

ANNUAL REPORT

FOR

THE SWEDISH NATIONAL PROGRAMME FOR

COLLECTION OF FISHERIES DATA 2011

Under

Council Regulation (EC) No 199/2008
Commission Regulation (EC) No 665/2008
Commission Decision 2010/93/EU

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I. General framework

This report gives the results of the Swedish National Programme for collection of Fisheries data in 2011 (Sweden_NP_Proposal_2011-2013_Text_25-Feb_2011.doc). The report follows the *Guidelines for the Submission of Annual Report on the National Data Collection Programmes under Council Regulation (EC) No 199/2008 Commission Regulation (EC) 665/2008 and Commission Decision 2010/93/EU Version January 2012*. All tables are presented in a separate document. Detailed information regarding the CV calculations made is presented in Annex Ia and Ib.

2011 was the first year in the program period 2011-2013. During 2011 there was a major reorganisation in Sweden. Swedish Board of Fisheries expired 30 June 2011 and since then Swedish agency for Marine and Water management (SwAM) is the responsible authority for the DCF. However, the largest part of the DCF related work is undertaken by Swedish University of Agricultural Sciences, Department of Aquatic resources (SLU aqua).

Another big change during 2011 was that the Swedish research vessel Argos was out of function due to safety regulations because occurrence of asbestos insulation of the vessel. The smaller vessel Mimer and Hålabben and the Danish vessel DANA replaced Argos and all surveys was conducted with some adjustments (see section III.G.1).

A website has been established in Sweden to inform involved partners, the EU Commission and the public about the Swedish implementation of the EU Data Collection framework. The website contains relevant legislation, reports from DCF related meetings, meeting calendars and the Swedish National Programme for collection of Fisheries data as well as the Annual Reports from the period 2009-2013. The website also fulfills the requirement of the Commission Regulation (EC) 665/2008 article 8(2).

<http://www.havochvatten.se/en/start/environmental-research/-data-collection-framework.html>

II. National data collection organisation

II.A National correspondent and participating institutes

National correspondent

The National correspondent for Sweden is:

Maria Hansson
Swedish University of Agricultural Sciences
Department of Aquatic Resources
Institute of Marine Research
Turistgatan 5
SE-453 30 Lysekil
Sweden

Tel: +46 18 67 10 00 (direct: +46 10 478 4020)

Fax: +

Mobilephone +46 70 23 11 523

maria.hansson@slu.se

Responsible authority

Swedish Agency for Marine and Water Management (SwAM)
Science Affairs Department including IT unit and
Inspection and Enforcement Department
Box 11 930
SE- 404 39 Göteborg
Tel +46 10 698 60 00 Fax: +46 10 698 61 11

Partners:

Swedish University of Agricultural Sciences (SLU), Department of Aquatic resources within which the following institutes participate:

Institute of Marine Research (**IMR**)
Swedish University of Agricultural Sciences
Turistgatan 5
SE-453 30 Lysekil, Sweden
Tel + 46 18 67 10 00

Institute of Freshwater Research (**IFR**)
Swedish University of Agricultural Sciences
Stångholmsvägen 2
SE-178 93 Drottningholm, Sweden
Tel + 46 18 67 10 00

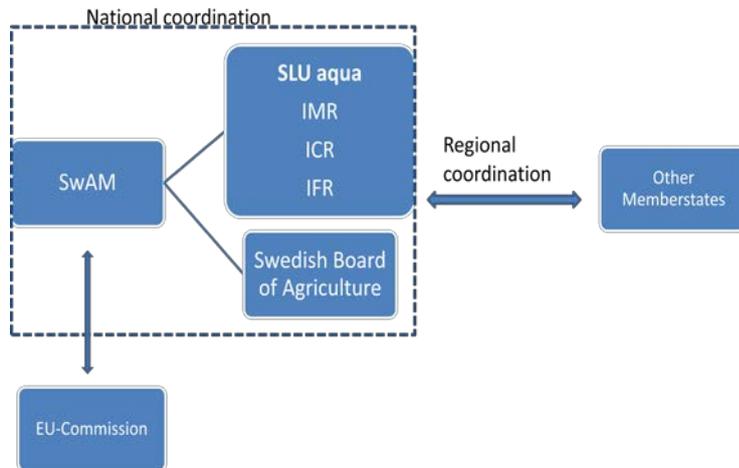
Institute of Coastal Research (**ICR**)
Swedish University of Agricultural Sciences
PO Box 109
SE-742 22 Öregrund, Sweden
Tel + 46 18 67 10 00

County Administrative Board
SE-871 86 HÄRNÖSAND
Tel + 46 611 34 90 00

County Administrative Board
SE-971 86 LULEÅ
Tel + 46 920 96 000

Swedish Board of Agriculture
Department of Rural Development
Rural Analysis Division
SE-551 82 Jönköping, Sweden

The new Swedish organization of DCF work:



National co-ordination meetings

All national coordination is led from SLU aqua and since the DCF related work is separated at different authorities (from mid 2011) another organisation of national coordination was needed. Within the SLU aqua where most of the DCF related work is undertaken, a new organisation was launched during second half of 2011. The purpose was to establish and identify clear responsibilities, decrease the gap between the “data collectors” and the “data users”. The national coordination meetings were held through videolink and was undertaken several times during 2011. Guidelines and deadlines, development of databases was communicated as well as the strategy of the new organisation.

Physical meetings were undertaken in the work of setting up a transversal database, training course in analysing histology as well as the national learning process of calculation of CV. In addition, some physical meetings were arranged during 2011, focusing on calibration of age reading and maturity.

II.B Regional and International co-ordination

II.B.1 Attendance of international meetings

The international meetings planned for 2011 and eligible under DCF are listed in table II.B.1. Sweden participated in all planned meetings except from WKNEW which was postponed to 2012 and WGDEEP which could not be prioritised as planned.

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

General recommendations made by RCM Baltic and RCM NS &EA from 2005 to 2011 and actions taken by Sweden are listed below. The list of recommendations made within the RCMs during 2011 was summarised and listed in an annex in the Liason meeting report from 2011 (Anon 2011a). No general recommendations from the RCM Baltic 2011 were made.

Source	Recommendation	Action
RCM Baltic (2010)	<i>In order to move forward and get data into FF, a workplan was set up to support the MS in the upload process. Landing data, sampling and effort data for 2009 was agreed to be uploaded by all MS before 1 Sept 2010.</i>	SWEDEN WAS RESPONSIBLE TO COORDINATE THE SKYPE MEETINGS THE MEETINGS WERE HELD AS PLANNED AND SWEDEN UPLOADED THE REQUESTED DATA.
RCM Baltic (2010)	<i>To ensure the wide implementation of COST, the RCM Baltic recommends that after the trial period lasting until May 2011 the working experience of member states will be reassessed and a training workshop should be organized in the first half of 2012.</i>	SWEDEN PUT A LOT OF EFFORT DURING 2010 TO LEARN HOW TO USE COST. 5 SWEDISH PARTICIPANTS WERE SENT TO THE WORKSHOP. SWEDEN ALSO SENT A FEED BACK LETTER (SEPT 2010) ON THE COST TOOL TO THE COMMISSION.
RCM Baltic (2010)	<i>In order to be able to analyse the current sampling level of sprat in the Baltic and suggest optimal sampling levels for future regional coordinated sampling, the data must be available in an agreed format and checked for errors. Data has to be uploaded in Fishframe All MS should upload 2009 sprat data into Fishframe before the end of October 2010.</i>	SWEDEN HAS UPLOADED THE REQUESTED DATA
RCM Baltic (2010)	<i>For institutes collecting small volumes of otoliths 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 that the NC's starts to discuss, decide and agree on which MS should be responsible for age reading of species rarely caught in BITS survey (brill, plaice, turbot, dab, sole). An agreement of task sharing for aging eel should also be established.</i>	SWEDEN SUPPORT THE IDEA OF TASK SHARING AND WELCOMES THE DISCUSSION TO TAKE PLACE BETWEEN NC'S.
RCM Baltic (2009)	<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>	SWEDEN WILL UPLOAD DATA (all species, all metiers lvl 6) FOR 2009 IN FF 5.0.
RCM Baltic (2008)	<i>In order to use the time of the RCM more efficient, the pre-processing of the exchange data tables, namely the merging of the data on fisheries statistics and planned sampling NP proposal tables in the NPs, for the harmonisation of the NPs, including the quality checks, should be carried out before the next RCM.</i>	ACTION WILL BE TAKEN IN 2009
RCM Baltic (2007)	<i>THE RCM BALTIC RECOMMENDS THAT ALL MS SUBMIT DATA IN THE AGREED FORMAT WHEN REQUESTED. THE COMPILED REGIONAL DATA SHOULD BE DISTRIBUTED TO</i>	SE COMPILED THIS DATA TO THE MEETING IN 2007 AND WILL PREPARE REQUESTED DATA FOR FUTURE

	<i>THE MEMBERS OF RCM BALTIC WELL BEFORE THE MEETING</i>	MEETING TO GAIN COOPERATION BETWEEN MS IN THE RCM.
RCM Baltic (2007)	<i>THE RCM BALTIC RECOMMENDS THAT ALL MS UPLOAD DATA (EFFORT, LANDINGS-ALL SPECIES, SEA-SAMPLING, SAMPLING OF LANDINGS) FOR THE TRAWL FISHERIES TARGETING COD IN THE BALTIC IN ORDER TO ALLOW ANALYSIS OF THE FISHERIES FACILITATING FUTURE TASK SHARING OF DISCARD SAMPLING</i>	DONE
RCM Baltic (2007)	<i>THE RCM BALTIC RECOMMENDS THE DESCRIPTION OF THE SOURCE OF THE INFORMATION AND WHEN APPLYING A SAMPLING PROCEDURE A DESCRIPTION OF METHOD AND STRATEGY HAS TO BE CLEARLY DESCRIBED IN THE NATIONAL PROGRAMME TO GIVE USEFUL INFORMATION ON QUALITY OF THE OBTAINED DATA. IN THE TECHNICAL REPORT THERE SHOULD THEN BE A QUALITATIVE QUALITY REPORT CONTAINING A THOROUGH DESCRIPTION OF THE METHODS AND STRATEGIES USED AND THE CHARACTERISTICS OF THE GATHERED DATA. THE RCM BALTIC RECOMMENDS TO NOT USE THE PRECISION LEVEL AS AN INDICATOR OF HETEROGENEITY BUT TO RATHER USE THE MEAN VALUE AND STANDARD DEVIATION.</i>	SE WILL DESCRIBE SAMPLING METHOD AND STRATEGY IN NP FOR 2009-10. A QUALITY REPORT IN TR FOR 2009 WILL BE PRESENTED IN 2010.
RCM Baltic (Jan 2005)	<i>3.1 BALTIC RCM RECOMMENDS THAT EACH MS ON MONTHLY BASIS UPDATES “REAL TIME MONITORING SPREADSHEET” GIVING THE ACTUAL SAMPLING STATUS IN EACH COUNTRY AND GIVING THE COVERAGE AS DEFINED ACCORDING TO THE DCR.</i>	NOT USED, AND THEREFORE SE HAS NOT FILLED IT IN.
RCM Baltic (Jan 2005)	<i>3.3 BALTIC RCM RECOMMENDS THAT AN ANALYSIS REVEALING AND COMPARING THE CONSEQUENCES OF DIFFERENT RAISING METHODS IS MADE AS SOON AS EFFORT INFORMATION AND MATCHING RAISING PROCEDURES ARE INCLUDED IN THE FISHFRAME DATABASE.</i>	SWEDEN WILL UPLOAD EFFORT INFORMATION TO THE FISHFRAME DATABASE IN ORDER TO BE ABLE TO ANALYZE DIFFERENT RAISING PROCEDURES.
RCM NS&EA (2011)	<i>The RCM NS&EA recommends that all MS respond to the data call in 2012 from the chair of RCM NS&EA and load their data to FishFrame or make it available in the FishFrame format. This data call will include Commercial Landings(CL), Commercial Effort (CE) and Commercial Samples (CS) records for 2010 and 2011</i>	SWEDEN WILL UPLOAD DATA TO FISHFRAME ACCORDING TO THE REQUEST IN THE DATACALL.
RCM NS&EA (2011)	RCM NS&EA recommends that each MS should send a representative to WKPICS to discuss data collection and the methods used to raise this data for assessment use and that WKPICS adds this to ToR.	SWEDEN WILL SEND 2-3 PARTICIPANTS TO WKPICS TO ACTIVELY TAKE PART IN THE DISCUSSIONS
RCM NS&EA (2011)	<i>Transversal variables. The Expert Group 11-02 recommends that overlap in the CR and the DCF should be avoided. Data collected under the CR should not be included in the DCF unless it is to be expected that the quality of the data collected under the CR does not fulfil the quality requirements of the DCF. STECF further recommends including in the new DCF commitments for Member States to set up at national or regional level, a system to encourage cooperation between control authorities and the National Programmes of the DCF.</i>	SWEDEN HAS DURING 2011 PUT SOME EFFORT INTO A PROJECT TO ESTABLISH A NATIONAL TRANSVERSAL DATABASE IN WHICH DISCREPANCIES BETWEEN THE CR AND DCF ARE DISCUSSED AND HANDLED.
RCM NS&EA (2011)	<i>Transversal variables. As some of the transversal variables to be collected according to the DCF are collected according to the Control Regulation N0. 404/2011 and these variables the not always are defined</i>	SWEDEN WILL REPORT BACK TO THE NATIONAL CONTROL AUTHORITIES ON THIS ISSUE AND REPORT BACK TO RCM MEETING IN 2012.

	<p>equally according to the two regulations the RCM NS&EA 2011 recommends: Variables Hours fished and soaking time should be added to Control Regulation 404/2011 (CR) and be included in the logbook as mandatory variables.</p> <p>The variable Fishing time might be excluded as this information is not used unless fishing authorities need this information. Variables Number of hooks and lines, Number of pots and traps, number of rigs should be defined more clearly in Control Regulation and for the purpose of the DCF reference to the CR could just be made. Concerning Number and height of nets, a more comprehensive approach is available in Control Regulation namely length, height and mesh size of the nets. This should be included in DCF by a reference to Control Regulation Use of selective devices should be mandatory reported in the logbook. Number of fishing operations should be included for all active gears in DCF (now only purse seine). In short term: NCs are requested to report back to the national control authorities on this issue and report back to the RCM NS&EA meeting in2012</p>	
RCM NS&EA (2011)	<i>Quality issues. Experience be gained in assessing quality indicators on stocks. Using the WKACCU score card. WKACCU score cards to assess bias in the sampling of stock will be completed for OTB_MCD in area IIIa, OTB_DEF for haddock in area IV and cod in NAFO Division 3M.</i>	SWEDEN WILL SUBMIT THE INFORMATION UPON REQUEST BEFORE THE RCM MEETING 2012.
RCM NS & EA (2010)	<i>RCM recommended that MS start to implement COST</i>	SWEDEN HAS PUT A LOT OF EFFORT TO IMPLEMENT AND USE COST.
RCM NS & EA (2010)	<i>In order to have correct reference list of species and stocks in Appendix VII 2010/93and to avoid inconsistencies and errors in the tables filled in by MS in their NP proposals RCM NS &EA made a recommendation to establish a reference list for revision of the guidelines and templates for future NP proposal</i>	SWEDEN HAS A RESPONSIBILITY TO ACT ON THIS RECOMMENDATION BEFORE NEXT RCM 2011. TO BE DONE.
RCM NS & EA (2009)	<i>RCM NS&EA recommends Sweden and Denmark to review inconsistencies in the raising/compilation procedures of discard data and to upload discard data into FishFrame.</i>	SWEDEN WILL UPLOAD ALL DATA TO FISHFRAME INCLUDING DISCARD DATA.
RCM NS & EA (2009)	<i>RCM NS&EA recommends Sweden and Denmark to compile and submit discard data of sole in Division IIIa to WGBFAS.</i>	SWEDEN WILL SUBMIT ALL DATA TO FISHFRAME INCLUDING DATA OF SOLE.
RCM NS & EA (2008)	<i>In order to use the time of the RCM more efficient, the pre-processing of the exchange data tables, namely the merging of the data on fisheries statistics and planned sampling NP proposal tables in the NPs, for the harmonisation of the NPs, including the quality checks, should be carried out before the next RCM.</i>	ACTION WILL BE TAKEN IN 2009
RCM North Sea & East Arctic (2007)	<i>THE RCM NS&EA RECOMMENDS THAT ALL MS SUBMIT DATA IN THE AGREED FORMAT WHEN REQUESTED. THE REGIONAL DATA SHOULD BE COMPILED WELL BEFORE THE MEETING AND BE DISTRIBUTED TO THE RCM PARTICIPANTS.</i>	SE COMPILED THIS DATA TO THE MEETING IN 2007 AND WILL PREPARE REQUESTED DATA FOR FUTURE MEETING TO GAIN COOPERATION BETWEEN MS IN THE RCM.
RCM North Sea & East Arctic (2006)	<i>RCM NS AND EA TO UPLOAD THE 2004-2006 LANDINGS AND EFFORT STATISTICS INTO FISHFRAME TOGETHER WITH THE ASSOCIATED DATA FROM MARKET AND ON-BOARD SAMPLING, FOR ALL SPECIES WITHIN THE REMITS OF THE WGNSSK BY APRIL 1ST, 2007.</i>	DONE

RCM North Sea & East Arctic (2006)	<i>THE RCM NS & EA RECOMMENDS THAT DENMARK AND SWEDEN PREPARE A WORKING DOCUMENT PROPOSING HOW REGIONAL DATA COLLECTION COULD BE ARRANGED BY USING THE KATTEGAT AS A TEST ARE. THE WD WILL BE PRESENTED AT WGBFAS 2007 AND FOR THE RCM'S.</i>	NOT FULFILLED TO WGBFAS. THE PROCESS WILL START BY FILLING IN SUGGESTED TABLES DESCRIBING THE PRESENT SAMPLING METHODS.
RCM North Sea (2005)	<i>13.1 RCM NORTH SEA INSISTS THAT ALL COUNTRIES PARTICIPATE IN THE EXERCISE OF COMPARING SAMPLING STRATEGIES ON COMMERCIAL CATCHES AND DISCARDS BY PROVIDING THE RELEVANT INFORMATION TO THE SWEDISH COORDINATORS.</i>	DONE
RCM North Sea (2005)	<i>14.1 RCM NORTH SEA AGREED THAT IN ORDER TO COORDINATE ACTIVITIES EFFECTIVELY THERE WAS A NEED TO DEVELOP A BETTER METHOD OF PRESENTING THE COVERAGE DISCARD SAMPLING AND THE NETHERLANDS HAVE AGREED TO PREPARE A TEMPLATE BASED ON FLEET SEGMENTATION (CURRENTLY UNDER REVIEW) AND CIRCULATE BEFORE NEXT YEAR'S MEETING.</i>	SWEDEN WILL PREPARE DATA AS SOON AS THE TEMPLATES ARE DELIVERED.
RCM North Sea (2005)	<i>14.2 RCM NORTH SEA RECOMMENDED THAT WHERE DISCARD SAMPLING COVERAGE IS RESTRICTED TO A LOW LEVEL, THE COUNTRY CONCERNED, CONSIDERS THE INPUTS FROM OTHER COUNTRIES AND ENTER INTO BILATERAL AGREEMENTS WHERE APPROPRIATE.</i>	WHEN GREATER KNOWLEDGE OF OTHER COUNTRIES DISCARD SAMPLING PROGRAMMES IS ACHIEVED, SWEDEN WILL DO THIS WHERE NECESSARY
RCM North Sea (2005)	<i>14.3 RCM NORTH SEA STRONGLY SUPPORTS THE INITIATIVE TO DEVELOP A DISCARD ATLAS AS IT IS REGARDED AS A MOVE WHICH WOULD PROVIDE USEFUL INFORMATION TO SUPPORT DECISION MAKING IN THE COORDINATION OF DISCARD SURVEYS.</i>	SWEDEN WAS REPRESENTED BY ONE PARTICIPANTS IN THE DISCARD ATLAS MEETING IN ISPRA (2006). SWEDEN WILL ALSO TAKE PART IN THE STEERING COMMITTEE.

III Module of evaluation of the fishing sector

III.A General description of the fishing sector

In the 1st of January 2011 the Swedish fishing fleet consisted of 1359 registered vessels, with a combined gross tonnage of 33 thousand GT and total power of 178 thousand kW. The average age of the vessels was 31 years. The size of the Swedish fishing fleet has followed a decreasing trend between 2008 and 2012. The number of vessels decreased by 10 % (or 144 vessels) while the total GT and kW of the fleet declined by 32 % and 20 %, respectively during the period.

No major changes occurred in the fishing sector during 2008-2012. The Swedish management has succeeded to decrease some of the over-capacity. A funded scrapping campaign during late 2009 and beginning of 2010 and an introduction of an ITQ-system in the pelagic fishery have shown to be successful. There has been a small increase of the fleet after 2011 due to new rules that private fishing-right owners must register their vessels. But the traditional fleet has continued to decrease after 2011.

The table below briefly describes the number of vessels per segment in Sweden in 2011.

Segment	No. Vessels (2011)
Demersal trawler 0-12 m	80
Demersal trawler 12-18 m	82
Demersal trawler 18-24 m	43
Demersal trawler 24-40 m	32
Pelagic trawler 18-40 m	10
Pelagic trawler > 40 m	8
Passive gear 0-10 m	610
Passive gear 10-12	141
Passive gear > 12 m	22
Inactive vessels	331
Total number of vessels	1359

The Swedish fleet consists of a majority of small vessels fishing with passive gear and a smaller number of larger ships mainly using trawls. Most demersal and pelagic trawlers have their home port on the Swedish west coast. Pelagic trawlers on the west coast mostly target herring, sprat and mackerel. Pelagic trawlers operating in the northern part of the Baltic Sea mainly target vendace. Demersal trawlers in the Baltic Sea mostly target cod whereas demersal trawlers on the west coast mostly target Norway lobster and shrimp. Vessels using passive gears are spread along the entire coastline. Geographically, the activities are concentrated to ICES divisions IIIa and IIIId and to some extent, divisions IVa and IVb.

