   | 20.038991  | 5.2004601 |
|             | 7               | 88       | 248.43182   | 18.680054  | 7.5191873 |
|             | 8               | 44       | 234.20455   | 16.851792  | 7.1953307 |

**Table 19. Maturity at age of Whitefish**

| <b>Year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 3               | 323      | 0.873065    | 0.0184842  | 2.1171622 |
|             | 4               | 753      | 0.9096946   | 0.0104599  | 1.1498242 |
|             | 5               | 400      | 0.8675      | 0.0168678  | 1.9444127 |
|             | 6               | 151      | 0.8476821   | 0.0288266  | 3.4006321 |
|             | 7               | 88       | 0.5909091   | 0.0528276  | 8.9400559 |
|             | 8               | 44       | 0.6818182   | 0.0675609  | 9.9089392 |

**Table 20. Sex at age of Whitefish**

| Year | Ageslice | N   | Mean      | Std       | CV        |
|------|----------|-----|-----------|-----------|-----------|
| 2012 | 3        | 323 | 0.5789474 | 0.0282262 | 4.8754431 |
|      | 4        | 753 | 0.6308101 | 0.0170297 | 2.6996537 |
|      | 5        | 400 | 0.5575    | 0.0240196 | 4.3084419 |
|      | 6        | 151 | 0.5231788 | 0.0421249 | 8.0517136 |
|      | 7        | 88  | 0.4318182 | 0.051278  | 11.874914 |
|      | 8        | 44  | 0.3863636 | 0.072934  | 18.877036 |

**Table 21. Length at age of Pike-perch**

| Year | Ageslice | N   | Mean      | Std       | CV        |
|------|----------|-----|-----------|-----------|-----------|
| 2011 | 4        | 261 | 417.71648 | 1.4815271 | 0.3546729 |
|      | 5        | 551 | 410.48094 | 1.2040271 | 0.2933211 |
|      | 6        | 639 | 414.33959 | 1.2725947 | 0.3071381 |
|      | 7        | 127 | 426.09449 | 3.8340502 | 0.8998122 |
|      | 8        | 105 | 408.88571 | 2.2898728 | 0.5600276 |
|      | 9        | 106 | 420.87736 | 4.4438004 | 1.0558421 |

**Study: EU-tike****Sponsor: RKTL****Page: 1 (1)****Table 22. Weight at age of Pike-perch**

| Year | Ageslice | N   | Mean      | Std       | CV        |
|------|----------|-----|-----------|-----------|-----------|
| 2011 | 4        | 261 | 620.37931 | 7.1438909 | 1.151536  |
|      | 5        | 551 | 575.76951 | 5.8401544 | 1.0143216 |
|      | 6        | 639 | 595.79812 | 6.618097  | 1.1107952 |
|      | 7        | 127 | 664.49606 | 22.362011 | 3.3652586 |
|      | 8        | 105 | 553.90476 | 10.844356 | 1.9578015 |
|      | 9        | 106 | 641.61321 | 28.062226 | 4.3736983 |

**Table 23. Maturity at age of Pike-perch**

| Year | Ageslice | N   | Mean      | Std       | CV        |
|------|----------|-----|-----------|-----------|-----------|
| 2011 | 4        | 261 | 0.954023  | 0.0134287 | 1.4075881 |
|      | 5        | 551 | 0.9782214 | 0.00623   | 0.6368741 |
|      | 6        | 639 | 0.9906103 | 0.0038282 | 0.3864484 |
|      | 7        | 127 | 0.984252  | 0.0108933 | 1.1067542 |
|      | 8        | 105 | 0.9904762 | 0.0097639 | 0.9857767 |
|      | 9        | 106 | 1         | 0         | 0         |