The total number of fishing enterprises in the Swedish fleet was 1058 in 2011. The vast majority of fishing enterprises, 77 %, owned a single vessel and 23 % of enterprises owned two to five fishing vessels. Only one fishing enterprises owned six or more fishing vessels.

III.B Economic variables

SUPRA REGION: BALTIC SEA, NORTH SEA AND EASTERN ARCTIC, AND NORTH ATLANTIC

There is a need for a brief explanation to the values in the annual report tables. Where a cell consists of two values describing a range the first number is related to survey conducted by the Swedish Agency of Marine and Water management and the second number is related the exhaustive survey carried out by Statistics Sweden.

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

Further stratification in data collection

Sweden uses a further stratification of the fishing fleet than required by the DCF in order to provide better final estimates.

Vessels in fleet segments are divided by economic activity where all vessels are divided into two groups, one with a low level of economic activity and one group with regular economic activity. The threshold is calculated as twice the yearly Swedish price base amount. Data on the economic activity level groups are collected and estimated separately. It is important to point out that data on all vessels are collected and estimated and in the end aggregated together. The use of a threshold is in order to provide better estimates.

In the demersal trawlers and fixed pots and traps segments a further stratification based on target species is used. Demersal trawlers are divided into four groups based on vessels targeting crustaceans, shrimp, vendace or other species (mostly cod and/or flatfish). Fixed pots and traps are divided into vessels targeting crustaceans or other species. The reason behind this is that crustaceans, shrimp and vendace (actually vendace roe) is high price species and the economics of these kinds of fisheries is highly different from fisheries targeting other species.

Estimation of total income, gross operational costs, assets, debt and crew wages

Gross operational costs and total income for the segments are collected through a census survey by Statistics Sweden. If the coverage rate is less than 70 per cent an evaluation of the representativeness of the data has to be conducted. The following is a description of how Statistics Sweden collects the data, corrects for missing data and evaluates the representativeness.

Total income, gross operational costs, assets, debt and crew wages is estimated in the same way and therefore the estimation description only describe how total income is collected.

Census data from financial accounts has been collected by Statistics Sweden. Statistics Sweden matches economic data from tax declarations by enterprises to individual vessels. In some cases this may not be possible if a declaration is missing or if the deviation between declared income and income from fisheries is too large to be reliable. Statistics Sweden corrects for non-responses and missing observations with a correction factor. The correction factor is the quota between average value of landings for all vessels in the segment and the average landings value for all vessels with process able data. Statistics Sweden also evaluates the representativeness of the data.

$$cf = \frac{\bar{V}_j}{\bar{V}_l}$$

where

cf = Correction factor

\bar{V}_j = Average landings value in segment j

\bar{V}_l = Average landings value among vessels with process able data

The declared income is estimated as the average declared income of vessels with process able data multiplied with the correction factor multiplied with the number of vessels in the segment.

$$I_j = \bar{I}_j \times cf \times N_j$$

where

I_j = Total declared income in the segment j

\bar{I}_j = Average declared income in the segment j

N_j = Number of vessels in segment j

Estimation of individual income items

Value of landings per segment is compiled from sales, notes, landings declarations logbooks and monthly journals (coastal journals) which are all kept by the Swedish Agency of Marine and Water Management. The compilation is exhaustive.

Fishing rights were not transferable in Sweden during 2008 neither temporarily nor permanent. No income from fishing rights did exist in 2008. The system fishing right system was introduced in November 2009 but no trades were recorded during 2009. During 2010 the trading started and price information of quotas were collected by a separate mail questionnaire send to all vessels that had traded quotas (trade register kept the Swedish Agency of Marine and Water management). From 2012 and onwards the data on quota-prices will be registered and collected directly from the quota register.

In total 63 vessels traded quotas in 2010. The questionnaire was sent to all of them and 84 % responded. The results shows that only 4 (8 %) of the responding vessels actually had economic cost for buying and 10 (20%) of the responding vessels had incomes from selling quotas. Concluding that most of the trades where performed without including money (clean trades, gifts, etc.). The turn-over from the trades was weighted by number of vessels to compensate for the non-response. Due to the low numbers of trades including money and that one vessel stands for around 60 % of the turn-over the figures must be handled with care.

Direct subsidies are compensation for temporary fishing stops regarding cod fishing in the Baltic Sea from the European Fisheries Fund (EFF). Records were kept at the Swedish Board of Fisheries which was the authority responsible for the EFF but from the 1 July 2011 the Swedish Board of Agriculture is responsible for the EFF. The collection is exhaustive.

Other income for a specific vessel is estimated as total income for the specific vessel, as compiled by Statistics Sweden, minus value of landings for the specific vessel.

Estimation of individual cost items

In order to allocate numerical values to individual cost items an allocation key for each segment is estimated. The allocation key is estimated through a survey by the Swedish Agency for Marine and Water Management.

The allocation key is estimated as the percentage of the gross operational costs for the individual cost:

$$p_{ij} = \frac{\bar{c}_{ij}}{\sum_{i=1}^4 \bar{c}_{ij}}$$

where

\bar{c}_{ij} = weighted mean in the sample for costs item i for segment j

p_{ij} = percentage of gross operational costs related to the individual cost item i for segment j

i = cost item where 1 = fuel costs, 2 = repair & maintenance costs, 3 = variable costs, 4 = non-variable costs

j = Segment e.g. PTS VL40XX

The weighting scheme applied to cost item is

$$\bar{c}_{ij} = \left(\frac{\sum c_{ij}}{n_j} \right) \times W_j$$

where

c_{ij} = observation on cost item i for segment j in the sample from the survey

n_j = number of observations in the sample

W_j = weigh calculated as $W_j = \frac{\bar{D}_{pj}}{\bar{D}_{sj}}$, where \bar{D}_{pj} = average number of days at sea for segment j in the population and \bar{D}_{sj} = average number of days at sea for segment j in the sample

Values for individual costs items for individual segments are calculated as:

$$\hat{c}_{ij} = GOC_j \times p_{ij}$$

where

\hat{c}_{ij} = estimated (fitted) value of individual costs item i for segment j

GOC_j = Gross operational costs for segment j as estimated by Statistics Sweden

Fuel consumption for a segment is estimated using a Horvitz-Thompson-type estimator

$$\hat{F}_j = N_j \times \bar{f}_j \times W_j$$

where

\hat{F}_j = Estimated fuel consumption for segment j

N_j = Total number of vessels in the segment

\bar{f}_j = average fuel consumption in sample for segment j

W_j = is the same weight used in the estimation for individual costs items.

Estimation of Engaged crew and FTE's

Engaged crew is estimated for each stratum using a Horvitz-Thompson-type estimator:

$$\hat{E}_j = \frac{N}{n} \sum_{k=1}^n e_{kj}$$

where

\hat{E}_j = Estimated number of engaged crew in segment j

e_{kj} = observation in the sample for vessel k on the number of engaged crew for segment j

N = Total number of vessels in segment

n = Total number of observations in a stratum

FTE's are calculated according to:

$$FTE = ((totEC \times DAS \times hAS) + (aveCT \times hOS \times w)) / FTh$$

where

FTE = Full time equivalents per vessel

$totEC$ = Total engaged crew per vessel

DAS = Days at sea per vessel

hAS = Number of working hours per day at sea, engaged crew and vessel. A working day is assumed to be 6 hours for vessels fishing with passive gears and 12 hours for vessels fishing with active gears.

$aveCT$ = Averaged crew per fishing trip and vessel

hOS = Average number of working hours in onshore per crew member, week and vessel

w = Number of working weeks per year and vessel

FTh = Number of working hours in a year for a full time employee. For national FTE's the number of working hours in year is assumed to be 1800 and for harmonised FTE's the number of hours is assumed to be 2000.

Estimation of Imputed value of unpaid labour

Imputed value of unpaid labour is calculated as the difference between labour costs given by the income tax declaration and the number of FTE's (harmonised) times an assumed yearly minimum salary (Including Social Costs):

Imputed Value of Unpaid Labour = Labour cost – FTE (harmonised) x Yearly Minimum Salary (Including Social Costs)

Vessels displaying a positive difference are able to pay the crew a minimum wage for the time they work and are therefore removed. For all the vessels displaying a negative difference the labour costs are lower than what is expected based on assumed yearly minimum salaries. The sums of the negative

differences are summarized for each segment and the absolute numbers of the sums are the imputed value of unpaid labour.

Assumed minimum wages 2009 (including social costs equal to 40 %) are 252 000 SEK for vessel shorter than 24 meters and 336 000 SEK for vessel longer than 24 meters. Excluding social costs the corresponding salaries are 180 000 SEK and 240 000 SEK. The increase wages was assumed to increase with 3 % from 2009 to 2010.

Estimation of Capital value and cost

The estimation of value of physical capital and annual depreciation costs will be based information on insurance value given by the questionnaire survey. The insurance value is estimated by divided the vessels into two groups, one less then 24 meters and one for vessels larger than 24 meters. A regression analysis for each group will then be run based on the following formulas:

Vessels less than 24 meter

$$\text{LN Insurance value} = \beta_0 + \beta_1 * \text{LN age} + \beta_2 * \text{LN kW} + \beta_3 * \text{LN length} + \beta_4 * D_{\text{DTS}} + \beta_5 * D_{\text{FPO}} + \beta_6 * D_{\text{HOK}} + \beta_7 * D_{\text{DFN}} + \beta_8 * D_{\text{PGP}} + \beta_9 * D_{\text{CRU}} + \beta_{10} * D_{\text{PRA}} + \beta_{11} * D_{\text{VEN}} + \varepsilon$$

Vessels 24 meter and over

$$\text{LN Insurance value} = \beta_0 + \beta_1 * \text{LN age} + \beta_2 * \text{LN kW} + \beta_3 * \text{LN length} + \beta_4 * D_{\text{PTS}} + \beta_5 * D_{\text{CRU}} + \beta_6 * D_{\text{PRA}} + \varepsilon$$

Where D equals dummy variables for dominant fishing gear or target species. Target species are CRU = Crustaceans, PRA = Prawns and VEN = Vendace.

Based on the results of the regressions fitted values of insurance values are calculated for each vessel. All vessels are divided into three groups:

1. Vessels fishing with passive gears
2. Vessels fishing with active gears with a length under 24 meters
3. Vessels fishing with active gears with a length over 24 meters

For each group the gross tonnage and insurance value is summarized for each individual building year. The sum of insurance value for each building year is divided by the sum of gross tonnage for each building year to obtain the depreciated price per capacity unit for each building year. Based on the depreciated price capacity unit a linear regression with a quadratic form is carried out to estimate the price per capacity unit for the current year of interest. The estimation equation is:

$$PPC_t = \beta_0 + \beta_1 t + \beta_2 t^2 + \varepsilon$$

where

$$PPC_t = \text{Price per capacity unit for building year } t$$

$$t = \text{building year}$$

And the price per capacity unit for 2010 is calculated as:

$$\hat{PPC}_{2010} = \hat{\beta}_0 + \hat{\beta}_1 \times 2010 + \hat{\beta}_2 \times 2010^2$$

The quadratic form is used to compensate for digressive depreciation.

In calculation the depreciated replacement values price per capacity unit for 2010 is used. In calculating the depreciated historical values price per capacity unit for 2010 is deflated using time series of the consumer price index. Both types of capital value calculations use the template connected to the PIM methodology in the capital valuation report (No FISH/2005/03).

Capital costs and the value of capital for each segment are calculated by extracting the values for each of the three large groups from the template and are reweighted to distribute them to individual segments according to the weighting scheme:

$$Cap_j = Cap_G \times \frac{\sum kW_j}{\sum kW_G} \times \frac{\sum Age_G}{\sum Age_j} \times \frac{Num_j}{Num_G}$$

where

Cap = Capital value or capital costs depending on which variable to be calculated

kW = Engine power

Age = Age of vessel

Num = Number of vessels

The subscript j refers to the segments e.g. DFN VL1218. The subscript G refers to the groups described earlier for which total capital value and capital costs are estimated i.e. vessels fishing with passive gears, vessels fishing with active gears under 24 meter and vessels fishing with active gears over 24 meters.

Pelagic fishing rights became transferable in Sweden by the 1st of November 2009. The first transactions of fishing right took place in January 2010. Since no transactions of pelagic fishing rights took place during 2009 the fishing right had no market value in 2009. For 2010 and 2011 the value of pelagic fishing rights will be surveyed by a census mail questionnaire. The results from the 2010 survey performed late 2011 shows that only 10 vessels sold and 4 vessels bought fishing rights (84 % response rate) with including money transfers. The values of the fishing rights are due to the low number of money transfers not possible to value and report due to secretacy reasons.

Estimation of in-year investments

In-year investments for a segment is estimated using a Horvitz-Thompson-type estimator

$$\hat{I}_j = N_j \times \bar{ii}_j \times W_j$$

where

\hat{I}_j = Estimated fuel consumption for segment j

N_j = Total number of vessels in the segment

\bar{ii}_j = average fuel consumption in sample for segment j

W_j = is the same weight used in the estimation for individual costs items.

Financial position

Is calculated as debt, as compiled by Statistic Sweden, divided by estimated vessel replacement value.

Fishing enterprises

Number of enterprises consisting of different amount of vessels is compiled from the fleet register kept by the Swedish Board of Fisheries.

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

As seen in table III.B.1 the final data delivered to the Swedish Agency for Marine and Water Management from Statistics Sweden shows that the Swedish data has improved remarkably. Compared to Annual report 2010 where 3 out of 18 segments displayed a coverage rate higher than 70 per cent (7 segments is over 65 per cent) now in Annual report 2011, 7 segments displays a higher average rate than 70 per cent (12 segments is over 65 per cent).

Reasons for non-response may be several, such as missing observations and outliers (as defined by the acceptance criteria established by Statistics Sweden). Statistics Sweden conducts an analysis of non-responses and correct for this by using a correction factor based on income from fisheries (supplied by the Swedish Agency of Marine and Water Management) and total income from the Statistics Sweden data bases.

Survey data has been collected by the Swedish Board of Fisheries through questionnaires and the aim has been a coverage rate of at least 10 % or a minimum of 10 observations in each segment. Only one segment display an achieved sample number less than 10 observations; pelagic trawlers and/or seiners over 40 meters (TM VL40XX) with an achieved sample number of 8 out of 12 possible observations. The achieved sample rate is 67 %, which higher than what was the aim in the national programme.

Clustering was necessary due to confidentiality reasons. The clustering scheme can be seen in table III.B.2. Clustering has been made with segments similar to other segments, except for inactive vessels which have been clustered with non-important segments with distinct characteristics. Sweden has had the aim to present as much data as possible un-clustered.

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

No economists were participating in the RCM during 2011 and therefore no recommendations were made on economical variables. The recommendations made between 2007-2009 are listed below.

Source	RCM Recommendation	Action
RCM Baltic (2009)	<i>Economic variables: The inclusion of a methodology report in the NPs as proposed by SGECA, would provide significant benefits</i>	SWEDEN WILL GIVE A THOROUGH DESCRIPTION OF THE METHODS USED TO SAMPLE AND ESTIMATE THE ECONOMIC DATA IN THE NATIONAL PROGRAMME
RCM Baltic (2007)	<i>The RCM Baltic recommends the description of the source of the information and when applying a sampling procedure a description of method and strategy has to be clearly described in the national programme to give useful information on quality of the obtained data. In the technical report there should then be a qualitative quality report containing a thorough description of the methods and strategies used and the characteristics of the gathered data.</i>	Sweden will describe sampling method and strategy in NP for 2009-10. A quality report in TR for 2009 will be presented in 2010.

	<i>The RCM Baltic recommends to not use the precision level as an indicator of heterogeneity but to rather use the mean value and standard deviation.</i>	
RCM NS&EA (2007)	<i>The RCM NS&EA recommends setting up a workshop to clarify all outstanding issues concerning the fleetbased approach with regard to economic data collection. Workshop on economic data collection with the following ToRs: 1) At what level should economic data be provided – clarification. 2) If a vessel uses different gears how should the cost per gear type/metier be calculated? Use of correction factors/coefficients? 3) Other methodological issues concerning the fleet based approach.</i>	Recommendations from the Liaison Meeting were that these issues were to be addressed under SGECA 08-03.
RCM Baltic (2007)	<i>In compliance with the RCM NS-EA, the RCM Baltic recommends that the Commission arranges a workshop to clarify all issues concerning the fleet based approach. Terms of reference: At what level should economic data be provided – clarification. If a vessel uses different gears how should the cost per gear type/metier be calculated? Use of correction factors/coefficients? Are collected data sufficient to calculate cost with respect to gear type/metier? If not, which amendments have to be done? Other methodological issues concerning the fleet based approach.</i>	
RCM North Sea & East Arctic (2007)	<i>The RCM NS&EA recommends setting up a workshop to clarify all outstanding issues concerning the fleet-based approach with regard to economic data collection</i>	Sweden participated in SGRN-SGECA 08-01: Implementation for the collection of indicators for the fleet-based approach and establishment of regional sampling designs for the new data collection framework
RCM North Sea & East Arctic (2008)	<i>The RCM NS&EA recommends that the Chair of the RCM NS&EA circulates the notes related to economic variables to the other RCMs in time to help inform their discussions of these matters, and to help determine if the views of the RCM NS&EA with regards to suggestions for areas for STECF-SGECA to look at are supported. The RCM NS&EA also recommends that the following actions be carried out before the STECF-SGECA Data Quality workshop (planned for 2009 quarter 1), in order to increase the effectiveness of the workshop with specific regard to clustering: 1. A questionnaire be sent to Member States to determine what practice is followed in Member States, to identify if any formal procedures exist. 2. Work should be carried out by Member States prior to the workshop on the degree of variation within fleet segments of indicators as suggested below so that at the workshop various options and their implications for the quality of results can be tried out In addition, as part of the wider preparation for the quality workshop, the RCM NS&EA recommends: 3. A summary of procedures reported in NP proposals</i>	Sweden participated in SGECA 09-03: Report of the Working Group on the quality aspects of the collection of economic data - methods of calculation of the indicators and sampling strategies

	<p><i>for the collection of economic data be drawn up (with a possible repeat of the 2004 exercise to collect such information from Member States).</i></p> <p><i>4. That SGECA work to develop early in 2009 a manual collating the various guidance that exists on the derivation of economic variables as part of helping to promote the use of such guidance by Member States during 2009.</i></p>	
RCM NS & EA (2009)	<p><i>Economic variables: The inclusion of a methodology report in the NPs as proposed by SGECA, would provide significant benefits</i></p>	<p>SWEDEN WILL GIVE A THOROUGH DESCRIPTION OF THE METHODS USED TO SAMPLE AND ESTIMATE THE ECONOMIC DATA IN THE NATIONAL PROGRAMME</p>

III.B.4 Actions to avoid shortfalls

The general trend in surveys both domestically and international is decreasing response rates in surveys. The Swedish Agency of Marine and Water Management is continuously looking in to different possibilities of raising the response rate. In 2010 the Swedish Board of Fisheries put an information provider obligation regarding surveys of the economic performance of the fishing fleet into place. A failure to respond to economic surveys under the DCF may lead to economic sanctions. There was no need to use sanctions the final response rate of the survey was 94 %. With a decreasing fleet the possibility to use probability sampling is decreasing and most probably Sweden will need to sample all (census) to get enough data and keeping some level of segmentation.

III.C Biological - metier-related variables

THE BALTIC SEA

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

Results of the sampling in 2011 in relation to what was planned are presented in tables III.C.3, III.C.4, III.C.5 and III.C.6.

Set gillnet fisheries targeting demersal fish (GNS DEF 110-156 0 0), subdivision 22-24

Set gillnet fisheries targeting demersal fish (GNS DEF 110-156 0 0), subdivision 25-29,32

Longline fisheries targeting demersal fish (LLS DEF 0 0 0), subdivision 25-29,32

Fisheries targeting cod with passive gear is sampled in excess of what originally was planned in the National Programme. The reason for this is that the fisheries also were sampled for discards. The fisheries have historically been sampled for discards for many years and the discard rate is found to be below 10%. The plan, at the time of compilation of the NP, was thereby to sample the fisheries only for landings. This was however a mistake since the assessment group uses the discard data. The fisheries have thereby been sampled for discards with the same intensity as in 2010. The sampling is carried out as self samplings were fishermen bring the discard fraction of the catch a shore. The NP has been revised accordingly for 2012-2013.

Bottom trawl fisheries targeting demersal fish (OTB DEF >=105 1 110), subdivision 22-24

Bottom trawl fisheries targeting demersal fish (OTB DEF >=105 1 110), subdivision 25-32

Seven out of eight planned trips achieved in subdivision 22-24 while the fishery was sampled slightly in excess compared to plan in subdivision 25-32. The main reason for this is that it sometimes is difficult to predict in what subdivision the fishery takes place when a trip is planned. In future NPs (2013) these fisheries will be sampled within one sampling frame.

Trawl fisheries targeting small pelagic fish (PTM SPF 32 104 0 0), subdivision 22-24

Trawl fisheries targeting small pelagic fish (PTM SPF 16 31 0 0), subdivision 25-29, 32

The assumption for the planned number of trips is that the fishery is conducted all year around in the main subdivisions (24, 25, 27, 28 and 29). The assumption is expressed in the National Programme. The fishery have however been very limited (or nonexistent) in some of the subdivisions in some quarters implying that the planned no of trips to be sampled was not achieved. There is also a mistake in table III_C_4. The planned (maximum) number of trips in subdivision 22-24 is 20 and not 24. The right figure is found in table III_C_3.

Pound net fisheries targeting catadromous species (FPN CAT 0 0 0)

Due to bad weather conditions, one trip in fishing ground SD 22-24 was sampled on shore, instead of at sea. Details regarding collection of silver eel to the biological sampling from this trip see section III.E Biological – stock-related variables.

Fyke net fisheries targeting catadromous species (FYK CAT 0 0 0)

Sampling was performed on shore as originally planned. Planned number of trips in NP tables III.C.3 and III.C.4 has incorrectly been recorded as trips sampled at sea.

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

Sweden initiated in 2009 a work to improve the designs of the metier sampling programmes taking the outcomes of WKACCU and WKMERGE into account. This work continued in 2011 and includes identification of proper sampling frames and probability based ways to select primary sampling units. At the same time we are trying to sort out some of the logistical problems that arise from the new more statistically sound sampling designs. The new designs will improve the possibilities to evaluate possible bias and thereby also accuracy. Sweden has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators such as CVs. During 2009 Sweden started to work with the tools provided in order to i) investigate if and where the tools can be used to evaluate the Swedish data and ii) evaluate the Swedish sampling wherever possible. Also this work continued in 2011. Unfortunately it became evident that the COST tools were not suitable for the Swedish sampling design (at least not directly) in many cases. This means that the evaluation on if and how the COST tools could be used is an ongoing work and the analysis have not been finalised yet. Meantime, and for the sake of the annual report, Sweden have calculated mCVs for *length frequencies* of different species and stocks (table III.C.5). Details regarding the estimation of precision (mCV) are presented in Annex Ia and the results reported in Table III.C.5. Overall the required precision target for length compositions was fulfilled. The COST tools have been used to estimate CVs for *volumes* of discards (table III.C.5) were appropriate.

III.C.3 Follow-up of regional and international recommendations

Source	Recommendation	Action
RCM Baltic (2011)	<i>For the purpose to give the RCM the possibility to evaluate were task sharing in métier sampling could be achieved. Robust analytical methods should be tested to look for differences / similarities in exploration patterns</i>	SWEDEN VOLUNTEERED TO LOOK INTO THIS ISSUE AND WILL PLAN TO PRESENT SOME RESULT IN THE RCM BALTIC MEETING IN 2012.

	<i>(size and species distribution, spatial pattern) between countries within 1-2 métiers as a case study.</i>	
RCM Baltic (2011)	<i>Routines for establishing bilateral agreements. MS should upload all landing data into FishFrame allowing the RCM to analyse the possible needs for bilateral agreement. MS should set up agreements, fixing the details of sampling, compilation and submission of data in each case it is concluded by the RCM that a bilateral agreement is needed.</i>	SWEDEN WILL SUBMIT DATA TO FISHFRAME AND CONTINUE THE WORK OF UPDATING AND ESTABLISH NEW BILATERAL AGREEMENTS WHEN NEEDED.
RCM Baltic (2011)	<i>To ensure possibilities for adequate sampling of biological and métier related data including landings in foreign MS, national institutes need to have online access to national logbook data and national VMS data.</i>	IN SWEDEN, ONLY LOGBOOK DATA ARE AVAILABLE ONLINE WHILE VMS DATA ARE ACCESSIBLE BY REQUEST.
RCM Baltic (2010)	<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>	SWEDEN WILL COMPILE AND SUBMIT SUCH INFORMATION UPON REQUEST
RCM Baltic (2009)	<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>	SWEDEN WILL USE THE AGREED NAMING OF FISHING GROUND, METIERS AND UNITS OF THE VARIABLES AS WELL AS RESPECT THE DEADLINE.
RCM Baltic (2009)	<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>	SEE ABOVE
RCM Baltic (2009)	<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 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>	SWEDEN WILL PRODUCE THE DESCRIPTION OF THE METIERS USING THE FORMAT IN ANNEX 3 BEFORE THE RCM 2010.
RCM Baltic (2008)	<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>	SE HAS ALREADY INCLUDED A SHORT DESCRIPTION OF ALL METIERS IN PROGRAMME FOR 2009-2010.
RCM Baltic (2007)	<i>REGIONAL SAMPLING 4.1 UNTIL ROBUST INTERNATIONAL GUIDELINES FOR ANALYSIS OF LOGBOOK DATA IS AVAILABLE RCM BALTIC MADE A FEW RECOMMENDATIONS HOW TO DEAL WITH ALLOCATION RULES.</i>	SE HAS COMPLIED WITH INTERIM ALLOCATION RULES MADE UP IN THE RCM

III.C.4 Actions to avoid shortfalls

One of the main reasons for inconsistencies between planned no of trips to be sampled and what is achieved, is that it is sometimes difficult to predict spatial and temporal fishing patterns for some metiers at the time of writing the National Programme. To some degree this is inherent to the time lag between the compilation of the National Programme and the sampling year. To a certain degree the problem can be reduced by implementation of proper sampling frames where the metiers can be seen as domains instead of strata. This is something that Sweden is working on and will continue to work on the forth coming years. Sweden will further continue to develop the sampling designs in order to

reduce some of the logistical problems that have risen after implementing a more random selection of trips to sample.

When revising NP next time, the tables will be reviewed more carefully. Moreover, when planning the sampling of the coastal fisheries, we will take into consideration to plan on shore sampling in higher extent due to the risk of unpredictable impact of bad weather conditions.

THE NORTH SEA AND EAST ARCTIC

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

Results of the sampling in 2011 in relation to what was planned are presented in tables III.C3, III.C.4, III.C.5 and III.C.6. A main overall reason for deviations from what was planned is that it sometimes can be difficult to predict fishing pattern (or changes in fishing pattern) by metier for the sampling year at the time of compilation of the National Programme.

Further, a large proportion of the Swedish fleet fishing for demersal species and crustaceans are further relatively small (<24 m). Most of them avoid being at sea in bad weather (or do not want to bring observers in bad weather due to safety conditions). This means that after prolonged period of bad weather Sweden sometimes are lagging behind in sampling of all fisheries and need to prioritise trips in the end of the quarter. Since the data from the metier sampling presently primarily is used to produce estimates of discards metiers with high and/or variable levels of discards are prioritised. In 2011 it was a cold winter with a lot of ice in the several fishing harbours. This prevented many vessels from fishing and consequently influenced the sampling of some metiers, particularly in the first quarter. Deviations from aim on a metier basis are expressed below.

Trawl fisheries targeting demersal fish (witch flounder) (OTB_DEF_90-119_0_0_WIT)

Trawl fisheries targeting demersal fish (gadoides) (OTB_DEF_90-119_0_0_GAD)

Trawl fisheries targeting Nephrops (OTB_CRU_90-119_0_0_IIIaN)

In accordance with regulation 850/98 is the minimum mesh size for most demersal fish species as well as Nephrops 90 mm in the Skagerrak. Despite that almost the entire demersal fishery is conducted with the same mesh size has it in previous years been possible to distinguish three more or less distinct metiers; A fishery targeting cod, saithe and haddock (OTB_DEF_90-119_0_0_GAD), a fishery targeting witch flounder (OTB_DEF_90-119_0_0_WIT) and a fishery targeting *Nephrops* (OTB_CRU_90-119_0_0_IIIaN) with by-catches of fish. In recent years there have been a considerable decline in all these fisheries (less than half of the trips compared to the reference year) and they have also evolved towards a more mixed nature making it difficult to clearly distinguish between them. In the revised NP for 2012 these fisheries will be sampled within one frame. It was not possible to reach the sampling targets for these fisheries primarily to the pronounced decline in activity. Vessels involved in the fishery are further to some extent the same vessels involved in the trawl fishery for *Nephrops* using sorting grid which is sampled separately. Some of the planned OTB_CRU_90-119_0_0_IIIaN trips turned into grid trips since the skipper at a late stage decided to change gear. As a consequence is the OTB_CRU_70-89_2_35_IIIaN sampled slightly in excess.

Trawl fisheries targeting crustaceans (OTB_CRU_35-69_0_0), IIIa, IV

Sweden fell short to sample 6 out of 12 trips in this fishery This was due to a combination bad weather and shortage in staff.

Trawl fisheries targeting crustaceans (OTB_CRU_35-69_2_22), IIIa, IV

This metier is more or less exclusively catching *Pandalus*. Sweden run a self-sampling programme for the metier in which Institute of Marine Research are buying unsorted samples of catches from randomly selected commercial vessels. The random selection of vessels resulted, as in 2010, in some problems such as e.g fishermen forgetting to bring samples (or parts of samples/information) ashore. All the planned trips were thereby not sampled. The sampling of the metier also suffered from the cold winter since most of the active vessels are small and was prevented from leaving the harbours due to ice in the first quarter.

Trawl fisheries targeting small pelagic fish (PTM_SPF_32-69_0_0), IIIa

46 out of planned 96 trips were sampled by buying unsorted samples of landings in the harbours/markets. The assumption for the planned number of trips is that the fishery is conducted all year around in both Kattegat and Skagerrak. A main reason for the deviation is that the fishery was limited in Kattegat (IIIaS) especially during the second and third quarter. The overall number of conducted trips by the fleet has further decreased (table III.C.3) considerably compared to the reference years.

Fyke net fisheries targeting catadromous species (FYK_CAT_0_0_0)

Sampling was performed on shore as originally planned. Planned number of trips in NP tables III.C.3 and III.C.4 has incorrectly been recorded as trips sampled at sea.

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

Sweden initiated in 2009 a work to improve the designs of the metier sampling programmes taking the outcomes of WKACCU and WKMERGE into account. This work continued in 2011 and includes identification of proper sampling frames and probability based ways to select primary sampling units. At the same time we are trying to sort out some of the logistical problems that arise from the new more statistically sound sampling designs. The new designs will improve the possibilities to evaluate possible bias and thereby also accuracy. Sweden has for a number of years been waiting for the outcome of the COST project to get tools for estimation of quality indicators such as CVs. During 2009 Sweden started to work with the tools provided in order to i) investigate if and where the tools can be used to evaluate the Swedish data and ii) evaluate the Swedish sampling wherever possible. Also this work continued in 2011. Unfortunately it became evident that the COST tools were not suitable for the Swedish sampling design (at least not directly) in many cases. This means that the evaluation on if and how the COST tools could be used is an ongoing work and the analysis have not been finalised yet. Meantime, and for the sake of the annual report, Sweden have calculated mCVs for *length frequencies* of different species and stocks (table III.C.5). Details regarding the estimation of precision (mCV) are presented in Annex Ia and the results reported in Table III.C.5. Overall the required precision target for length compositions was fulfilled. The COST tools have been used to estimate CVs for *volumes* of discards (table III.C.5) were appropriate.

III.C.3 Follow-up of regional and international recommendations

Source	Recommendation	Action
RCM NS&EA (2011)	<i>Routines for establishing bilateral agreements. MS should make sure that their landings abroad are included in their FishFrame upload allowing the RCM to analyse the possible needs for bilateral agreements.</i>	SWEDEN HAS UPLOADED THE DATA TO FF MAKING THE ANALYSIS POSSIBLE TO PERFORM WITHIN NEXT RCM 2012.
RCM NS&EA (2011)	<i>MS to fill update metier descriptions already compiled by RCM NS&EA 2010 and using the standard template complete descriptions for any new metiers identified. Updated and new files to be uploaded by Fishing Ground co-ordinators.</i>	SWEDEN IS AWARE OF THE EXISTING TEMPLATE AND USE IT FOR NEW METIERS IDENTIFIED BEFORE RCM 2012.
RCM NS&EA (2010)	<i>The RCM NS & EA considers that in a situation where sampling resources are limited, priority should be given to the sampling of discards in those metiers with high discarding. The information required is an estimate of the level of discarding (volume and percentage) and the main species contributing to the discard fraction of the catch. MS to prepare information on level of discarding in national metiers</i>	SWEDEN WILL PARTICIPATE IN THE ICES PG FOR DISCARDS (SGPIDS) AND WILL DELIVER DATA AND INFORMATION ON REQUEST.

	<i>collected in recent years to be presented at a dedicated workshop to be defined.</i>	
RCM NS&EA (2010)	<i>The RCM NS & EA recommends that OTB_DEF_>=120_0_0 and TBB_DEF_70-99_0_0 are used as case studies for North Sea region in the ICES WKEID. The RCM NS & EA further recommends MS to submit data to ICES WKEID</i>	SWEDEN SUBMITTED THE REQUESTED DATA TO WKEID
RCM NS&EA (2009)	<i>RCM NS&EA recommends Sweden and Denmark to explore whether the discrepancy identified between the Swedish and Danish métier definition of vessels operating in Div. IIIa have any effect on the raising of the input data during HAWG and to provide a definition of the métier exploiting the herring stock in IIIa.</i>	SWEDEN HAS SUBMITTED A WD TO THE ASS WG IN 2007 WHICH SHOWED NO DISCREPANCY BETWEEN THE METIERS IN THE SWEDISH FISHERY.
RCM NS&EA (2009)	<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>	SWEDEN WILL USE THE AGREED NAMING OF FISHING GROUND, METIERS AND UNITS OF THE VARIABLES AS WELL AS RESPECT THE DEADLINE
RCM NS & EA (2009)	<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>	SEE ABOVE
RCM NS & EA (2009)	<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 9. 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>	SWEDEN WILL PRODUCE THE DESCRIPTION OF THE METIERS USING THE FORMAT IN ANNEX 3 BEFORE THE RCM 2010.
RCM NS & EA (2009)	<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>	DONE
RCM NS & EA (2008)	<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>	SE HAS ALREADY INCLUDED A SHORT DESCRIPTION OF ALL METIERS IN PROGRAMME FOR 2009-2010.
RCM North Sea & East Arctic (2007)	<i>THE RCM NS&EA RECOMMENDS THAT, AT A TRIP LEVEL, OR AT A FISHING OPERATION LEVEL WHEN POSSIBLE, THE RETAINED PART OF THE CATCH SHOULD BE CLASSIFIED BY TARGET ASSEMBLAGE (CRUSTACEANS, CEPHALOPODS, DEMERSAL,...) AND SORTED BY WEIGHT (BY TOTAL VALUE IN THE CASE OF VALUABLE CRUSTACEAN SPECIES, E.G. NEPHROPS). THE TARGET ASSEMBLAGE THAT COMES UP AT THE FIRST POSITION SHOULD BE CONSIDERED AS THE TARGET ASSEMBLAGE TO REPORT IN THE MATRIX. THE RCM NS&EA UNDERSTANDS THAT THIS WAY OF DOING DOES NOT ALLOCATE ANY INFORMATION TO THE MÉTIERS TARGETING MIXED TARGET ASSEMBLAGES.</i>	SE WILL REPORT FISHING ACTIVITY DATA IN THE FLEET-FISHERY MATRIX ACCORDING TO THE RECOMMENDATIONS MADE.
RCM North Sea & East Arctic (2007)	<i>THE RCM NS&EA RECOMMENDS THAT <u>IN GENERAL</u> IF AN AREA IS COVERED BY ONE DEDICATED TRIP PER YEAR ONLY, THE EFFORT PUT INTO THIS SINGLE TRIP COULD BETTER BE ALLOCATED TO OTHER FLEET SEGMENTS ENSURING BETTER COVERAGE OF THESE SEGMENTS. THE RCM FURTHER RECOMMENDS UPDATING THE LIST OF ONBOARD OBSERVER TRIPS BY FISHING ACTIVITY ON LEVEL 6 BEFORE THE NEXT MEETING.</i>	SE WILL CONTRIBUTE WITH THIS INFORMATION.

III.C.4 Actions to avoid shortfalls

One of the main reasons for inconsistencies between planned no of trips to be sampled and what is achieved is that it is sometimes difficult to predict spatial and temporal fishing patterns for some metiers at the time of writing the National Programme. To some degree this is inherent to the time lag between the compilation of the National Programme and the sampling year. To a certain degree the problem can be reduced by implementation of proper (and robust) sampling frames where the metiers can be seen as domains instead of strata. This is something that Sweden is working on and will continue to work on the forth coming years. Sweden will further continue to develop the sampling designs in order to reduce some of the logistical problems that have risen after implementing a more random selection of trips to sample.

When revising NP next time, the tables will be reviewed more carefully.

III.D Biological - Recreational fisheries

THE BALTIC SEA

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

According to the Data Collection Frame Work, DCF 2010/93/EU, member states shall evaluate the quarterly weight of the recreational catches of cod, salmon and eel for the Baltic Sea. For Sweden, salmon and cod are reported while recreational fishery for eel is not allowed according to regulation (FIFS 2004:36) and therefore no data has been collected.

National mail screening surveys

A new national mail screening survey was carried out during spring 2011 regarding recreational fisheries 2010. No deviations from the NP proposal.

Salmon

Biological sampling of recreational salmon and sea trout catches was carried out during the fishing season in two rivers in the Gulf of Bothnia and one river in the Main Basin. The monitored variables include smolt age, sea-age, sex, origin (wild/reared) and size at capture (weight and length). These data are an integral part of the assessment of the spawning run composition and the effects of the fishery. Data on fecundity was collected by a recreational brood stock fishery in River Dalälven, Sub-division 30.

New surveys were performed in 2011 to estimate recreational catch at the coast and the sea. Quarterly catch was estimated at sea by use of a modified method of that described in Anon 2003. Recreational fishery at the coast only occurs in quarter 2 and 3, catches was estimated according to surveys performed in 2003 and 2007. Collection of river data is carried out annually in accordance with routines described in the pilot study (Anon 2003). Summarized data of catches are delivered to the relevant ICES group (WGBAST). Achieved sampling of biological variables (length, weight, age, sex) in the recreational fishery was 37 % lower than planned III.E.3. This is explained by a low spawning run in 2011.

Cod

A study directed towards charter vessels having recreational fishermen onboard was undertaken during 2011. The Sound (IIIb, between Sweden and Denmark) was chosen for this study as it was considered the only area with significant Swedish recreational fishing for cod. This study reports the quarterly catches of cod (as kg cod kept) onboard Swedish tour boats. All 10 Swedish tour boats operating in the Sound participated in the study. One new boat that started fishing in August was not included in the study. Daily catches were estimated, mainly visually, and reported by crew members. Control weightings of catches were carried out by IMR personnel indicating that crew members overestimated catches of cod in kg by 5 % (n = 4). Catches from 1 018 fishing days were reported. The total quarterly weight of cod taken was 15 656, 25 241, 39 174 and 5 065 kg. The total annual cod catch was 85 136 kg. This can be compared to 413 618 kg cod taken by the Swedish commercial fleet (56 boats) in the Sound during 2011. The total tour boat catch was 17 % of the combined tour boat and commercial catches. At present there are no verified estimates of the remaining recreational fishing for cod in the Sound. (Øresland, V. 2012)

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

National mail screening surveys

A new national mail screening survey was carried out during spring 2011 regarding recreational fisheries 2010. The design of the survey has been changed compared to earlier surveys in order to get a better coverage of active recreational fishermen. No deviations from the NP proposal

Salmon

A survey directed towards recreational salmon fishermen was carried out in a large northern salmon river. The result from this survey gives further information of the need for annual surveys and closer collaboration with organisations that are managing the fishery in this and other similar organised rivers. There are no deviations from NP proposals.

Cod

As we received a very positive feed-back from the skippers, everyone agreed to jointly carry out the monitoring program and all 10 Swedish tour boats operating in the area participated in the study. One boat reported number of fishers onboard and those data are reported here as an effort estimate (boat catch in kg cod versus number fishers onboard). As a mean, the crew over estimated the catches by 5 % on the occasions when the catch >11 kg (n = 4). The number of controls needs to be increased. At least 20 controls are planned for the 2012 study after which the number of controls again will be evaluated. The results also shows that both the number of fishing days and the total catch were highest during summer. It is notable that the mean catch per tour was higher during summer than during the cod spawning season in spring.

A self reporting system as used here has many advantages; it is cheap, data can be verified through controls, and it increases positive contacts between tour operators, researchers, fishery administration, and fishers. Such a system utilizes a feeling of responsibility for common fish resources among tour operators and fishers.

Only positive feedback was given during this study and fishers onboard tour boats were very positive when control weightings were carried out. The control, however, must be included and further developed in such a self reporting system. This study will be repeated during 2012. We will use a simplified monthly report sheet and data regarding foreign fishers will not be reported. Reporting catch estimates in Excel and using Email will be encouraged. Reporting catch estimates to a homepage will be discussed at a future meeting with boat operators.

No deviations from the NP proposal.

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

Source	Recommendation	Action
RCM Baltic 2011	<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. ICES WGBFAS, WGBAST and WGEEL are asked to consider the usefulness of inclusion the recreational fishery data into the stock assessment. IF it is useful for certain stock WG should provide the list of necessary data needed from recreational fishery in the Baltic.</i>	NO DATA WAS DELIVERED TO WGBFAS BUT A PRESENTATION WAS HELD. A CLEAR REQUEST FROM THE WG NEED TO BE FORMULATED TO GET THE DATA IN THE RIGHT FORMAT.
RCM Baltic 2010	<ol style="list-style-type: none"> <i>1. Investigate the potential to coordinate recreational fisheries cod catches in SD 22-24 between Denmark, Germany and Sweden</i> <i>2. Discuss the possibility to include recreational fisheries data into FishFrame</i> <i>3. Compile 1-page status report of ongoing recreational fisheries surveys</i> <i>4. Provide guidance how often recreational fisheries surveys need to be conducted</i> <i>RCM Baltic endorses to use annual weight estimates</i>	SE PARTICIPATED IN THE MEETING WERE THESE ISSUES WERE DISCUSSED AND DEALT WITH
RCM Baltic (2008)	<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 http://www.ices.dk/iceswork/recs/2008recs.asp).</i>	SE WILL PARTICIPATE IN WK AND ACTIONS WILL BE TAKEN AS RECOMMENDED

III.D.4 Actions to avoid shortfalls

National mail screening surveys

A new national mail screening survey was carried out during spring 2011 regarding recreational fisheries 2010. No deviations from the NP proposal.

Salmon

There is a plan to carry out better designed and larger surveys to improve the poor quality of the catch data in some rivers.

Cod

No shortfalls to be reported and therefore no actions to be taken.