**Table 24. Sex at age of Pike-perch**

| Year | Ageslice | N   | Mean      | Std       | CV        |
|------|----------|-----|-----------|-----------|-----------|
| 2011 | 4        | 261 | 0.394636  | 0.0303212 | 7.6833254 |
|      | 5        | 551 | 0.3811252 | 0.0194103 | 5.0928874 |
|      | 6        | 639 | 0.4084507 | 0.0194443 | 4.7605018 |
|      | 7        | 127 | 0.4015748 | 0.0418852 | 10.430248 |
|      | 8        | 105 | 0.4952381 | 0.04745   | 9.5812515 |
|      | 9        | 106 | 0.4339623 | 0.0482704 | 11.123168 |

**Table 25. Length at age of Salmon in ICES subdivisions 29 - 31**

| year | Ageslice | N    | Mean      | Std       | CV        |
|------|----------|------|-----------|-----------|-----------|
| 2012 | 1        | 403  | 612.75434 | 2.7629983 | 0.4509145 |
|      | 2        | 1261 | 839.7923  | 1.7617526 | 0.2097843 |
|      | 3        | 765  | 1015.6429 | 2.2795972 | 0.2244487 |
|      | 4        | 54   | 1000.9483 | 10.450449 | 1.0440549 |
|      | 5        | 13   | 1083.0769 | 23.357601 | 2.1565967 |

**Table 26. Weight at age of Salmon in ICES subdivisions 29 - 31**

| year | Ageslice | N    | Mean      | Std       | CV        |
|------|----------|------|-----------|-----------|-----------|
| 2012 | 1        | 403  | 2133.2506 | 36.889146 | 1.7292458 |
|      | 2        | 1261 | 5798.4109 | 41.010688 | 0.7072746 |
|      | 3        | 765  | 10285.271 | 78.452242 | 0.762763  |
|      | 4        | 54   | 10125.926 | 393.70942 | 3.8881325 |

| year | Ageslice | N  | Mean      | Std       | CV        |
|------|----------|----|-----------|-----------|-----------|
|      | 5        | 13 | 11746.154 | 947.70819 | 8.0682426 |

**Table 27. Sex at age of Salmon in ICES subdivisions 29 - 31**

| year | Ageslice | N    | Mean      | Std       | CV        |
|------|----------|------|-----------|-----------|-----------|
| 2012 | 1        | 403  | 0.9152103 | 0.0140598 | 1.5362377 |
|      | 2        | 1261 | 0.342318  | 0.0149194 | 4.3583489 |
|      | 3        | 765  | 0.2840508 | 0.0179961 | 6.3355226 |
|      | 4        | 54   | 0.166649  | 0.0633074 | 37.988441 |
|      | 5        | 13   | 0.3334939 | 0.1642567 | 49.253297 |

**Table 28. Length at age of Salmon in ICES subdivision 32**

| Year | Ageslice | N  | Mean      | Std       | CV        |
|------|----------|----|-----------|-----------|-----------|
| 2012 | 1        | 1  | 680       | 0         | 0         |
|      | 2        | 41 | 824.14634 | 8.192044  | 0.9940036 |
|      | 3        | 4  | 997.5     | 51.159234 | 5.1287453 |

**Table 29. Weight at age of Salmon in ICES subdivision 32**

| Year | Ageslice | N  | Mean      | Std       | CV        |
|------|----------|----|-----------|-----------|-----------|
| 2012 | 1        | 1  | 3300      | 0         | 0         |
|      | 2        | 41 | 6582.9268 | 233.78307 | 3.5513545 |
|      | 3        | 4  | 12875     | 1517.9882 | 11.790199 |

**Table 30. Sex at age of Salmon in ICES subdivision 32**

| Year | Ageslice | N  | Mean      | Std       | CV        |
|------|----------|----|-----------|-----------|-----------|
| 2012 | 1        | 1  | 0         | 0         | .         |
|      | 2        | 41 | 0.3170732 | 0.0745773 | 23.520543 |
|      | 3        | 4  | 0.5       | 0.2589731 | 51.79462  |