THE NORTH SEA AND EAST ARCTIC

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

For the North Sea only cod are to be reported while recreational fishery for eel is not allowed according to regulation (FIFS 2004:36) in Sweden and therefore no data has been collected.

National mail screening surveys

A new national mail screening survey was carried out during spring 2011 regarding recreational fisheries 2010. No deviations from the NP proposal.

Cod

While the Sound (area IIIb, between Sweden and Denmark) have been considered to be the only area with significant Swedish recreational fishing for cod, all effort for sampling data was put in that area and reported in section III.D Baltic Sea.

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

No data to be reported. No deviation from NP proposal

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

Source	Recommendation	Action
RCM NS & EA (2009)	<i>RCM NS&EA recommends MS to provide an overview of their inland sampling of the recreational fishery on eel.</i>	SWEDEN WILL PROVIDE OVERVIEW OF INLAND SAMPLING (TEMPORAL, SPATIAL, DISTRIBUTION, SAMPLING INTENSITIES, INVOLVED INSTITUTES) TO THE RCM MEETING IN 2010

III.D.4 Actions to avoid shortfalls

No shortfalls to be reported and therefore no actions to be taken.

III.E Biological - stock-related variables

THE BALTIC SEA

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

All stocks sampled during 2011 for biological variables, age, length, weight, sex and sexual maturity are listed in table III.E.3. The variables are collected from different sources like survey, market or sea sampling and different sampling strategy has been used. For most stocks, the sampling sources are listed separately in order to keep track on the contribution of the different sources to the total.

To get catch-in-numbers (CANUM) and weight-in-catch (WECA) by age group, sampling of the landings is undertaken. Simple random sampling was used for pelagic stocks, cod, eel and flounder. The simple random sampling means that a fixed number of individuals were sampled randomly within market size category (if sorted) /unit (unit =area, quarter and gear) independent of landing size. All individuals in a sample were analyzed according to length, weight and age. Sampling strategy on surveys and onboard fishing vessels differs from market sampling and was performed as follows: all individuals (or a sub sample) were length measured and a fixed number per length class was sampled for age, sex, maturity and weight. For stocks sampled on surveys and onboard fishing vessels, the length can be given an age by using an Age-Length-Key.

International survey manuals give guidelines on number of individuals / length class to be sampled for age, sex and maturity. These were followed and the actual sampled number is therefore dependent on the amount of catch. In table III.E.3 the column “planned minimum number “ presented for discard and survey sampling refers to the results from 2008. Therefore, percent achievement can therefore vary and look like it’s over – or undersampled.

Samples of herring and sprat were collected by Denmark according to the bilateral agreements and number of individuals collected is included in table III.E.3.

Sampling of eel in freshwater:

Fyke net fisheries (FYK_CAT_0_0_0) in inland (fresh) waters are targeting eel mostly in the (near) silver phase, and to a lesser extent in the yellow phase. This fishery is found in all major lakes (to a much lesser extent in smaller lakes and rivers) flowing into the Baltic and the Skagerak/Kattegat (North Sea) areas. Since all Swedish inland waters now belong to a single Eel Management Unit, and data will only be applied at the national scale, the sampling in inland waters will not be stratified spatially. Consequently, sampling inland waters will only be described in full under this section.

Landings in inland waters are just over 100 t. By-catch and discards in this fishery occurs, but this does rarely involve species under international management. Sampling is therefore concentrated on eel only, i.e. Scheme 2/3, with 100% of samples focused on Group 1 species. Our approach has been to collect six (6) samples of 125 (5*25 cm-classes) eels each for length, weight, life-stage (yellow, half-silver and silver) and sex. That sums up to 750 eels per year. The proportion of males in Swedish freshwaters is close to nil, thus they are not considered as significant in this context. As this fishery targets mainly silver eels we have not considered separate samples for the very few yellow eels landed. Sampling once a year during peak season in each lake seems appropriate at this stage to explore the spatial variation. All eels are aged and as a matter of practicality, weight, sex and maturity are measured in all eels at the same time. As spawner quality issues have been raised by EIFAAC/ICES WGEEL we include our routine analysis of prevalence and intensity of the swim-bladder parasite *Anguillicoides crassus* in this programme.

A total of 750 silver eels were planned to be sampled in 2011 and subsequently analysed with regard to length, weight, sex, maturity stage (silver index), age (growth) and infestation rate (prevalence and intensity) of the swim-bladder parasite *Anguillicoloides crassus*. Silver eels were to be taken from the peak season in the pound net fisheries in four lakes. From each of two of these lakes, 125 eels were sampled. The remaining two lakes are quite complex and were thus represented by samples from two sites each, i.e. in total six samples. The lakes chosen as representatives for the whole commercial fishery for eel in freshwater were Vänern, Mälaren, Hjälmaren and Ringsjön. The first three lakes were chosen because of their importance and the extent of the fishery. Lake Ringsjön was chosen as a representative for eel fisheries in “smaller/remaining lakes”.

Salmon

Sampling of the commercial salmon catches, and additionally caught sea trout, in the coastal métier (FPO_ANA_0_0_0) was carried out in the Gulf of Bothnia (ICES sub-divisions 30-31). Collected data include length, weight and sex of individual fish. Scales are collected from all fish in the samples to determine age, wild or reared origin as well as use in genetic studies.

River monitoring of wild salmon and sea trout stocks

In 2006-2008, river monitoring of Swedish wild salmon stocks was included in the NP. The monitoring consisted of annual electrofishing surveys of salmon and sea trout parr in wild salmon rivers, running of a smolt trap for emigrating smolts and maintaining counting of ascending salmon and sea trout spawners in fishladders in three rivers. In the new Commission Regulation valid for 2009-10, it is stated that countries should establish salmon index rivers, as defined by ICES, for counting of smolts, numbers of ascending spawners and estimating densities of parr. Because Sweden has a major part of the Baltic salmon rivers, this had major implications for the Swedish monitoring system. In line with the ICES-definitions, Sweden established three index rivers - two in the Gulf of Bothnia (Rivers Vindelälven and, Sävarån) and one in the Main Basin (River Mörrumsån), instead of the single partial small index river in use earlier (Sävarån).

Establishment of salmon index rivers is normally associated with major costs, because basic facilities are needed for the counting activities, but also because costs for running these investigations are substantial. In order to handle the new demands it was necessary to decrease the amount of monitoring in other non-index rivers. Furthermore SLU-Aqua co-operates with other bodies, both private companies and regional and local agencies and local organizations as well as another department at the Swedish University of Agriculture. These bodies are used as subcontractors and they also contribute with considerable amounts of money to the index river projects. SLU-Aqua is responsible for project management, and in some cases also detailed planning and reporting of results. These projects are seen as important parts of the new salmon management plan that is expected to replace the old SAP plan (1997-2010). As SLU-Aqua will not own any of the investments in fishladders, it will be considered as subcontracting costs.

The activities in salmon index rivers 2011 are as described in the text table below.

River	Smolt count	Adult count	Electro-fishing
Ume/Vindelälven, Sub-div. 31, a large river	Smolt trap (fyke net) operated	New built fishladder with counter and smolt leader used	No
Sävarån, Sub-div. 31, a small river	Smolt trap (smolt wheel) operated	Counting of ascending spawners using sonar equipment	Yes
Mörrumsån, Sub-div. 25, midsize river	Smolt trap (smolt wheel) operated	Use of existing fishladder (counter with camera)	Yes

In addition to the monitoring of the index rivers, operation of a fishladder in River Kalixälven and electrofishing is included in the NP. A new counter (with camera) for river Kalixälven was purchased in 2011, as planned.

Data from river monitoring are reported to the relevant ICES Working Group (WGBAST). Results from electrofishing surveys are collected in a national database covering all Swedish surveys (SERS). Other data are also collected and kept in databases that are partly operated by the SLU-Aqua. It is expected that it will take about one year to get all datasets in order.

Deviations in sampling:

Eel (*Anguilla anguilla*) freshwater

The planned pilot-study of length measuring of 12 000 silver eels, were not accomplished as the asked fishermen did not co-operate as expected.

Herring (*Clupea harengus*) sd 22-24

There are several reasons for not fulfilling the sampling level planned. Fishing for herring in the area is conducted mainly in quarter 1, 2 and 4. Only a few Swedish vessels are actively fishing in the area and most of the landings take place during night time which reduces the sampling opportunities. Also, some landings are delivered straight to purchaser, with the consequence that no sampling could be performed. Since staff from the control department actively focused on control of cod fishery during 2011 the number of samples collected from the pelagic fishery decreased. The reorganisation during 2011 also had impact on the organisation of sampling responsibilities.

Herring (*Clupea harengus*) sd30-31

Only sampling of commercially caught fish was included in planned minimum No and CV estimates (N commercial 917). In achieved No (N total 1839), 50% of the individuals from BIAS of Sweden and Finland (N survey Sweden 922) were added to individuals from the commercial sampling (N commercial 917).

Cod *Gadus morhua* sd 22-24 and sd 25-32

In the sea sampling cod was over-sampled according to what was planned. In the sea sampling program it is the number of trips rather than number of individuals the sampling is planned for. Therefore number of individuals can end up lower or above the planned numbers. The planned number is just a mean value based on historical data. No extra cost is involved to receive the higher number of individuals.

Salmon (*Salmo salar*)

Achieved number of samples at sea from the commercial fishery was lower than planned (72 %). These samples are collected from the coastal trap net fishery (SD 30, 31) where catches highly vary due to annual spawning run of salmon. Planned number of samples was not achieved due to a lower than expected spawning run in 2011. Low spawning run may be explained by a cold winter in 2010/2011 that has shown to reduce and delay number of ascending spawners. Reduced number of samples at sea was partly compensated for in sampling at market from the commercial LLD fishery in South Baltic. Achieved number of samples at market was 214 % of planned minimum number. Low spawning run also explain an achieved number of samples lower than planned in the recreational river fishery (63 %) as well as count of ascending fish in traps (71 %). Due to flood and high water level in several rivers only 55 % of original sites were possible to include in the survey of abundance of parr. Achieved number of measured individuals was 40 % of planned minimum number.

Sprat (*Sprattus sprattus*) IIIb-d

While both herring and sprat is caught in the pelagic fishery, the plan is to collect both sprat and herring from the same samples. Even though number of samples follows the numbers planned, very few individuals of sprat appear in the samples and the planned level of individuals were not reached.

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

So far, there has only been possible to use the COST tool for analysing CV for some parameters, also, COST has not been developed to deal with survey data. Therefore, Sweden developed new R-scripts using boot-strap for calculating CV on length, weight, sex and maturity by age and the methods are described in Annex Ia and Ib. For surveys, only data collected during quarter one was included in the analyses.

In Annex Ia and Ib details regarding the estimation of precision (mCV) reported in Table III.E.3 for Baltic herring, cod, sprat, flounder, eel and salmon are presented. For these species, the required precision target (CV) was well fulfilled for the variable “Length at age” and when applicable, likewise for the variable “Maturity at age”. However for the variable “Weight at age” the estimated CV values did not reach required target, except for eel in inland waters and the deficient results can be explained by the huge variation in weight, i.e. condition of the sampled fish. The precision target was not reached for the variable “Sex-ratio at age. For herring in sd30-31 and salmon CV estimates only include individuals from the commercial sampling.

As 2010 was the first sampling year for eel in fresh-water calculations on achieved precision target (CV) refer to the samples from 2010 only and the CV:s for 2011 will be presented next year. As reported last year one lake was missing in 2010 and therefore the total numbers analysed with respect to age was some 125 eels less than planned. In 2012 large numbers of eel will hopefully be measured at each of the six sites representing the commercial fishery for eel in freshwater to facilitate estimates of CV.

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

Source	Recommendation	Action
RCM Baltic 2011	<i>In order to be able to analyse the current sampling level of cod in the Baltic and suggest optimal sampling levels for future regional coordinated sampling, the data must be available in an agreed format and checked for errors. Data has to be uploaded in FishFrame. All MS should upload 2010 cod data into FishFrame before the end of October 2012.</i>	SWEDEN WILL UPLOAD DATA TO FISHFRAME AS REQUESTED TO MAKE THE ANALYSIS POSSIBLE.
RCM	<i>MS to look into discard sampling program</i>	SWEDEN WILL LOOK INTO THE DIFFERENT

Baltic 2011	<i>according to WKACCU 2008 guidelines (12 aspects).</i>	ASPECTS FOR THE DISCARD SAMPLING UPON REQUEST FROM THE CHAIR
RCM Baltic 2011	<i>Task sharing of age reading. The RCM Baltic recommends Sweden to investigate our capacity to read relevant age samples of eel and salmon.</i>	SWEDEN HAS CLARIFIED THAT WE ARE WILLING TO DO AGE READING OF SALMON . REGARDING EEL IT ´S STILL QUESTIONED IF AGE BASED MODELS WILL BE USED, UNTIL THEN NO AGREEMENTS CAN BE ESTABLISHED AND TASK SHARING BE DISCUSSED.
RCM Baltic 2010	<i>In order to be able to analyse the current sampling level of sprat in the Baltic and suggest optimal sampling levels for future regional coordinated sampling, the data must be available in an agreed format and checked for errors. Data has to be uploaded in Fishframe</i>	SWEDEN HAS UPLOADED THE REQUESTED DATA INTO FF.
RCM Baltic (2009)	<i>In order to use the time of the RCM more efficient and for the harmonisation of the NPs, including the quality checks, the 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>	SWEDEN IS RESPONSIBLE FOR COMPILING THE DATA FROM ALL MS TO BE USED IN RCM 2010.
RCM Baltic (2009)	<i>MS to use the average landing figures over the year 2007-2008 as the basis for ranking métiers within the NP 2011-2013</i>	DONE
RCM Baltic (2008)	<i>Member states are recommended to seek for task sharing when starting ageing new species .</i>	SE WILL SEEK FOR TASK SHARING IN THESE CASES
RCM Baltic (2006)	<i>THE RCM BALTIC RECOMMENDS THAT FINLAND AND SWEDEN WILL EVALUATE THE COLLECTION OF BIOLOGICAL DATA OF THE HERRING FISHERY IN THE GULF OF BOTHNIA IN ORDER TO ELABORATE CONGRUENT PROCEDURES. THE POSSIBILITIES TO HARMONIZE THE COLLECTION OF CORRESPONDING ECONOMIC DATA SHOULD BE EVALUATED.</i>	IN 2007 FINLAND AND SWEDEN HAVE CONDUCTED INTERCALIBRATION IN BOTH AGE READING (COMPARING METHODS) AND MATURITY STAGING OF HERRING. HARMONIZATION OF SAMPLING METHODS ARE UNDER DISCUSSION. IMPROVEMENT OF ALL ASPECTS REGARDING THE JOINT ACOUSTIC SURVEY IN SD30 ARE ALSO DISCUSSED AND A MEETING IN END OF MAY 2008 IS PLANNED FOR SUCH DISCUSSIONS. HOWEVER IT IS A GOAL OF SWEDEN TO CONTINUE THE WORK ON HARMONIZING BOTH THE BIOLOGICAL AND ECONOMICAL COLLECTION OF DATA.
RCM Baltic (Jan 2005)	<i>3.2 BALTIC RCM RECOMMENDS IN CASE WHERE MORE THAN 5 PERCENT OF THE NATIONAL QUOTA IS LANDED IN A FOREIGN COUNTRY, BILATERAL AGREEMENTS SHOULD BE MADE.</i>	BILATERAL AGREEMENTS HAS BEEN DONE YEARLY. AND FOR 2005 THIS WAS DONE BETWEEN SWEDEN AND DENMARK IN JANUARY 2005 AND SWEDEN AND GERMANY IN MAY 2005.
RCM Baltic (Jan 2005)	<i>5.1 THE RCM RECOMMEND THAT BOTH EASTERN AND WESTERN BALTIC COD, OTOLITHS WEIGHT SHOULD ON A ROUTINE BASIS BE COLLECTED AS A COMPLEMENT TO AGE READING. THIS MUST START FROM 2005.</i>	SWEDEN IS RECORDING WEIGHT ON COD OTOLITHS ON A ROUTINE BASIS.
RCM Baltic (Jan 2005)	<i>6.1 THE RCM RECOMMENDS THAT SAMPLING SHOULD BE CARRIED OUT THROUGH OUT THE ENTIRE TRI ANNUAL PERIOD.</i>	SWEDEN IS SAMPLING DATA ON OTHER BIOLOGICAL PARAMETERS EVERY YEAR.

III.E.4 Actions to avoid shortfalls

Eel (*Anguilla anguilla*) in freshwater

In order to minimise the risk of missing eel samples or opportunities to get the planned length data from some sites, continuous and intense contact with the fishermen involved will be prioritised.

Herring (*Clupea harrengus*) in sd 22-24

The communication and cooperation with the control department in SWAM will improve since the reorganisation will settle, and the staff from the control department will be more heavily involved in the collection of samples and we will strive for finding new ways in the routines to get the herring samples (sampling direct at purchaser).

Salmon (*Salmo salar*)

Achieved number of salmon to be sample is hard to plan due to unpredictable environmental constrains that influence number of individuals possible to sample. If spawning run remains low, increasing sample intensity should be considered.

Sprat (*Sprattus sprattus*) IIIb-d

The more general discussion of sampling design is ongoing in which problems like this is incorporated.

In general:

When revising NP next time, the tables will be reviewed more carefully. Moreover, when planning the sampling of the coastal fisheries, we will take into consideration to plan on shore sampling in higher extent due to the risk of unpredictable impact of bad weather conditions.

THE NORTH SEA AND EAST ARCTIC

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

All stocks sampled during 2011 for biological variables, age, length, weight, sex and sexual maturity are listed in table III.E.3. The variables are collected from different sources like survey, market or sea sampling and different sampling strategy has been used. For most stocks, the sampling sources are listed separately in order to keep track on the contribution of the different sources to the total.

To get catch-in-numbers (CANUM) and weight-in-catch (WECA) by age group, sampling of the landings is undertaken. Simple random sampling was used for pelagic stocks herring, sprat, cod, eel and witch flounder. The simple random sampling means that a fixed number of individuals were sampled randomly within market size category (if sorted) /unit (unit =area, quarter and gear) independent of landing size. All individuals in a sample were analyzed according to length, weight and age. For species landed ungutted also sex and maturity was sampled. For nephrops and pandalus no information on age is collected

Sampling strategy on surveys and onboard fishing vessels differs from market sampling and was performed as follows: all individuals (or a sub sample) were length measured and a fixed number per length class was sampled for age, sex, maturity and weight. For stocks sampled on surveys and onboard fishing vessels, the length can be given an age by using an Age-Length-Key.

International survey manuals give guidelines on number of individuals / length class to be sampled for age, sex and maturity. These were followed and the actual sampled number is therefore dependent on the amount of catch. “Planned minimum number “ presented for discard and survey in table III.E.3 refers to historical data and consequently percent achievement can therefore vary and look like it’s over – or undersampled.

Deviations in sampling:

Herring (*Clupea harengus*) IIIa

Sampling of herring is planned to take place in both Kattegat and Skagerrak (650 individuals /quarter and area). All quarters were covered (450-700 ind / q) for both areas except from Kattegat in quarter 2 (0 ind) because no fishing were undertaken and consequently no samples could possibly be collected.

Cod (*Gadus morhua*) IIIaS

Sampling was performed in all quarters but due to very low landings during 2011 (in total 41 tonnes) planned sampling level was simply not possible to reach. For cod collected in the sea sampling programs, number of trips rather than number of individuals are the levels to be achieved. That explains the under sampling in (IIIa S) and the over sampling (IIIa N) of cod which is received without extra cost.

Witch flounder (*Glyptocephalus cynoglossus*) IIIa

Sampling on sex and maturity was performed on individuals sampled during surveys. In addition, witch flounder was purchased from market and sampled onboard in the seasampling. Fish from the market was ungutted in order to get data on sex and maturity while individuals from sea sampling were sampled for age, length and weight only. That explains that the achieved numbers on sex and maturity was not fulfilled. In general it was not possible to reach the sampling targets due to a decline in activity of this fishery (see more details in section III.C.1)

Norway lobster (*Nephrops norvegicus*) FU4, IIIaN

In 2011 there was ice coverage during quarter 1 preventing the vessels to leave the harbour in combination of shortage of staff, total number of individuals sampled did not reach the planned level. (for more details see section III.C.1)

Sprat (*Sprattus sprattus*) IIIa

Sampling was planned to be performed in quarter 1 and 4 (500 individuals per quarter in total 1000 individuals) In NP 2011, the planned number is stated to be 2000 individuals, which is a mistake and will be changed to 1000. That means the percent achievement is 74%. In quarter 4, 550 individuals were sampled and the planned number was achieved. The deviation was in quarter 1, in which a large amount of the landings were done during night time and consequently no samples were possible to collect.

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

So far, there has only been possible to use the COST tool for analysing CV for some parameters, also, COST has not been developed to deal with survey data. Therefore, Sweden developed new R-scripts using boot-strap for calculating mCV on length, weight, sex and maturity by age and the methods are described in Annex Ia and Ib. For surveys, only data collected during quarter one was included in the analyses.

In Annex Ia and Ib, details regarding the estimation of precision (mCV) reported in Table III.E.3 for eel, herring, cod, plaice, witch flounder and sprat are presented. For these species, the required precision target (CV) was fulfilled for the variable “Length at age” and when applicable, for the variable “Maturity at age” for most of the species. For the variable “Weight at age” the estimated CV values did not reach required target and the deficient results can be explained by the huge variation in weight of the sampled fish. The precision target was not reached for the variable “Sex-ratio at age”.

The CV script used was designed to handle age disaggregated data and therefore no CV was calculated for Nephrops and Pandalus which is not based on age. This will be taken care of in the near future.

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

Source	Recommendation	Action
RCM NS&EA (2011)	<i>Investigate opportunities for ask sharing age reading. MS to investigate each task sharing opportunity with specific MS taking responsibility for each species and report for the chair of RCM NS&EA. Sweden is asked for taking lead in age reading of witch flounder.</i>	SWEDEN IS DOING AGE READING OF WITCH FLOUNDER FOR DENMARK WHICH IS INCLUDED IN THE BILATERAL AGREEMENT WITH DENMARK. SAMPLES HAS ALSO BEEN RECEIVED FROM UK.
RCM NS&EA (2010)	<i>MS are asked to start using the tool COST for calculation of CV for the Technical Report</i>	SWEDEN HAS PUT A LOT OF EFFORT IN ORDER TO START TO USE THE TOOL. STILL THERE ARE TOO MANY BUGS AND PARTS MISSING IN COST TO USE IT.
RCM NS & EA (2010)	<i>The RCM NS&EA recommends that relevant countries investigate the distribution of their landings from the named stocks in Table 12 in relation to the overall distribution across the stock area. Where they have no sampling plans for catches, they should consider if their component of the stock is adequately sampled, spatially and temporally by other MS.</i>	Mackerel (<i>Scomber scombrus</i>) IIIa and IV was picked out in table 12 for Sweden. Sweden do not plan to sample this stock while approximately 77 % of the Swedish landing is taken place in UK and 20 % in Norway.
RCM NS & EA (2009)	<i>In order to use the time of the RCM more efficient and for the harmonisation of the NPs, including the quality checks, the 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>	SWEDEN IS RESPONSIBLE FOR COMPILING THE DATA FROM ALL MS TO BE USED IN RCM 2010.
RCM NS & EA (2008)	<i>Stock variables: Minimum required taxonomical levels for identification</i>	AFTER APPROVAL BY STECF, SE WILL ADOPT THE CHANGES
RCM NS & EA (2008)	<i>Stock variables: Group 3 on a higher taxonomical level</i>	AFTER APPROVAL BY STECF, SE WILL ADOPT THE CHANGES
RCM NS & EA (2008)	<i>Stock variables: Recommended changes in G-status</i>	AFTER APPROVAL BY STECF, SE WILL ADOPT THE CHANGES
RCM North Sea & East Arctic (2007)	<i>THE RCM NS&EA RECOMMENDS THAT ALL MS TAKE PART IN THE CASE STUDY ON SPATIAL ASPECTS ON GROWTH PATTERNS FOR NORTH SEA COD BY SUBMITTING DATA TO FRANCE USING THE TEMPLATE IN ANNEX 6.</i>	NO DATA HAS BEEN SENT.
RCM North Sea (2005)	<i>7.1 RCM NORTH SEA EXPECTS THAT ALL LABS WILL UPDATE THE SPREADSHEET WITH THEIR COD SAMPLING INFORMATION ON A MONTHLY BASIS.</i>	SWEDEN HAS NOT UPDATED THE SPREADSHEET.
RCM North Sea (2005)	<i>8.1 RCM NORTH SEA RECOMMENDS THAT ALL COUNTRIES HAVING DATA ON NS COD PARTICIPATE IN</i>	SWEDEN WAS REPRESENTED BY ONE PARTICIPANT IN THE FISHFRAME

	<i>THE PROPOSED WORKSHOP ON FISHFRAME (CHAIR: HENRIK DEGEL, MID-JANUARY 2006, COPENHAGEN, DENMARK).</i>	WORKSHOP
RCM North Sea (2005)	<i>9.1 RCM NORTH SEA RECOMMENDED THAT DATA ARE SUBMITTED TO FISHFRAME, STARTING WITH THE 2004 AND 2005 DATA FOR NORTH SEA COD BEFORE 1 MAY 2006.</i>	DATA WILL BE DELIVERED BEFORE 1 ST JUNE 2006.
RCM North Sea (2005)	<i>17.1 THE RCM NORTH SEA REITERATES ITS 2004 RECOMMENDATION ON THE CONCLUSION OF FORMAL BILATERAL AGREEMENTS ON THE SAMPLING OF FOREIGN FLAG VESSELS, AND ON THE INCLUSION OF THESE AGREEMENTS IN THE MS' NATIONAL PROGRAMME PROPOSALS.</i>	BILATERAL AGREEMENTS BETWEEN SWEDEN AND DENMARK AND SWEDEN AND GERMANY WERE UPDATED IN FIRST QUARTER OF 2006.

III.E.4 Actions to avoid shortfalls

Herring (*Clupea harengus*) IIIa

Getting samples from the metiers actively fishing in quarter 4 is working fine. When landings are scarce the sampling is of course impossible to undertake. The problems of getting samples when landing is taken place during night time is a problem which is discussed and solutions are looked for.

Cod (*Gadus morhua*) IIIaS

Sampling directly at the auction by the staff has in general been very successful and cost effective and Sweden will continue with the sampling setup.

Norway lobster (*Nephrops norvegicus*) IIIaN

While fishing for nephrops is highly dependent on good weather conditions, the sampling can just follow the fishing activity. Sweden plan to follow the fishing activity.

Sprat (*Sprattus sprattus*) IIIa

Sweden plan to follow the fishing activity. In quarters with no fishing, consequently no sampling can be conducted. Planned number will be changed to 1000 in the update of the NP 2013.

III.F Transversal variables

III.F.1 Capacity

III.F.1.1 Achievements: results and deviation from NP proposal

No shortfalls and/or deviations exist in relation to what was stated in the national programme.

Capacity data was obtained from the fleet register. In order to segment the data accordingly the main gear type used. The dominance criteria to allocate each vessel to a segment were based on the number of fishing days used with each gear.

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

No shortfalls and/or deviations exist in relation to what was stated in the national programme.

Capacity data was collected exhaustively in the fleet register (Database Fartyg 2). All transversal data is reported un-clustered

III.F.2 Effort

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

No shortfalls and/or deviations exist in relation to what was stated in the national programme.

Data was acquired as defined in Appendix VIII of the Commission decision 2010/93/EC. All spatial data used to calculate time in area for vessels reporting in logbook, was based on best information from VMS, AIS (where applicable), Effort reports, logbook and inspection information (sighting etc.). The spatial data was stored trip by trip with information for each record on vessel, position (long./lat.), and time and data source. Information on activity and gear on-board was linked to each trip.

Vessel not obliged to keep logbook reported their effort information in the monthly coastal journal. Data on gear capacity and activity was collected as well as information on days at sea/fishing days. For simplicity reason calendar day was used instead of 24-hour periods for the calculation of activities of vessels under 8m/10m without logbook.

Effort calculation related to static gear did not include time in port since it was almost impossible to calculate with any precision. In small scale fisheries different vessels could be used for setting gears and collecting gears or collecting catch from gears. It is also possible that gears belonging to two different vessels (on territorial waters) is set by only one of the vessels and later collected by each vessel. In order to have conformity with management effort calculations, fishing days for static gears was calculated in accordance with management provisions for calculating effort for static gears. Thus, calculating of fishing days included time when a vessel was out of port with gears on board or in sea, without just being transiting.

Variable Data sources and methodologies	Variable Data sources and methodologies
Days at sea	Spatial data sources (described above) and coastal journals for vessels without logbook
Hours fished.	Effort data in logbook (haul by haul records) information
kW * Fishing Days	Fleet register and logbook/coastal journal
GT * Fishing days	Fleet register and logbook/coastal journal
Number of trips	Logbook/Coastal journal (gear information)
Number of rigs	Logbook/Coastal journal (gear information)
Number of fishing Operations	Logbook/Coastal journal
Number of nets, Length	Logbook/Coastal journal
Number of hooks, Number of lines	Logbook/Coastal journal
Numbers of pots, traps	Logbook/Coastal journal
Soaking time	Logbook/Coastal journal

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

No shortfalls and/or deviations exist in relation to what was stated in the national programme.

Effort data derived from the same datasets used to monitor quotas and effort limitations. Comprehensive validations were made during the database entry process (logbook, landing declarations, sales notes, Coastal journals, effort reports). Spatial data from logbook, VMS, effort reports, sightings etc were compiled trip by trip. The trip information was crosschecked in order to verify catch and effort area information in the logbook and to calculate time in different effort areas. Cross-checking of effort information in the monthly coastal journals was not made on a trip by trip base and not on a regular base.

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

No relevant recommendations have been made about the collection of effort data.

III.F.3 Landings

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

No shortfalls and/or deviations exist in relation to what was stated in the national programme.

Data was acquired as defined in Appendix VIII of the Commission decision 2010/93/EC.

Variable Data sources and methodologies	Variable Data sources and methodologies
Value of landings total and per Commercial species	Logbook/Landing declaration, Coastal Journal and salesnotes. Since all quantity in a landing does not necessarily end up in a salesnote, an average price for the species landed was used instead of the corresponding sales note. For monthly coastal journals an average for the month was used. The average prices were based on species, landing location and landing date.
Live Weight of landings total and per species	Logbook/Landing declaration and Coastal Journal. National conversion factors (same as for quota calculation) were used to calculate live weight from product weight.
Prices by commercial Species	Sales notes (no demanded 2010)
Conversion factor per species	National conversion factors (same as for quota calculation) were used to calculate live weight from product weight (only for AR).

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

No shortfalls and/or deviations exist in relation to what was stated in the national programme.

Landing data derive from the same datasets used to monitor quotas. Comprehensive validations were made during the database entry process (logbook, landing declarations, sales notes, Coastal journals, effort reports). Catch, landing and sales data as well as spatial data from logbook, VMS, effort reports, etc. was compiled trip by trip. The trip information was crosschecked in order to verify catch and catch area information in the logbook. Crosschecking of information in the monthly coastal journals was not made on a trip by trip base and not on a regular base.

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

No related recommendations have been made about the collection of landings data.

III.G Research surveys at sea

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

During 2011, Sweden has as planned undertaken five surveys in the Baltic Sea, Kattegat and Skagerrak.

In January, the Swedish Board of Transportation closed down the Swedish R/V ARGOS due to the fact that ceilings and walls in the aisles of the ship were covered with asbestos sheets. The Institute of Marine Research was in an awkward position, having to replace R/V Argos just a few weeks before running the IBTSq1. Because of the short notice we had to resort to our smaller vessel R/V MIMER which was not quite appropriate for these kinds of surveys. We had to reduce the number of hauls for the IBTSq1 and BITSq1 surveys and for the IBTSq1 survey we had to skip the MIK larvae trawl hauls altogether. For the IBTS survey in area IIIb, the Sound, the smaller vessel R/V Hålabben was used as a pilot study in order to avoid too much impact and trawl effort in the area which is a closed area for trawling. 2 hauls were made in each IBTS survey in this area. First time out with the Danish R/V DANA was IBTS 2011q3 and she was also chartered for the Swedish BIAS and BITS surveys during the autumn.

Sweden also participated as planned in the joint survey in area IIa.

A description of the different surveys undertaken in 2011 follows below and a summary is also presented in table III.G.1.

The Baltic International Trawl Survey (BITS) first and fourth quarter

The main aim of the survey is to estimate cod recruitment indices and cod abundance in the different Sub-Divisions in the Baltic. The survey has also the purpose to follow the development of the flounder and other flatfish populations. The BITS survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS).

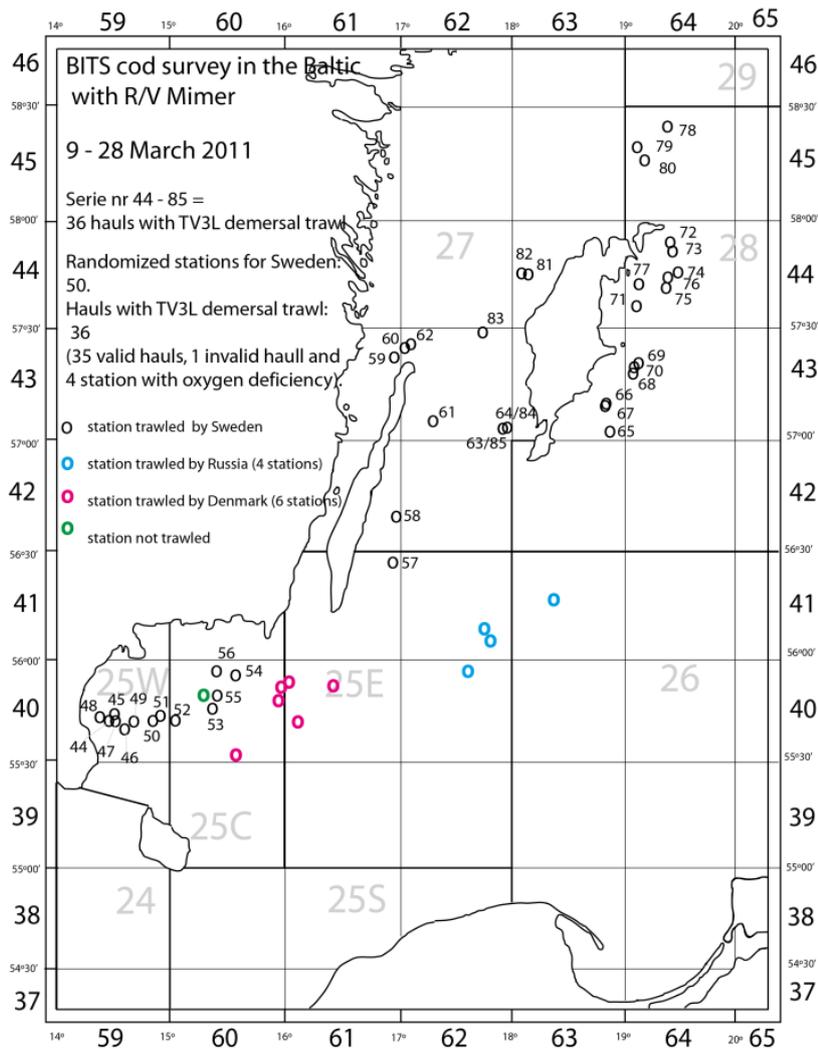
All Swedish survey data are stored in “Fish sample database” (IMR, Sweden) and sent to ICES DATRAS database for international data storage. The present surveys provide data to the ICES Baltic Fisheries Assessment Working Group (WGBFAS).

BITS first quarter

The survey was conducted during the period 9 – 28/3 using the TV3 demersal trawl according to the BITS manual (Anon., 2010a). Overall, 39 valid fish hauls were made (including four fictitious hauls which were not trawled because the oxygen concentration close to the bottom was less than 1.5 ml/l) in SD 25, 27 and 28, randomized from the Tow Database and these hauls were completed within 13 days at sea (Map1).

Sweden was originally assigned 50 randomly selected hauls but due to the vessel problem we could not realize all of them. Denmark and Russia kindly realized six respectively four of these hauls. R/V MIMER realized 39 of the remaining 40 hauls. The weather conditions made it impossible to trawl one station. During the whole survey, acoustic data were continuously recorded.

Almost all cod (totally 10 172) were measured and otoliths from 366 individuals were taken. From the catch of flounder (totally 4 167), otoliths were taken from 637 individuals. Overall, 14 fish species were caught during the survey and the catch was dominated by herring, sprat, cod and flounder, in terms of weight.



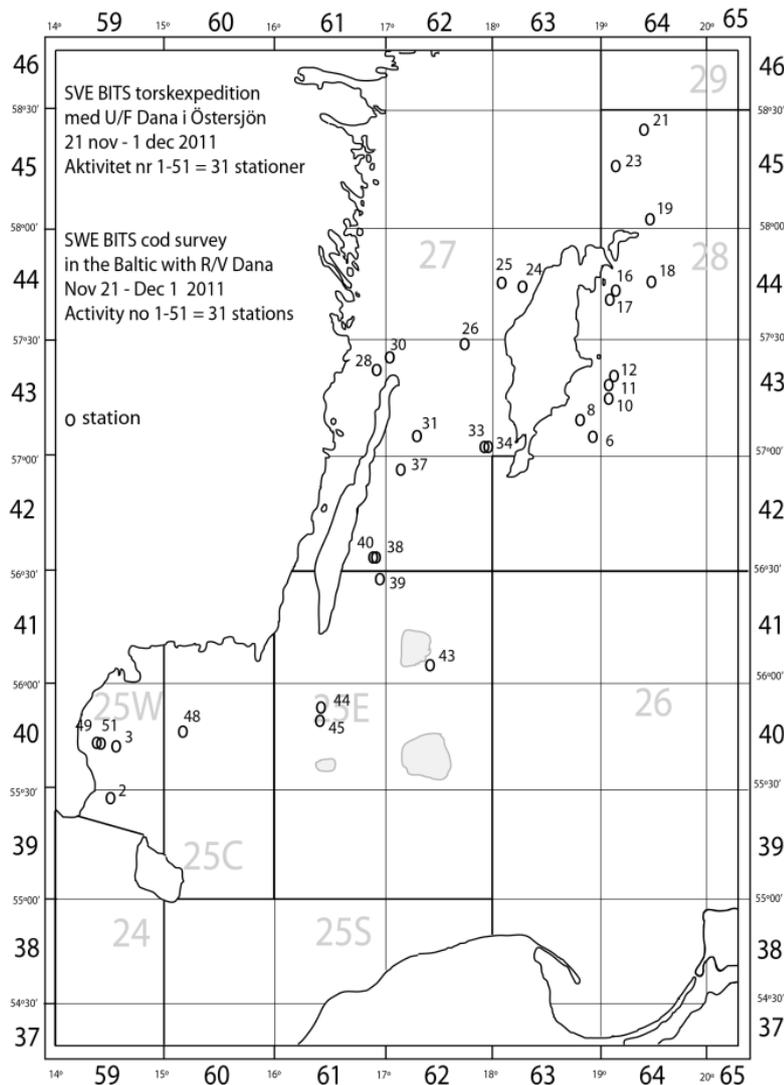
Map 1. Trawl stations BITS first quarter survey 2011.

BITS fourth quarter

The survey was conducted during the period 21/11 – 1/12 using the TV3 demersal trawl according to the BITS manual (Anon., 2010a). Sweden was assigned 30 randomly selected hauls in SD 25, 27 and 28 from the Tow Database. These hauls were realized during this survey within 9 days at sea.

Overall, DANA made 31 valid hauls with TV3L demersal trawl (Map 2) (including 10 fictitious hauls which were not trawled due to oxygen concentration close to the bottom was less than 1.5 ml/l). One complementary haul was made in SD 27. During the whole survey, acoustic data were continuously recorded.

Of the 5 658 cod caught, a majority was measured and otoliths were taken from 601 individuals. Flounder, of which 2 726 were caught, was also analysed and otoliths were taken from 852 individuals. Overall, 22 fish species were caught in the Baltic during the survey and the catch was dominated by herring, cod, sprat and flounder, in terms of weight.



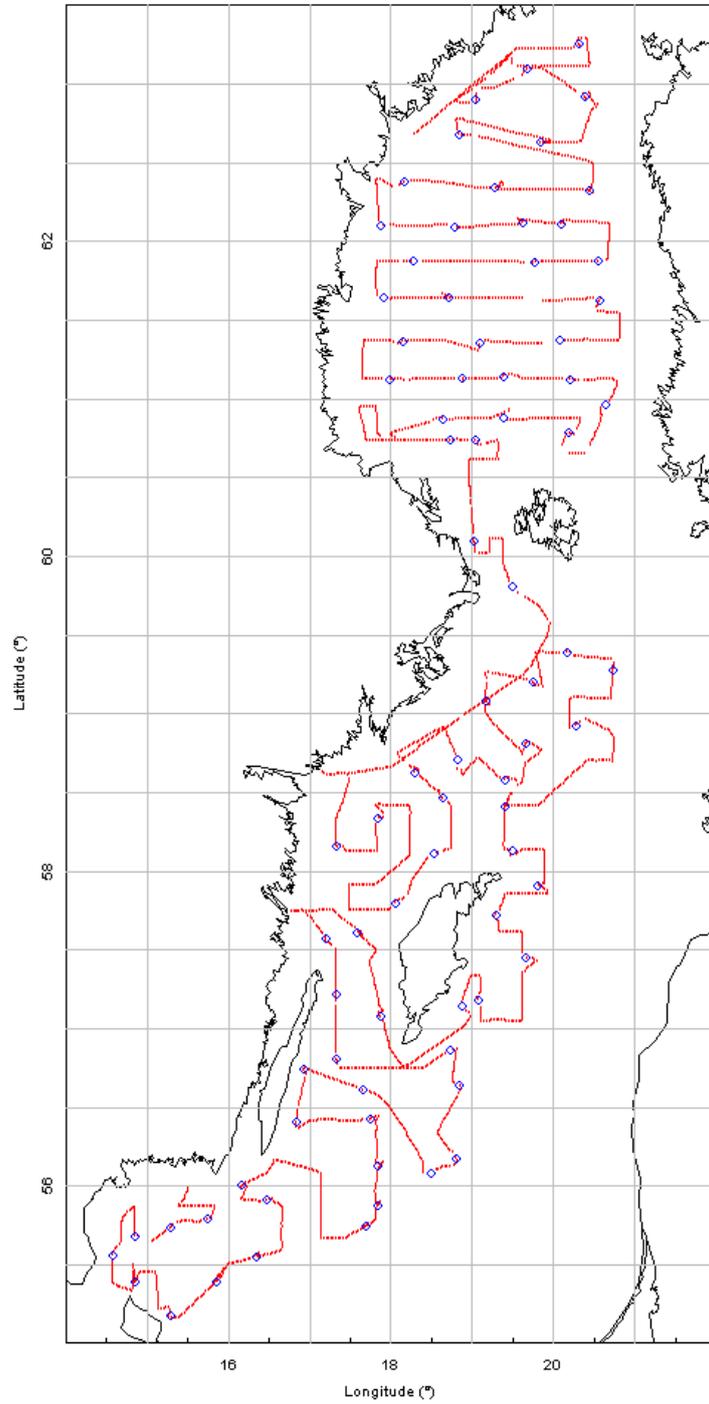
Map 2. Hauls with TV3L demersal trawl, BITS fourth quarter survey 2011 with DANA

BIAS Baltic International Acoustic Survey

The main objective of the survey is to assess clupeoid resources in the Baltic Sea.