**Table 31. Length at age of Sea trout in ICES subdivisions 29 - 32**

| year | Ageslice | N   | Mean      | Std       | CV        |
|------|----------|-----|-----------|-----------|-----------|
| 2012 | 1        | 166 | 544.51807 | 2.9110221 | 0.5346052 |
|      | 2        | 200 | 615.75    | 4.1936937 | 0.6810708 |

| <b>year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
|             | 3               | 50       | 683.68562   | 8.2233186  | 1.2027924 |
|             | 4               | 6        | 688.33333   | 25.664454  | 3.7284922 |
|             | 5               | 6        | 741.66667   | 10.707639  | 1.4437267 |

**Table 32. Weight at age of Sea trout in ICES subdivisions 29 - 32**

| <b>year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 166      | 1650        | 36.051101  | 2.1849152 |
|             | 2               | 200      | 2487        | 62.65556   | 2.5193229 |
|             | 3               | 50       | 3354        | 140.625    | 4.192755  |
|             | 4               | 6        | 3250        | 296.88349  | 9.1348766 |
|             | 5               | 6        | 4450        | 218.63979  | 4.9132538 |

**Table 33. Sex at age of Sea trout in ICES subdivisions 29 - 32**

| <b>year</b> | <b>Ageslice</b> | <b>N</b> | <b>Mean</b> | <b>Std</b> | <b>CV</b> |
|-------------|-----------------|----------|-------------|------------|-----------|
| 2012        | 1               | 166      | 0.5266426   | 0.0411847  | 7.8202386 |
|             | 2               | 200      | 0.350798    | 0.0342603  | 9.7663775 |
|             | 3               | 50       | 0.3617652   | 0.0705523  | 19.502241 |
|             | 4               | 6        | 0.6666667   | 0.1947481  | 29.212212 |
|             | 5               | 6        | 0.3991167   | 0.2240281  | 56.130973 |

# APPENDIX 1: MODEL DESCRIPTION

## 1. Fitting logistic model using PROC LOGISTIC

Logistic regression is used to investigate the relationship between discrete responses and a set of explanatory variables. For binary response the linear logistic model is of the form

$$\text{logit}(\pi) = \log\left(\frac{\pi}{1-\pi}\right) = \alpha + x\beta,$$

where  $\pi = \Pr(Y = 1)$  is the response probability to be modeled,  $\alpha$  is the intercept parameter,  $x$  is a vector of explanatory variables and  $\beta$  is the vector of slope parameters. Link functions  $g = g(\mu)$  can be cumulative logit functions, generalized logit functions, probit functions or complementary log-log-functions. The logit function is the default selection in SAS procedure PROC LOGISTIC.

Response variable can be binary, ordinal or nominal. Explanatory variables can be category or continuous. Category variables must be listed in CLASS statement. It is also possible to specify interactions of explanatory variables, but they were not added into our model.

Analyzes were realized using Maximum likelihood method. Estimates of regression coefficients can be obtained either through the Fisher scoring algorithm or the Newton-Raphson algorithm. Variances for regression parameters and the odds ratios are calculated using a Taylor series expansion.

PROC LOGISTIC can also estimate predicted probabilities with standard errors and confidence intervals of estimates. However, because the standard errors are affected by the study design, any function of the covariance matrix of the parameters (such as confidence intervals) provided by PROC LOGISTIC is not correct.

## 2. Bootstrap method

Bootstrapping is a statistical method for estimating the sampling distribution of an estimator. This distribution is based on sampling from the original sample data. Most often bootstrapping is used to estimate standard errors, confidence intervals and coefficients of variation for the parameter estimates, as mean, median or proportion.

There is no single way to do bootstrapping. It is computer intensive method, which depends heavily on random numbers and repeated sampling.

The basic idea behind this method is that we from some reason don't know how to calculate the theoretically appropriate distribution for an estimate. The bootstrap method simulates then, what would happen, if repeated sample of population could be taken by taking repeated samples of the available sample data. These repeated samples could each be smaller than the available sample data and these could be done

with or without replacement. Empirical research suggests that the best results are obtained with the repeated samples, which are the same size as the original sample, and when sampling is done with replacement.

Method consists of two steps:

- 1) Take the sample data that is available, and construct a bootstrap sample.
- 2) Empirically calculate the desired statistic. In some cases this is very similar to the ordinary calculation of a statistic while in other cases it is different.