The R/V Dana cruise started 22/9 at Gåsöfjärden and ended 19/10 in Karlskrona. All trawl hauls were made using the Fotö Model 06 pelagic trawl with 6 mm mesh bar in the codend. In total 84 trawl hauls were carried out and the cruise covered ICES subdivision 27, 30 and parts of 25, 26, 28 and 29 (Map 3). Sweden follows the recommendations given by WGBIFS that states that the maximum sampling effort should preferably be used and therefore produces an age key by taking otoliths from each ICES rectangle covered by the survey. Sampling of otoliths, weight and maturity was performed on 4 354 herring and 2 130 sprat.

The surveys in September/October are coordinated within the frame of the Baltic International Acoustic Surveys (BIAS). Data are stored in "Fish sample database" (IMR, Sweden) and sent for international data storage to WGBIFS in the BIAS database. The present survey provides data to the ICES Assessment Working Group (WGBFAS). Data is also available to be uploaded in FishFrame.



Map 3. Survey grid and trawl positions of R/V Dana during BIAS survey 2011

The International Bottom Trawl Survey (IBTS) first and third quarter

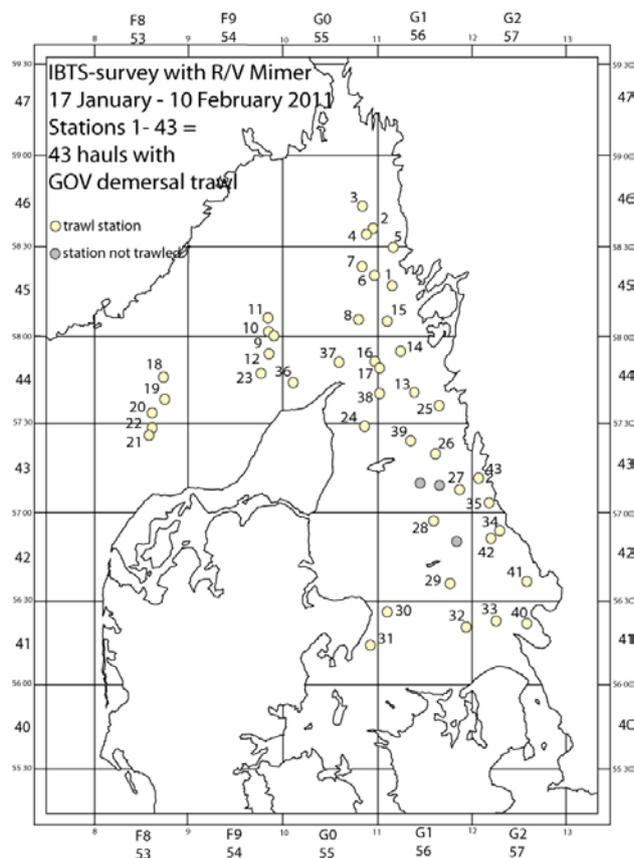
The main aim of the survey is to estimate abundance of commercial (cod, haddock, whiting, norway pout, herring, sprat, saithe and mackerel) and non commercial fish. Moreover, the otoliths of the commercial species are stored and subsequently analysed in order to assess abundance by age, in particular for the recruiting year classes in the North Sea, Skagerrak and Kattegat. The IBTS survey is coordinated by the ICES International Bottom Trawl Survey Working Group.

All survey data are stored in “Fish sample database” (IMR, Sweden) and sent to DATRAS, i.e. the ICES database, for international data storage. This survey currently provides data to the ICES Assessment working groups WGBFAS, HAWG and WGNSK.

IBTS first quarter

The survey was conducted using DANA for the Kattegat and Skagerrak area and Hålabben for the Sound. The major part of the survey was conducted using DANA between 17/1 – 10/2 using the GOV demersal trawl according to the IBTS manual (Anon., 2006b). Hålabben used a down scaled TV3 930 trawl, to 30 % of original size, on the 25-26 of January. In total, 45 valid hauls were towed during this survey within 16 days at sea (43 with DANA and 2 with Hålabben). Three stations were not possible to trawl due to lack of time. The hauls with GOV demersal trawl were made in the Skagerrak/Kattegat area (Map 4). In the Sound, the same stations as previous years were trawled, N. Hven and Lundåkrabukten.. As mentioned above we had to skip the MIK larvae trawl hauls altogether due to our vessel problems.

For the Kattegat and Skagerrak area, individual weight and maturity stage of 433 cod, 223 haddock, 14 saithe, 105 norway pout, 513 plaice, 1 535 herring and 715 sprat were recorded and their otoliths were stored. Overall 54 fish species were caught. . In the Sound, individual weight and maturity stage of 170 cod and 18 plaice was measured and otoliths were taken. In total 15 species were caught.

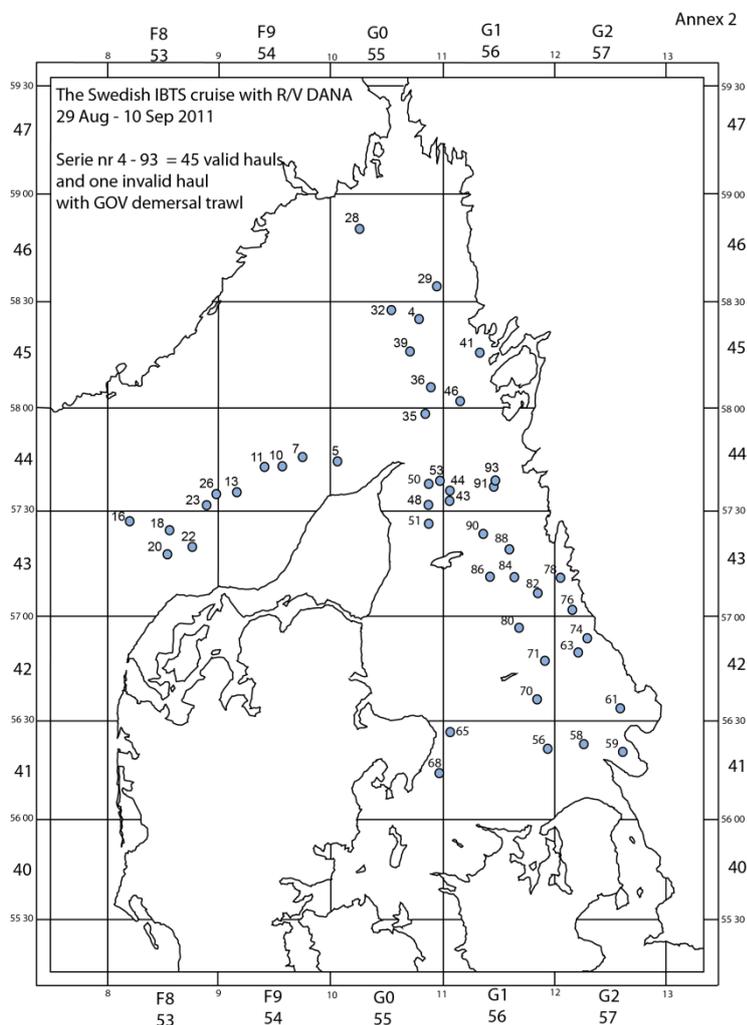


Map 4 Hauls with GOV demersal trawl IBTS first quarter survey 2011.

IBTS third quarter

The survey was conducted using DANA for the Kattegat and Skagerrak area and Hålabben for the Sound. The major part of the survey was conducted using DANA during the period 29/8 – 10/9 using the GOV demersal trawl according to the IBTS manual (Anon., 2006b), and Hålabben trawled in the Sound on the 10th and 11th of September with the same gear as in January. All planned hauls could be made within 12 days at sea. In total 47 valid hauls (45 hauls with DANA and 2 hauls with Hålabben). DANA covered the Skagerrak/Kattegat area (Map 5) and individual weight of 413 cod, 194 haddock, 106 saithe, 132 norway pout, 685 plaice, 148 witch, 1 365 herring and 704 sprat were recorded and their otoliths were stored. Overall 60 fish species were caught. Onboard Hålabben individual weight of 205 cod and 40 plaice were recorded and their otoliths were stored. In total 12 different species were caught.

On this survey we used, for the seventh time, a semi random stratified sampling design in the Skagerrak. The reason for this change is that the typography in this area is more divers compared to the rest of the North Sea.



Map 5. Hauls with GOV demersal trawl IBTS third quarter survey 2011.

Underwater TV (UWTV) survey on *Nephrops* grounds.

Uncertainty over landings figures and concern over some of the analytical assumptions upon which analytical assessments are based, has led to investigations into alternative approaches for providing *Nephrops* advice.

Nephrops stocks are limited to bottoms with suitable silty clay sediment where they live in burrows. This mud-burrowing species is protected from trawling while inside its burrow. Burrow emergence is known to vary with environmental (ambient light intensity) and biological (moult cycle, female reproductive condition) factors. Trawl surveys are therefore not ideal for *Nephrops*, and underwater TV (UWTV) has been developed as a means of estimating stock size from burrow densities.

The Marine laboratory in Aberdeen developed a fishery independent UWTV survey in early 1990's in order to estimate stock size from burrow densities. UWTV consists of a video camera mounted on a sledge that is towed slowly (0.5-0.8 knot) on the bottom by a vessel. *Nephrops* burrows are counted and converted into densities using information on the width of the view of the camera and length of the tow. Mean weight from biological samplings are used to estimate stock biomass

ICES Advisory Committee for Fisheries Management (ACFM) recommend that UWTV surveys should be used to provide biomass estimates for mud-burrowing animals like *Nephrops*.

The Swedish and Danish *Nephrops* fishery has got an increasing economic importance in recent years and it was agreed that Denmark and Sweden start a joint UWTV survey at around 90 stations on *Nephrops* grounds in the Skagerrak and Kattegat.

The UWTV survey during 2011.

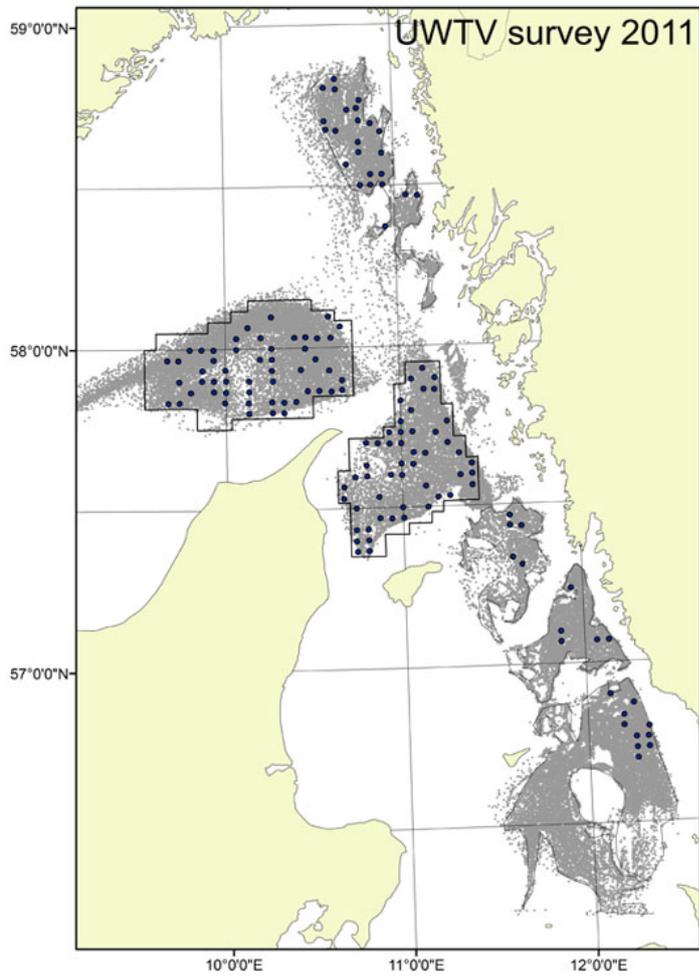
The 2011 UWTV survey started with equipment of a hydraulic controlled cable drum on aft deck and a hydraulic controlled ramp in the stern of the R/V Asterix. A ramp by the stern simplify the handling of the sledge and make it even possible to conduct the survey with one person on deck.

The survey is based on technical setups similar to those applied in the U.K. A standard set up has successfully been applied and highly good quality footages of the *Nephrops* burrow systems have been accomplished for 57 stations during 2011.

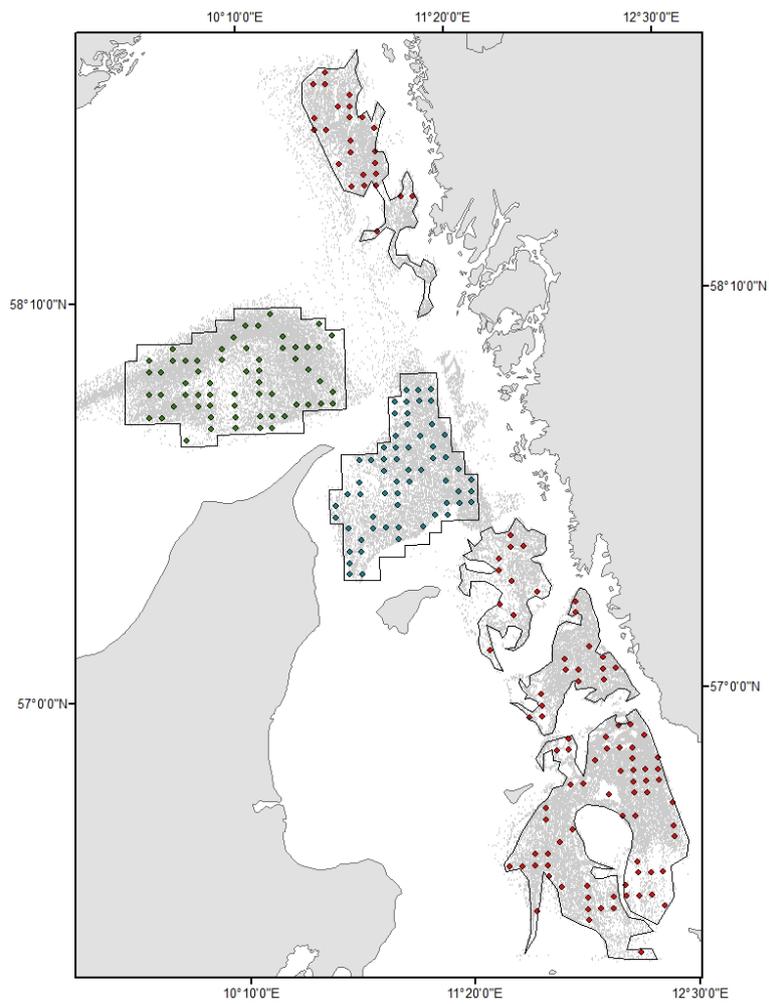
The distribution of the *Nephrops* stock in IIIa (Skagerrak and Kattegat) was estimated from Danish and Swedish VMS data from *Nephrops* trawler (>15 m) with landings consisting of at least 50% *Nephrops*. The *Nephrops* grounds in IIIa has been divided into six sub areas as shown in the map below.

The 2011 TV survey was conducted during the period 10/5 – 13/6 using the Danish sledge on the Swedish UWTV vessel and resulted in 57 valid hauls (of total 61) in sub division IIIa (10 hauls in area 3, 9 in area 4, 5 in area 5 and 33 hauls in area 6). Four stations were considered not valid due to turbidity and low visibility.

Subarea	km ²	Number of valid sledge hauls, (visited hauls in bracket) See Map 6.	Total number of randomly selected sledge hauls (of which 90 was to be done). See Map 7.
1	3 079		
2	1 905		
3	2 462	10 (11)	60
4	676	9 (11)	15
5	670	5 (5)	10
6	1 289	33 (34)	25
IIIa	10 081	57 (61)	110



Map 6. Showing all visited sledge stations during 2011.



Map 7. All randomly selected sledge stations in IIIa. Red dots are the Swedish (110) of which 90 was planned to visit

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

Generally, the surveys are following the international manuals set up for the different surveys. These manuals therefore establish the quality. Sweden is following the written manuals and is actively taking part in quality work done in the WGBIFS and WGIBTS. For 2011 a deviation during the IBTS survey first quarter was that no MIK-hauls could be taken using the smaller research vessel MIMER.

For the new UWTV survey deviation from the target of 90 hauls can be noted and was due to bad weather conditions. This survey is rather sensitive to weather and wave conditions, which might limit the possibility of reaching targets.

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

Recommendations set up in the different survey working groups have been taken care of by the Swedish participants taken part in the meetings.

III.G.4 Actions to avoid shortfalls

The shortfall of no MIK hauls in the IBTS survey will be solved in 2012 and 2013 by chartering the larger Danish R/V Dana.

IV. Module of the evaluation of the economic situation of the aquaculture and processing industry

IV.A Collection of economic data concerning the aquaculture

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

The planned sampling scheme and the results can be seen in table IV.A.2 in the tables whereas the results for individual variables can be found in table IV.A.3. The aquaculture population can be found in table IV.A.1.

Economic data for the reference year of 2009 was collected and compiled by Statistics Sweden in cooperation with the Swedish Board of Fisheries. Three sources of information were used: income tax declarations (census data), a questionnaire (Q1) sent to every aquaculture farm unit (census data) and a questionnaire (Q2) sent previous year to a non-probability sample of 46 aquaculture enterprises. All three parts were implemented and compiled by Statistics Sweden.

The planned segmentation presented in the National Programme 2008 and 2009 was made before the declaration of the Council Regulation (EC) No 199/2008 of 25 February 2008 and the Commission Decision of 6 November 2008. Therefore the final segmentation presented in the Technical Report 2010 is quite different from the one proposed in the National Programme 2009 - 2010. Moreover, due to confidentiality reasons the some of the segments had to be merged into clusters. For example the segment for salmon had to be merged with trout because the numbers of enterprises in the salmon segment were too few to be presented separately. Also mussels and oysters had to be merged due to confidentiality reasons. The final clustering of strata are presented in the table below:

Clustered strata for reporting	No of enterprises in clustered strata	Segments
Land based farms- On growing, Combined- Salmon and Brown trout	21	Land based farms – On growing – Salmon
		Land based farms - Combined - Salmon
		Land based farms-On growing-Brown Trout
		Land based farms-combined-Brown Trout
Land based farms - On growing –Other freshwater fish (Rainbow trout, Arctic char, Eel and other freshwater fish)	40	Land based farms - On growing - Arctic char
		Land based farms - On growing - Eel
		Land based farms - On growing - Other freshwater fish
		Land based farms - On growing - Rainbow trout
Land based farms - Combined – Other freshwater fish (Rainbow trout)	14	Land based farms - Combined - Arctic char
		Land based farms - Combined - other fresh water fish
		Land based farms - Combined - Rainbow trout
		Hatcheries and nurseries - Other fresh water fish
Cages - Salmon and Brown trout	6	Cages – Salmon
		Cages - Brown trout
Cages –Other freshwater fish(Rainbow trout and Artic Char)	62	Cages - Rainbow trout
		Cages - Arctic char
Shellfish and farming techniques – Long line – Mussels and Oysters	6	Shellfish farming techniques - Long line – mussels
		Shellfish farming techniques - Other – oysters
Shellfish farming techniques-Other technique-other shellfish (crayfish)	42	Shellfish farming techniques-Other technique-other shellfish (crayfish)

The segment other shellfish (crayfish) as proposed in the National program was not included for reference 2008 and 2009 but has been added for reference year 2010. For 2008 and 2009 it was not possible to give any reliable estimation on crayfish at all due to a non-updated register on crayfish farms.

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

The planned sample is presented as a range in Table IV A 2. The first figure refers to the questionnaire (Q2) based on a non-probability sample and the second figure refers to census data from both income tax declarations, administrative records and a questionnaire (Q1) sent to all aquaculture farmers. The sample for the second questionnaire (Q2) is a non-probability sample based on a priori information that comes from Q1 and income tax declarations. Therefore it could not be planned before the income tax declarations and the results of the first questionnaire (Q1, covering every farming unit) were compiled. Based on the results of the census data, Statistics Sweden made decisions on which enterprises were most representative for the second questionnaire (Q2). In order to be sure of covering large enterprises as well as enterprises from all other appropriate corporate structures and enterprises from every segment, Statistics Sweden decided on the appropriate sampling and sample size for this questionnaire (Q2). The questionnaire 2 was sent out 46 enterprises with response rate of 65 per cent.

The questionnaire 2 (Q2) for reference year 2008 was reused for reference year 2009. The primary objective of Q2 was to create a cost allocation key for costs that are not specified in income tax declarations. This cost allocation key cannot possibly have changed from one year to the next to such an extent that it will have negative effects on the quality of data. The cost and burden for enterprises of sending out Q2 every year is therefore not defensible. Instead we plan to use a longer time horizon so that Q2 will be sent out again in the following years in order to study possible changes in the cost allocation. However, the variable fish feed volume will not be possible to estimate for reference year 2009. For reference 2008 it was possible but only when strata were further clustered into, land based farming technique and cages, respectively.

Furthermore data on crayfish enterprises under data collection scheme C in table IV_A_3 is for reference year 2009 estimated using the created cost allocation key for mussel companies.

We define primary activity as follows. The questionnaire (Q1) is sent out to all aquaculture farm units. The farm units are clustered into enterprises. For each enterprise the value of sales from Q1 are compared to the income reported in tax declarations. Enterprises which have between 70% and 143% of their income from aquaculture (income from tax declarations/sales value from Q1) are considered to have their primary activity in aquaculture. These enterprises will represent the cost allocation, which is derived from income tax declarations combined with Q2, for all aquaculture activity in Sweden. By comparing value of sales from Q1 which covers all aquaculture activity in Sweden with income in tax declarations for the enterprises with aquaculture as their primary activity we get a figure which we can use to scale-up all the relevant variables so that they will represent all aquaculture activity in Sweden. It will still be the same allocation between variables as it is for the enterprises with aquaculture as their primary activity. In this way we cover all aquaculture in Sweden.

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

No relevant recommendations have been made about the collection of economic data on the aquaculture sector.

IV.A.4 Actions to avoid shortfalls

We have now established a population except for minor yearly changes of new enterprises entering aquaculture production and others ending their production which will cause natural changes in the population. The crayfish producers are not part of the population of 2008 since we still need to establish the correct number of farming units in order to cluster them into enterprises. The Swedish Board of Fisheries has been working on this task and was able to include crayfish farming for the reference year 2009. The basic method used to collect the data for reference year 2009 is the same as for 2008. We focus on keeping the method consistent from one year to the next in order to ensure full

comparability. We will send out Q2 again in the following years in order to ensure good quality of data.

IV.B Collection of data concerning the processing industry

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

The planned sampling scheme and the results can be seen in table IV.B.1 in the tables whereas the results for individual variables can be found in table IV.B.2.

The data was collected and processed by Statistics Sweden through the SRU register which is maintained by Statistics Sweden and consists of income tax declarations in Sweden. Part of the data is also collected from the Statistical Business Register which is a central register consisting of information on all registered enterprises in Sweden which is maintained by Statistics Sweden. One variable was collected through questionnaires by Statistics Sweden based on PPS-selection in the Statistical Business Register. The variable collected through questionnaires is subsidies. The questionnaires are the base for estimating an allocation key to allocate costs and income to variables not included in the company/financial accounts. The total sum of costs and total sum of income is unaffected. The data still holds for calculations such as gross value added and return on investment.

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data.

The achieved sample rate is 100 % for variables collected through company/financial accounts by Statistics Sweden.

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

Although all data is collected and processed by Statistics Sweden some variables are not available through company/financial accounts. One variable is collected through questionnaires namely subsidies. Enterprises are sometimes confusing energy cost with raw material. Statistics Sweden then has to make calculations using different sources which make it impossible to calculate an accuracy indicator for energy costs.

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

No related recommendations have been made about the collection of economic data on the processing industry.

IV.B.4 Actions to avoid shortfalls

In data collection from 2011 (reference year 2009) and onward the fish processing industry is an own stratum. This means that the questionnaire to estimate subsidies and energy costs 2010 (reference year 2009) has been sent out to 12 enterprises, compared to 13 during 2010 (reference year 2008). The response rate was 83 %.

V. Module of evaluation of the effects of the fishing sector on the marine ecosystem

V.1 Achievements: results and deviation from NP proposal

In 2011 the data requirements for the indicators 1-4 proposed in the Commission Decision 2010/93/EC Appendix XIII through was realized through the annual surveys. The data was collected in area IIIa in the first and third quarters and in area IIId in the first and fourth quarters 2011. The data collection was fishery independent and was carried out by the research vessel Mimer for the first half of 2011 and with R/V DANA for the second half using standard gear, thereby fulfilling the required precision level. The surveys are described in section III.G.1. Data on species, length frequencies and abundance was collected from all hauls including individual parameters such as age, length, sex and maturity from the target species of the survey following the sampling levels established in the manuals for the respective survey.

The economic indicator fuel efficiency of fish capture uses the variable cost of fuels as input. The collection is described in section III.B Economic variables. The survey conducted by the Swedish Agency of Marine and Water management is exhaustive.

The Swedish Agency for Marine and Water Management is collecting VMS and logbook information. And SLU aqua has access to the data upon request, but not online access.

In Sweden, VMS positions are reported once every hour for boats of 15m length or longer. Data can be aggregated at metier level 6 for environmental indicators 4, 5 and 6 and processed accordingly. The data are sent to SLU aqua upon request and is not accessible online.

V.2 Actions to avoid shortfalls

No shortfalls regarding the data collected.

VI. Module for management and use of the data

VI.1 Achievements: results and deviation from NP proposal

The development of databases during 2011 included projects for the data collection at the Institute of Coastal Research (ICR), for the data collection at the Institute of Marine Research (IMR) and for the data collection of economic and transversal data at the Swedish Board of Fisheries (SBF) / the Swedish Agency for Marine and Water Management (SvAM).

The Institute of Coastal Research continued their project of improving their new system including data entry and reporting of fish sample data. The development phases during 2011 covered:

- Continued work with the conversion of old data (this is a work that will continue for a long time).
- Improvements of the data entry system.
- Improvements of the data warehouse for reporting of the fish sample data.

Only a limited part of the system is under development for the ICR.

The Institute of Marine Research continued with their project of modernizing and refactoring the existing system including data entry and reporting of fish sample data. The development phases during 2011 covered:

- Continued work with the development of the data entry routines.
- Continued work with the migration of data from the current Oracle database to the new Oracle database.

For the data collection of economic data the project to modernize and rebuild the existing systems including data entry and reporting continued. The development phases during 2011 covered:

Processing industry

- Continued development of a data warehouse for the reporting of economic data.

Aquaculture industry

- Continued development of a data warehouse for the reporting of economic data.

Fishing sector

- Continued development of data entry routines.
- Continued development of a data warehouse for the reporting of economic data.

For the data collection of transversal data pilot study for a system for collection of transversal data, focused on modernizing and rebuilding the existing system, was started 2010. The development phases during 2011 covered:

- Finishing of the pilot study.
- Start of the project in order to develop the new system.

Due to the reorganisation during 2011, shortage of personal resources was obvious and the number of working hours in the project for the development of a new system for the data collection of economic and transversal data have not been as many as planned.

VI.2 Actions to avoid shortfalls

During a reorganisation phase it is obvious that some personal time is reallocated to other tasks. The speed in development of the new system for the data collection of economic and transversal will increase as the new organisation will settle.

VII. Follow-up of STECF recommendations

Sweden has taken the recommendations made by the Expert Working group (Evaluation of the 2010 Annual report and the evaluation of 2011 National Programme) under consideration while writing the Annual report for 2011.

Source	Recommendation	Action
EWG 11-08 June 2011	<i>EWG 11-08 recommends that information and description of the method/software used for calculation of CV's should be included (or referred to) in the AR if not provided in NP</i>	THE DESCRIPTION OF METHOD USED IS INCLUDED IN ANNEX IN AR.
EWG 11-08 June 2011	<i>EWG 11-08 recommends for the AR tables, Table II.B.1 (list of eligible meetings) that is provided by the Commission should be used and all meetings and not only the meetings attended should be provided.</i>	ACTION TAKEN
EWG 11-08 June 2011	<i>EWG 11-08 recommends that MS set-up a website on their data collection. They are obliged (by DCF regulation) to do so. No MS mentioned or referenced in the AR to such websites.</i>	ACTION TAKEN. http://www.havochvatten.se/en/start/environmental-research/-data-collection-framework.html
EWG 11-08 June 2011	<i>EWG 11-08 recommends that in cases that a research vessels is not available for carrying out a contribution to a DCF survey, that MS in question should demonstrate that it made all necessary efforts to carry out the survey. MS must make provisions so that such problems do not happen e.g. seek assistance from other MS or charter a vessel).</i>	THIS IS WHAT HAPPENED TO SWEDEN DURING 2011. THE SITUATION WAS SOLVED BY USING A SMALLER VESSEL AND TO CHARTER THE DANISH VESSEL DANA.
SGRN 10-01 June 2010	<i>Salmon river monitoring (Comment on NP Guidelines). Data collection on salmon river monitoring is difficult to present using standard tables. Some of the countries have "forced" salmon data collection details into the standard tables, others give salmon details in the text part only. A common approach is needed, since it would make it possible to evaluate the different MS in a consistent manner. This could be a task for the RCM. SGRN recommends that Sweden in correspondence with Estonia and Finland develop the table by September 2010 to be agreed by STECF by correspondence.</i>	NO GENERAL ACTION TAKEN OR DISCUSSED IN THE RCM BALTIC.
SGRN 10-01	<i>Some member states plan to sample data on stock-level variables for triennial species annually. Others plan a triennial approach. A common approach in the Baltic would be desirable. In many cases collection of annual data does not cause remarkable extra costs, since métier-level variables are sampled anyway. Task for RCM to decide? SGRN recommend that MS follow the RCM recommendations.</i>	SWEDEN HAS FOLLOWED THE DISCUSSION HELD IN THE RCM
SGRN 10-01	<i>Overall the MSs need to provide more detailed information on the methods used to collect and analyze economic variables which are not clearly defined in the commission decision (capital value and costs, value of quotas and fishing rights, FTE national, imputed value of unpaid labor and fuel efficiency of fish capture).</i>	SWEDEN HAS A DETAILED DESCRIPTION IN THE TEXT.
SGRN 10-01	<i>Overall most of the MSs need to provide more detailed information and description about the methodologies applied in the estimation process of the economic variables, the methods used to provide measures to assess data quality</i>	SWEDEN HAS A DETAILED DESCRIPTION IN THE TEXT.
SGRN 10-01	<i>Overall most MSs did not provide information for inactive vessels. SGRN invites the MSs to provide information on inactive vessels in the NPs.</i>	ACTION TAKEN
SGRN 2010-02	<i>Relevant MS to attend the RCM LDF in future if the</i>	SWEDEN IS NOT TAKEN PART

	<i>corresponding MS has a long-distance fishery in “Other regions” and to be equipped with the necessary data, background information and mandate to take decisions.</i>	IN THE RCM LDF DUE TO LITTLE ACTIVITY IN OTHER REGIONS
SGECA-09-02 (2009)	<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>	STATISTICS SWEDEN AND THE SWEDISH BOARD OF FISHERIES CORRECTS FOR NON-RESPONSES IN CENSUS DATA COLLECTION BY REWEIGHTING ESTIMATES USING AUXILIARY INFORMATION SUCH AS EFFORT OR VALUE OF LANDINGS.
SGECA-09-02 (2009)	<i>Due to concerns raised over the implications for data time series if clustering practices change over time, SGECA-09-02 recommends MS to take this into account when they segment the fleet in order to produce consistent time series over time.</i>	SWEDEN TAKES INTO ACCOUNT THESE ISSUES AND WORK TO ASSURE THAT CLUSTERING SCHEMES DOES NO CHANGE OVER TIME. SWEDEN USE THE SAME METHOD FOR CLUSTERING OVER TIME.
SGECA-09-02 (2009)	<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>	AS PART OF THE QUALITY EVALUATION OF THE FINAL DATA SWEDEN CONDUCTS THIS TYPE OF ANALYSIS.
SGECA/SGRN 09-02	<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>	SWEDEN HAS PROVIDED ESTIMATES OF PRECISION FOR ALL ECONOMIC VARIABLES IN THE ANNUAL REPORT BOTH FOR REFERENCE YEAR 2008 AND 2009.
SGRN June 2009 Evaluation of TR 2008	<i>The TR should be structured by region</i>	From 2009 onwards Sweden will follow the guidelines and structure the National programme and Technical report by region.
SGRN Febr 2009 Evaluation of NP 2009-2010	<i>General: Although the proposal metiers mergers are sensible there is no statistical evidence put forward to justify them.</i>	“The merging of metiers is for the planned sampling in 2009-2010 not always based on a thorough scientific analysis but on the knowledge of the exploitation pattern, management of the fisheries and “common sense”. Scientific analysis of the metiers and the possibilities

		to merge them based on scientific analysis will be a prioritised issue during the programme period. WKMERGE (2010), in which Sweden will participate will be of great value for the analyses of merging fisheries.
SGRN Febr 2009 Evaluation of NP 2009-2010	<i>General: Discard level for metiers which are not selected by ranking is not included in the NP</i>	Metiers not selected by the ranking have not been selected for discard sampling as “ <i>stand alone metiers</i> ”. The main reason for this is that the activity and catches in these metiers are low making sampling difficult and cost ineffective. Metiers not selected by the ranking system are further to a certain extent included in merged metiers that are sampled.
SGRN Febr 2009 Evaluation of NP 2009-2010	Economic and Transversal Variables: the method for raising the sample results to the total population is not clearly presented. more clear information of the method used for this calculation is needed.	Sweden has within this section in the Technical report 2009 specified the methods used for the calculations.
SGRN Febr 2009 Evaluation of NP 2009-2010	Metier-related variables; It is not clear if <10 are included.	Sweden are including all vessels for the ranking and vessels < 10 meters are included.

VIII. List of acronyms and abbreviations

ACE	Advisory Committee on Ecosystem
ACOM	Advisory Committee
BIAS	Baltic International Acoustic Survey
BITS	Baltic International Trawl Survey
COST	Common Open Source Tool
DATRAS	Database Trawl Surveys
GUI	Graphical User Interface
HAWG	Herring Assessment Working Group for the Area South of 62° N
HELCOM	Helsinki Commission
IBTS	International Bottom Trawl Survey
IBTSWG	International Bottom trawl Survey Working Group
ICR	Institute of Coastal Research
IFR	Institute of Freshwater Research
IMR	Institute of Marine Research
PGCCDBS	Planning Group on Commercial Catch, Discards and Biological Sampling
RCM Baltic	Regional Co-ordination Meeting for Baltic Sea
RCM NS & EA	Regional Co-ordination Meeting for North Sea and East Arctic
SERS	Database for electrofishing
SLU	Swedish University of Agricultural Sciences
SGRN	Study group for research Needs
STECF	The scientific, Technical and Economic Committee for Fisheries
SWAM	Swedish Agency for Marine and Water Management
WGBIFS	Baltic International Fish Survey Working Group
WGBFAS	Baltic Fisheries Assessment Working Group
WGBAST	Baltic Salmon and Trout Assessment Working Group
WGEEL	Working Group on Eels
WGFAST	Working Group on Fisheries Acoustics Science and Technology
WGNSSK	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak
NIPAG	The joint NAFO/ ICES Pandalus Working Group
VMS	Vessel Monitoring System
WKACCU	Workshop on methods and to evaluate and estimate the Accuracy of Fisheries Data used for Assessment
WKDRASS	ICES Workshop on the Design of Regional Age Sampling Schemes [
WKFLAT	Benchmark workshop on Flatfish
WKMERGE	Joint ICES-STECF Workshop on methods for merging fleet metiers for fishery based sampling

IX. Comments, suggestions and reflections

No comments, suggestions and reflections.

X. References

Anon. 2003. Game and recreational fishery in Sweden. Pilot study. Report by the Swedish Board of Fisheries dated 10 October, 2003.

Anon. 2006b. Manual for the International Bottom Trawl Surveys, Revision VII. Annex 1 IBTS North Sea Manual. ICES WGIBTS Report 2006.

- Anon., 2010a. Manual for the Baltic International Trawl Surveys. Addendum 1: WGBIFS BITS Manual 2010. ICES C.M. 2010/ SSGESST:07.
- Anon., 2010a. Report of the Baltic International Fish Survey Working Group (WGBIFS). ICES C.M. 2010/ SSGESST:07.
- Anon 2011a. Report of the 8th Liaison Meeting, Meeting between the Chairs of the RCMs, the chair of ICES PGCCDBS, the chair of PGMED, the ICES representative, the Chairs of STECF DCF EWG's and the European Commission, DG Maritime Affairs and Fisheries, Brussels, Belgium, 4th and 5th October 2011
- Anon 2011b. Report of the Regional Co-ordination Meeting for Baltic Sea, 2011. Copenhagen Denmark, 29th of August to 2nd September 2011.
- Anon 2011c. Report of the Regional Co-ordination Meeting for the North Sea & East Arctic, 2011. Hamburg, Germany, 26th to 30th September 2011.
- FIFS 2004:36. Fiskeriverkets Författningssamling. Swedish legislation
- Efron, B. & Tibshirani, R.J. 1993. An introduction to the Monographs on Statistics and Applied Probability no. 57. Chapman & Hall. 436 pp.
- Øresland, V. (2012). Cod catches onboard Swedish tour boats in the Sound during 2011. Aqua reports 2012:2. Swedish University of Agricultural Sciences, Lysekil, 19 pp.

XI. Annexes

Annex I a

Introduction to estimation of precision (mCV) using the bootstrap method

One statistically way of estimating dispersion of a variable or a parameter is to make bootstrap samples of the original data (Efron & Tibshirani 1993). While waiting for the standard tool (COST) for analysing precision, Sweden has calculated mean CV (mCV) in the stock sampling in the NP of DCR and DCF using a bootstrap method. The results from the analyses have been used to adjust the sampling size as well as to improve and optimise the sampling scheme.

Starting year 2010, the mCV calculations in the stock sampling (species below) were performed in “R” (using our own written scripts). Also starting 2010, estimation of mCV in metier/fisheries sampling was performed in “R”. Information regarding “R”, see <http://www.r-project.org/>

Estimation of precision (mCV) for length compositions in the Baltic Sea and the North Sea and Eastern Arctic

Here details regarding the precision levels given in Table III.C.5 – Sampling intensity for length compositions (all metiers combined) in part III.C Biological - metier-related variables are presented.

Method for estimating mCV for length compositions in selected Species-Fishing ground units (Data from Coastal fisheries) in Table III.C.5

Sampling of fisheries can be carried out on unsorted catches, landed fish and/or discard and we present mCV values for the Species-Fishing ground units (listed below) in the Swedish coastal fisheries (also listed below) accordingly to how sampling was performed.

We have from a sample of n individuals made bootstrap samples of n individuals of the original data. For each bootstrap sample we calculated mean length, and the bootstrap sampling was repeated 1000 times for each species. We calculated the dispersion of the mean length as the standard deviation across all bootstrap samples divided by the mean length from all bootstrap samples. This is our estimated “Precision (CV) achieved” in AR Table III.C.5.

In the mCV estimates, lengths from the stock sampled individuals are included. We have *not* divided the data on fisheries, and hence, the precision is calculated over fisheries with different length distributions, for example catches of herring with active gears (trawls) and passive gears (gill nets) are likely to have different length distributions. Also, silver eel and yellow eel have large differences in length distributions but are pooled. Thus, the estimated precision values do not reflect the precision of the length distribution in specific fisheries but in catches as whole. We have not weighted our results with how much of total catches that come from specific fisheries, e.g. for herring trawl catches can be several times higher than catches from gillnetters targeting herring. Furthermore, data is pooled from different seasons of the year (all months/quarters) and different fishing areas (several SD together).

Estimation of precision (CV) for volume of discards

The estimation of precision for volume of discards in Table III.C.5 was done using COST (Common Open Source Tool). In the calculations, data was stratified on fishing ground, quarter and fishery according to the Swedish sampling scheme.

Estimation of mean CV for Baltic herring, Flounder, Eel and Salmon in the Baltic sea and for Eel in the North Sea and Eastern Arctic and for Eel caught in freshwater.

Here details regarding the precision levels given in Table III.E.3 - Sampling intensity for stock-based variables in section III.E Biological – stock-related variables are presented.

Method for estimation of mCV for weight, length, sex-ratio respectively maturity at age

Sampling for Baltic herring (Subdivision 30-31), flounder, eel and salmon is based on random samples collected from landings and/or discard from selected fishing vessels. However, since there are very few samples per stratum (subdivision, month/quarter and gear), analytical methods for calculating coefficient of variation (CV) is not appropriate, and the bootstrap method was used instead (see WKSCMFD 2004).

When calculating mCV, each subdivision, quarter and gear was considered as the standard sampling unit (exceptions explained below in the table headings). The estimated mCVs at each age are presented for each species and sampling unit in **Tables 1-5 (a)** below.

We have from a sample unit of n individuals made bootstrap samples of n individuals of the original data. For each bootstrap sample we calculated mean weight, length, sex ratio and maturity at age. The bootstrap sampling was repeated 1000 times for each data set. We calculated the dispersion of mean values as the standard deviation across all bootstrap samples. However, as dispersion tends to increase with increasing size of individuals we, for weight and length at age, divided the standard deviation with mean values of weight and length at class, respectively. This is our estimated mCV. Note that we did not do this correction for sex ratio and maturity as there is no reason to believe dispersion should change with mean values in any systematic way as these were proportions. Instead, for these two variables, we kept standard deviation of the means over all 1000 bootstrap sample as our estimate of dispersion of mean values.

In the cases where there were fewer than 50 individuals for a quarter and subdivision, quarters were merged to increase sample size.

Prior to the age analyses of herring and eel, length stratified age samples were taken from the original randomly collected individuals from the landings and/or discard. Here, the probability of an individual to be included in the bootstrap sample was related to its occurrence in a complementary random length sample from the same catch. This sampling method ensures in a cost-efficient way, that the length distributions in the stratified bootstrapped age sample were similar to the length distributions in a corresponding larger random age read sample.

For flounder, sexes have been separated since they differ substantially in their growth and thereby in their abundance in the catches (and sampling). For eel, silver eel (mature) and yellow eel (immature) are caught in different gears, and therefore, both sampling and estimation of mCV are done separately for the two stages of the species. From freshwater where silver eels are the main target stage for the fishery, the very few yellow eels were omitted from analyses. Also, the eels caught are almost exclusively females and in the mCV estimates the very few males were excluded since females and

males also in these species differ very much in their growth. Thus, since the eel fishery indirectly is stratified on sex and maturity, the mCV for these two variables is not calculated. Furthermore, depending on NP sampling strategy, the estimates for eel in marine waters are done either per quarter or per fishing season. From freshwater all samples were taken during peak season of the silver eel fishery only. For salmon, mCV for maturity is not included in the NP. Furthermore, it was not possible to sample sex-ratio for all Salmon, see Table 5. Finally, in all estimations of mCV only commercially caught individuals have been included.

Prior to the calculations, individuals with missing values for age, sex or maturity (including fish with abnormal gonads) were dismissed. Also, regarding the variables length and weight, it is crucial when estimating mCV to have biological relevant samples and therefore, fish judged as outliers due to any sampling error, were not included in the calculations.

Finally, the mCV for each subdivision and quarter was calculated as a grand average of mCV from each age class, weighted for how many individuals there were in the different age classes. For flounder, the grand average was calculated for females and males separately. Hence, we used data from all age classes but weighted data relative to the abundance in each age class. Estimated grand mCV for each sampling unit is presented in **Tables 1-5 (b)**.