Appropriateness of bootstrap depends on the sample being representative. If the sample is not representative, the conclusions will be completely inappropriate. An important decision is that, how large each replicate sample should be, and how many replicates to take. Greater computer power makes it easy to use larger numbers of replicates instead of collecting too few replicates. Another important decision is, that how to do the bootstrap and how to calculate the test statistic. Many times problems with the original sample can be minimized by taking them into account in the test statistic or bootstrap procedure used.

Procedure PROC MEANS will calculate the standard deviation of the bootstrap replications. The standard error of the mean is obtained by dividing the standard deviation by the square root of the number of replicates. Bootstrap estimations for our data were done by SAS 9.1.

### 3. Estimating means and standard errors for estimates using PROC SURVEYMEANS

Survey sampling means that a probability-based sample is selected from a finite population through a certain sampling design. Procedure PROC SURVEYMEANS analyzes data so that complex sampling designs are taken account. This procedure can calculate estimates for population means and totals, corresponding standard errors or standard deviations and t-tests. It can also be used for estimating proportions for categorical variables and ratio estimates of population means and proportions. Also standard errors and t-tests for these can be calculated.

Sampling errors of estimates are estimated using Taylor's expansion method. This method is suitable for all sampling designs, where first stage of sampling is selected with replacement, or where sampling fraction in first stage is small. This latter case is very common in practice. The Taylor expansion method estimates through linear approximation, and then uses the variance estimate for this approximation to estimate of the estimate itself.

For a stratified and clustered sample design, the sample can be written in following form:

$$(w, Y) = (w_{hij}, y_{hij}) = (w_{hij}, y_{hij}^{(1)}, y_{hij}^{(2)}, \dots, y_{hij}^{(P)}).$$

This is an  $n \times (P + 1)$ -matrix, where

$h = 1, 2, \dots, H$  is the stratum number,

$i = 1, 2, \dots, n_h$  is the cluster number within stratum  $h$ ,

$j = 1, 2, \dots, m_{hi}$  is the unit number within cluster  $i$  in stratum  $h$ ,

$p = 1, 2, \dots, H$  is the analysis variable number,

$n = \sum_{h=1}^H \sum_{i=1}^{n_h} m_{hi}$  is the total number of observations in the sample,

$w_{hij}$  is the sampling weight for observation  $j$  in cluster  $i$  and stratum  $h$  and  $y_{hij}$  are observed values of the analysis variables for observation  $j$  in cluster  $i$  and stratum  $h$  including both the values of numerical and indicator variables.

This notation is applicable for all sampling designs. For instance, if there is no stratification, then  $H = 1$ . Whereas, if the sample schema does not include clusters, then  $m_{hi} = 1$  for every  $h$  and  $i$ . Analysis were done separately for each age group by using BY-statement in PROC SURVEYMEANS procedure.

When there are no clusters in sampling design, PROC SURVEYMEANS estimates the mean of variable as follows:

$$\hat{y} = \frac{\sum_{h=1}^H \sum_{i=1}^{n_h} w_{hi} y_{hi}}{w},$$

where  $w = \sum_{h=1}^H \sum_{i=1}^{n_h} w_{hi}$  is the sum of the weights in the sample. Variance for mean estimate is calculated using the Taylor series expansion theory. Coefficient of variation is computed by:

$$cv(\hat{Y}) = \frac{StdErr(\hat{Y})}{\hat{Y}}.$$

If analysis variable is categorical, estimate of mean is calculated as a proportion or relative frequency in each level of categorical variable. Estimated proportion in level  $c_k$  for variable  $C$  is

$$\frac{\sum_{h=1}^H \sum_{i=1}^{n_h} w_{hi} y_{hi}^{(q)}}{\sum_{h=1}^H \sum_{i=1}^{n_h} w_{hi}},$$

where  $y_{hi}^{(q)}$  is the value of indicator function for level  $C = c_k$ . It equals 1, if the observed value of variable  $C$  equals  $c_k$ , and otherwise it is 0. Because proportion estimate is actually the estimate of mean, variance and standard error of estimate are calculated as mentioned earlier.

## ANNEX II. Realized acoustic transects of herring acoustic surveys

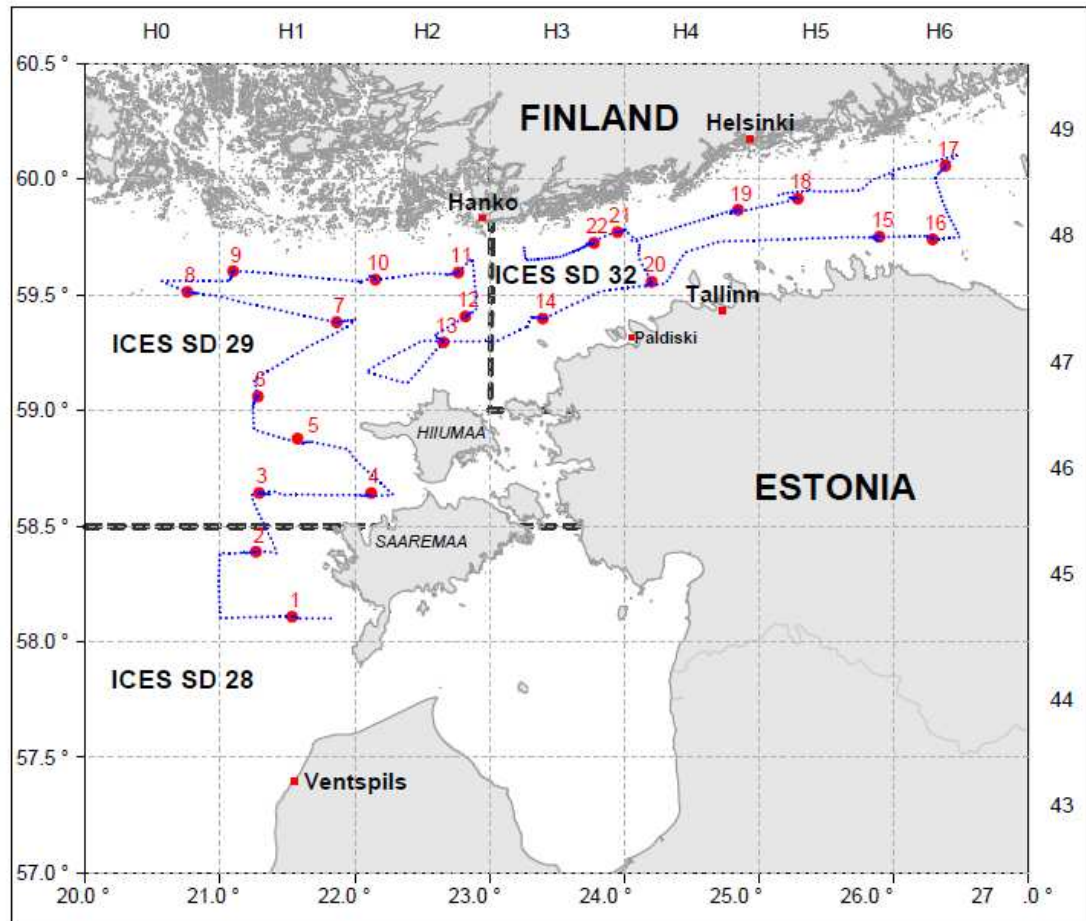


Figure 1. Location of the fish control-catches and hydrological stations (red bullets Nos. 1-6; 12-16; 20 – in the Estonian EEZ and Nos. 7-11, 17-19, 21-22 – in the Finnish EEZ) inspected by the r.v. “Baltica” along the acoustic transect (blue dotted line) in October 2012.

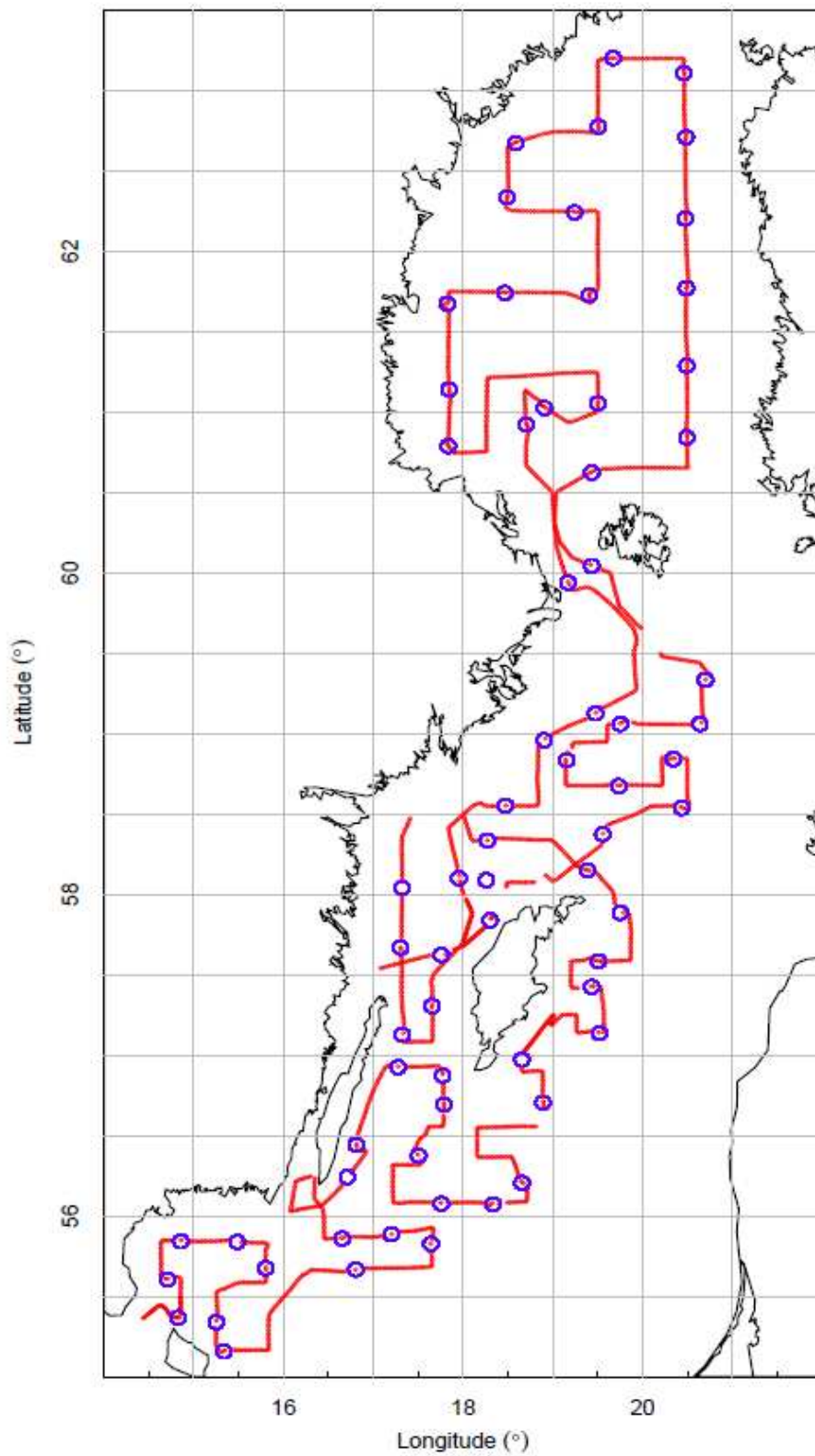


Figure 2. Location of the realised acoustic transects (red dotted line), and the fish control-hauls (blue bullets) inspected in the northern Baltic by the r.v. "Dana" during the BIAS survey in September-October 2012 (joint Swedish - Finnish survey includes the area north from 60°30').