Calculation of precision target in Table III.E.3

The “Achieved precision target (CV)” in AR Table III.E was then calculated as the average of mCV values over all quarters and all subdivisions for each species. Except for eel in marine waters that was divided between two fishing grounds in the Baltic Sea Region and one fishing ground in the North Sea and Eastern Arctic Region. Here the two stages of the species were pooled. In eel from freshwater all lakes and sites were combined.§

Table 1a.) For each age, mCV of weight at age (CV_W), length at age (CV_L), sex-ratio (CV_Sex) at age and maturity at age (CV_Mat) achieved for **Baltic herring** and sampling unit “SD, quarter (Q) and gill nets (GNS)” in R out-put format. (AgeC) is age class and (nAge) is number of individuals in each age class in original sample. (CV_AC) is standard variation of the mean proportion of age class x in the population.

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
30	2	GNS	Both	3	5	8.596	4.802	40.112	0	81.757
30	2	GNS	Both	4	3	5.67	1.705	32.438	0	57.512
30	2	GNS	Both	5	12	3.013	1.07	25.539	0	44.914
30	2	GNS	Both	6	11	3.219	1.331	16.687	0	32.587
30	2	GNS	Both	7	11	2.435	0.856	14.684	0	29.357
30	2	GNS	Both	8	20	2.81	0.885	10.362	0	18.093
30	2	GNS	Both	9	65	1.39	0.498	5.45	0	8.441
30	2	GNS	Both	10	21	2.355	0.669	8.791	0	16.711
30	2	GNS	Both	11	18	3.123	1.008	2.037	0	21.295
30	2	GNS	Both	12	11	5.472	1.747	16.24	0	31.605
30	2	GNS	Both	13	14	7.025	2.065	21.48	0	38.84
30	2	GNS	Both	14	13	5.464	1.559	20.138	0	34.416
30	2	GNS	Both	15	4	16.139	7.627	35.093	0	73.404
30	2	GNS	Both	16	2	9.679	1.581	42.046	0	83.737
30	2	GNS	Both	17	3	10.659	2.488	26.725	0	75.352
30	2	GNS	Both	19	1	0	0	0	0	138.524
31	2	GNS	Both	3	4	15.039	3.797	41.727	0	88.804
31	2	GNS	Both	4	4	9.412	3.762	24.313	0	54.524
31	2	GNS	Both	5	30	3.166	0.888	10.738	0	20.33
31	2	GNS	Both	6	46	1.851	0.517	6.831	0	12.667
31	2	GNS	Both	7	12	1.633	0.685	10.909	0	20.634
31	2	GNS	Both	8	17	2.774	0.873	10.186	0	18.692
31	2	GNS	Both	9	21	2.547	0.651	9.057	0	17.36
31	2	GNS	Both	10	19	2.12	0.659	9.509	0	16.782
31	2	GNS	Both	11	11	2.94	1.044	15.283	0	29.547
31	2	GNS	Both	12	16	3.753	1.333	15.363	0	27.962
31	2	GNS	Both	13	7	7.357	1.681	35.89	0	57.723
31	2	GNS	Both	14	9	7.451	1.863	27.448	0	47.322
31	2	GNS	Both	15	3	5.152	0.565	0	0	83.342
31	2	GNS	Both	16	2	1.567	0.116	0	0	137.006
31	2	GNS	Both	17	2	0	0	0	0	153.466
31	2	GNS	Both	18	1	0	0	0	0	130.774
31	2	GNS	Both	19	1	0	0	0	0	137.499

Table 1a. Cont.

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
30	3	GNS	Both	2	6	9.393	4.197	32.547	0	77.761
30	3	GNS	Both	3	21	6.216	1.28	19.395	0	37.026
30	3	GNS	Both	4	9	5.578	1.605	32.902	0	53.788
30	3	GNS	Both	5	17	3.539	1.081	14.2	0	26.685
30	3	GNS	Both	6	19	3.944	0.727	15.153	0	28.156
30	3	GNS	Both	7	12	3.525	0.748	12.911	0	24.334
30	3	GNS	Both	8	8	3.555	0.971	14.131	0	27.451
30	3	GNS	Both	9	44	1.25	0.405	5.948	0	10.064
30	3	GNS	Both	10	10	2.377	1.057	13.482	0	26.503
30	3	GNS	Both	11	17	4.85	1.65	13.409	0	25.77
30	3	GNS	Both	12	24	2.708	0.768	11.877	0	22.86
30	3	GNS	Both	13	11	2.057	0.649	13.717	0	27.484
30	3	GNS	Both	14	11	2.227	0.645	11.566	0	24.884
30	3	GNS	Both	15	11	9.388	2.195	19.66	0	36.389
30	3	GNS	Both	16	7	5.443	1.47	17.652	0	31.783
30	3	GNS	Both	17	4	4.155	0.27	23.098	0	41.274
30	3	GNS	Both	18	3	6.4	2.055	12.064	0	56.498
30	3	GNS	Both	19	2	3.043	0	45.678	0	95.393
30	3	GNS	Both	20	1	0	0	0	0	60.54
30	3	GNS	Both	21	1	0	0	0	0	95.618
31	3	GNS	Both	1	19	4.329	1.742	86.282	17.185	40.022
31	3	GNS	Both	2	48	1.869	0.633	6.527	3.767	12.727
31	3	GNS	Both	3	42	2.424	0.735	6.5	0	11.736
31	3	GNS	Both	4	48	3.733	1.037	6.776	0	12.583
31	3	GNS	Both	5	50	2.772	0.856	6.755	0	11.74
31	3	GNS	Both	6	18	7.265	2.326	14.28	0	27.148
31	3	GNS	Both	7	7	10.176	2.61	22.724	0	43.466
31	3	GNS	Both	8	7	12.032	3.503	0	0	44.588
31	3	GNS	Both	9	10	14.467	3.417	22.03	0	38.24
31	3	GNS	Both	10	7	12.64	4.244	30.871	0	57.794
31	3	GNS	Both	11	1	0	0	0	0	140.829
31	3	GNS	Both	12	1	0	0	0	0	131.873
31	3	GNS	Both	13	1	0	0	0	0	131.366
31	3	GNS	Both	17	1	0	0	0	0	101.408

Table 1b.) Grand mCV of weight at age (Weight), length at age (Length), sex-ratio at age (Sex) and maturity at age (Mat) achieved for **Baltic herring** and sampling unit “SD, quarter (Q) and gill nets (GNS)” in R out-put format. (Age) is the grand average of SD over all age classes of the mean proportion in age class x.

SD	Q	Gear	Sex	N	Weigh%	Length%	Sex%	Mat%	Age%
30	2	GNS	NA	214	2.795	0.921	10.094	0	0.016
31	2	GNS	NA	205	2.713	0.821	10.699	0	0.022
30	3	GNS	NA	238	3.058	0.843	12.202	0	0.025
31	3	GNS	NA	260	3.634	1.085	9.712	1.189	0.03

Table 2 a.) For each age, mCV of weight at age (CV_W), length at age (CV_L) and maturity at age (CV_Mat) achieved for **flounder**, females (F) and males (M) separated, and sampling unit “SD, quarter (Q) and bottom trawlers (OTB)” in R out-put format. . (AgeC) is age class and (nAge) is number of individuals in each age class in original sample. (CV_AC) is standard variation of the mean proportion of age class x in the population.

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
25	1	OTB	F	3	6	13.337	4.461	NA	0	39.342
25	1	OTB	F	4	53	3.128	0.888	NA	0	10.951
25	1	OTB	F	5	20	5.984	1.816	NA	0	20.917
25	1	OTB	F	6	14	9.446	3.007	NA	0	25.758
25	1	OTB	F	7	7	9.599	3.459	NA	0	36.132
25	1	OTB	F	8	31	5.828	1.344	NA	0	15.939
25	1	OTB	F	9	4	16.174	2.355	NA	0	47.832
25	1	OTB	F	11	3	15.966	3.855	NA	0	53.408
25	1	OTB	F	12	1	0	0	NA	0	83.649
25	1	OTB	M	3	14	4.964	1.909	NA	0	23.958
25	1	OTB	M	4	22	3.776	1.377	NA	0	17.952
25	1	OTB	M	5	6	5.316	2.712	NA	0	39.818
25	1	OTB	M	6	9	5.56	1.923	NA	0	31.656
25	1	OTB	M	7	1	0	0	NA	0	80.675
25	1	OTB	M	8	8	5.854	1.839	NA	0	31.19
25	4	OTB	F	3	46	4.535	1.476	NA	0	11.386
25	4	OTB	F	4	27	7.069	2.313	NA	0	17.608
25	4	OTB	F	5	14	9.642	3.723	NA	7.377	26.502
25	4	OTB	F	6	13	7.065	2.305	NA	0	27.196
25	4	OTB	F	7	10	11.921	3.437	NA	0	31.085
25	4	OTB	F	8	8	8.721	2.638	NA	0	33.95
25	4	OTB	F	9	2	13.851	5.509	NA	0	60.031
25	4	OTB	F	11	5	17.755	5.209	NA	0	43.62
25	4	OTB	F	12	2	6.682	1.577	NA	0	61.05
25	4	OTB	F	15	1	0	0	NA	0	79.663
25	4	OTB	M	2	2	5.354	1.229	NA	0	62.765
25	4	OTB	M	3	31	3.567	1.176	NA	0	13.686
25	4	OTB	M	4	14	5.645	1.756	NA	0	24.418
25	4	OTB	M	5	8	9.046	3.153	NA	0	33.536
25	4	OTB	M	6	2	14.357	4.172	NA	0	61.669
25	4	OTB	M	7	3	10.7	3.834	NA	0	51.322
25	4	OTB	M	8	8	5.962	2.457	NA	0	33.121
25	4	OTB	M	10	1	0	0	NA	0	78.164
25	4	OTB	M	12	2	3.933	0.525	NA	0	62.533
25	4	OTB	M	13	1	0	0	NA	0	83.85
25	4	OTB	M	15	1	0	0	NA	0	79.803
25	4	OTB	M	17	1	0	0	NA	0	76.07

Table 2 b.) Grand mCV of weight at age (Weight), length at age (Length) and maturity at age (Mat) achieved for **flounder**, females (F) and males (M) separated, and sampling unit “SD, quarter (Q) and bottom trawlers (OTB)” in R out-put format. (Age) is the grand average of SD over all age classes of the mean proportion in age class x.

SD	Q	Gear	Sex	N	Weigth%	Length%	Sex%	Mat%	Age%
25	1	OTB	F	139	6.174	1.718	NA	0	0.029
25	1	OTB	M	60	4.695	1.756	NA	0	0.044
25	4	OTB	F	128	7.379	2.407	NA	0.812	0.041
25	4	OTB	M	74	5.274	1.752	NA	0	0.068

Table 3 a.) For each age, mCV of weight at age (CV_W) and length at age (CV_L) achieved for **silver eel**, females (F) only, and sampling unit “SD and pound nets (FPN)” in R out-put format. (AgeC) is age class and (nAge) is number of individuals in each age class in original sample. (CV_AC) is standard variation of the mean proportion of age class x in the population. In freshwater the sampling site and lake is given instead of SD.”

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
23	4	FPN	F	4	1	0	0	NA	NA	107.735
23	4	FPN	F	6	2	40.414	13.55	NA	NA	73.115
23	4	FPN	F	7	1	0	0	NA	NA	111.951
23	4	FPN	F	8	11	9.28	2.834	NA	NA	27.088
23	4	FPN	F	9	13	9.084	2.764	NA	NA	25.273
23	4	FPN	F	10	23	12.052	3.413	NA	NA	20.861
23	4	FPN	F	11	40	6.281	1.554	NA	NA	12.914
23	4	FPN	F	12	18	11.466	3.173	NA	NA	22.558
23	4	FPN	F	13	11	9.534	3.289	NA	NA	28.684
23	4	FPN	F	14	14	11.904	3.541	NA	NA	23.85
23	4	FPN	F	15	26	8.246	2.565	NA	NA	18.675
23	4	FPN	F	16	15	10.145	3.188	NA	NA	26.603
23	4	FPN	F	17	12	9.331	3.45	NA	NA	28.069
23	4	FPN	F	18	4	14.99	5.472	NA	NA	52.077
23	4	FPN	F	19	2	15.662	3.85	NA	NA	57.388
23	4	FPN	F	20	3	17.151	4.26	NA	NA	64.753
23	4	FPN	F	21	2	7.861	0.665	NA	NA	76.012
23	4	FPN	F	23	2	9.266	0.925	NA	NA	74.024
23	4	FPN	F	24	2	9.409	0.161	NA	NA	81.997
23	4	FPN	F	25	1	0	0	NA	NA	75.629
23	4	FPN	F	28	1	0	0	NA	NA	118.823
24	3-4	FPN	F	6	4	12.055	5.17	NA	NA	49.527
24	3-4	FPN	F	7	2	1.943	0.508	NA	NA	54.116
24	3-4	FPN	F	8	7	20.6	5.748	NA	NA	39.389
24	3-4	FPN	F	9	17	15.289	3.559	NA	NA	24.029
24	3-4	FPN	F	10	24	8.075	2.606	NA	NA	19.079
24	3-4	FPN	F	11	30	7.437	2.048	NA	NA	16.729
24	3-4	FPN	F	12	18	8.374	2.535	NA	NA	22.539
24	3-4	FPN	F	13	20	10.143	3.186	NA	NA	21.778
24	3-4	FPN	F	14	21	9.649	2.539	NA	NA	21.803
24	3-4	FPN	F	15	26	6.24	1.98	NA	NA	18.739
24	3-4	FPN	F	16	15	12.217	3.183	NA	NA	23.914
24	3-4	FPN	F	17	6	9.412	2.921	NA	NA	38.552
24	3-4	FPN	F	18	7	24.361	5.399	NA	NA	35.826
24	3-4	FPN	F	19	4	28.854	9.445	NA	NA	54.256
24	3-4	FPN	F	20	6	9.825	4.41	NA	NA	40.107
24	3-4	FPN	F	21	1	0	0	NA	NA	82.288
24	3-4	FPN	F	22	1	0	0	NA	NA	100.332

Table 3a. Cont.

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
25	3	FPN	F	8	3	17.417	3.336	NA	NA	47.796
25	3	FPN	F	9	4	17.98	4.985	NA	NA	50.631
25	3	FPN	F	10	17	7.177	2.369	NA	NA	23.474
25	3	FPN	F	11	33	4.927	1.428	NA	NA	15.165
25	3	FPN	F	12	25	4.714	1.473	NA	NA	17.464
25	3	FPN	F	13	18	7.884	2.298	NA	NA	22.74
25	3	FPN	F	14	31	8.4	2.801	NA	NA	20.023
25	3	FPN	F	15	28	4.562	1.537	NA	NA	17.718
25	3	FPN	F	16	21	6.514	2.281	NA	NA	21.618
25	3	FPN	F	17	12	8.086	2.642	NA	NA	26.301
25	3	FPN	F	18	9	9.989	2.439	NA	NA	30.043
25	3	FPN	F	19	7	15.213	4.77	NA	NA	40.725
25	3	FPN	F	20	4	20.285	5.102	NA	NA	45.603
25	3	FPN	F	21	3	9.237	2.129	NA	NA	56.046
25	3	FPN	F	22	1	0	0	NA	NA	120.04
25	3	FPN	F	26	1	0	0	NA	NA	78.187
27	3	FPN	F	8	2	13.486	1.769	NA	NA	92.231
27	3	FPN	F	10	5	8.478	2.548	NA	NA	40.68
27	3	FPN	F	11	14	7.651	2.204	NA	NA	27.937
27	3	FPN	F	12	13	7.478	2.211	NA	NA	24.978
27	3	FPN	F	13	18	4.625	1.403	NA	NA	21.859
27	3	FPN	F	14	26	4.979	1.62	NA	NA	18.941
27	3	FPN	F	15	32	3.759	1.143	NA	NA	15.75
27	3	FPN	F	16	21	5.309	1.654	NA	NA	21.323
27	3	FPN	F	17	19	5.592	1.791	NA	NA	20.934
27	3	FPN	F	18	10	6.942	2.034	NA	NA	28.907
27	3	FPN	F	19	18	6.277	2.39	NA	NA	25.012
27	3	FPN	F	20	8	18.848	6.97	NA	NA	44.529
27	3	FPN	F	21	6	7.141	2.533	NA	NA	38.068
27	3	FPN	F	22	5	7.47	1.822	NA	NA	37.772
27	3	FPN	F	23	2	9.878	1.882	NA	NA	72.842
27	3	FPN	F	24	1	0	0	NA	NA	130.972
27	3	FPN	F	26	1	0	0	NA	NA	81.878
27	3	FPN	F	29	1	0	0	NA	NA	68.076

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
Hjälmaren	3	FPN	F	12	1	0,0	0,0	NA	NA	79,0
Hjälmaren	3	FPN	F	13	1	0,0	0,0	NA	NA	80,9
Hjälmaren	3	FPN	F	14	2	30,5	7,0	NA	NA	61,1
Hjälmaren	3	FPN	F	15	6	9,5	2,9	NA	NA	37,7
Hjälmaren	3	FPN	F	16	6	18,5	5,3	NA	NA	39,4
Hjälmaren	3	FPN	F	17	13	8,9	2,8	NA	NA	26,2
Hjälmaren	3	FPN	F	18	27	5,3	1,6	NA	NA	16,6
Hjälmaren	3	FPN	F	19	11	8,3	2,6	NA	NA	27,4
Hjälmaren	3	FPN	F	20	14	11,4	3,6	NA	NA	24,4
Hjälmaren	3	FPN	F	21	11	9,0	2,3	NA	NA	28,8
Hjälmaren	3	FPN	F	22	6	9,4	3,4	NA	NA	40,3
Hjälmaren	3	FPN	F	23	4	4,7	1,5	NA	NA	44,7
Hjälmaren	3	FPN	F	24	2	0,8	0,5	NA	NA	61,0
Hjälmaren	3	FPN	F	25	1	0,0	0,0	NA	NA	87,1
Hjälmaren	3	FPN	F	30	1	0,0	0,0	NA	NA	79,7
Hjälmaren	3	FPN	F	34	1	0,0	0,0	NA	NA	82,5
Mälaren Galten	3	FPN	F	9	1	0,0	0,0	NA	NA	82,6
Mälaren Galten	3	FPN	F	10	11	8,1	2,4	NA	NA	28,9
Mälaren Galten	3	FPN	F	11	15	8,2	1,7	NA	NA	24,3
Mälaren Galten	3	FPN	F	12	15	8,2	2,2	NA	NA	24,0
Mälaren Galten	3	FPN	F	13	14	8,1	2,2	NA	NA	24,8
Mälaren Galten	3	FPN	F	14	22	8,1	2,1	NA	NA	19,8
Mälaren Galten	3	FPN	F	15	15	11,2	3,1	NA	NA	24,2
Mälaren Galten	3	FPN	F	16	15	10,6	2,9	NA	NA	24,2
Mälaren Galten	3	FPN	F	17	10	10,4	3,0	NA	NA	31,3
Mälaren Galten	3	FPN	F	18	5	13,6	4,3	NA	NA	44,8
Mälaren Prästfjärden	3	FPN	F	10	1	0,0	0,0	NA	NA	75,8
Mälaren Prästfjärden	3	FPN	F	11	8	11,6	3,1	NA	NA	33,6
Mälaren Prästfjärden	3	FPN	F	12	1	0,0	0,0	NA	NA	82,9
Mälaren Prästfjärden	3	FPN	F	13	12	6,0	1,6	NA	NA	26,6
Mälaren Prästfjärden	3	FPN	F	14	8	6,4	1,4	NA	NA	33,4
Mälaren Prästfjärden	3	FPN	F	15	11	11,7	3,5	NA	NA	29,5
Mälaren Prästfjärden	3	FPN	F	16	8	10,3	3,3	NA	NA	35,1
Mälaren Prästfjärden	3	FPN	F	17	20	8,8	2,5	NA	NA	20,6
Mälaren Prästfjärden	3	FPN	F	18	11	11,4	2,9	NA	NA	30,8
Mälaren Prästfjärden	3	FPN	F	19	11	10,0	2,2	NA	NA	29,4
Mälaren Prästfjärden	3	FPN	F	20	13	9,1	2,7	NA	NA	25,6
Mälaren Prästfjärden	3	FPN	F	21	7	9,1	1,8	NA	NA	36,3
Mälaren Prästfjärden	3	FPN	F	22	2	13,9	5,1	NA	NA	62,0
Mälaren Prästfjärden	3	FPN	F	23	2	2,7	3,0	NA	NA	65,7
Mälaren Prästfjärden	3	FPN	F	24	1	0,0	0,0	NA	NA	78,3
Mälaren Prästfjärden	3	FPN	F	25	1	0,0	0,0	NA	NA	72,7
Mälaren Prästfjärden	3	FPN	F	26	2	14,0	3,0	NA	NA	60,8

Vänern north	3 FPN	F	8	1	0,0	0,0	NA	NA	82,1
Vänern north	3 FPN	F	9	1	0,0	0,0	NA	NA	76,7
Vänern north	3 FPN	F	10	7	12,7	3,3	NA	NA	35,7
Vänern north	3 FPN	F	11	8	2,9	1,2	NA	NA	34,1
Vänern north	3 FPN	F	12	13	7,9	2,0	NA	NA	25,9
Vänern north	3 FPN	F	13	8	8,2	2,4	NA	NA	33,6
Vänern north	3 FPN	F	14	12	9,3	2,8	NA	NA	27,1
Vänern north	3 FPN	F	15	16	7,3	2,0	NA	NA	22,4
Vänern north	3 FPN	F	16	10	9,4	2,8	NA	NA	29,0
Vänern north	3 FPN	F	17	17	7,9	2,7	NA	NA	22,6
Vänern north	3 FPN	F	18	11	11,4	2,6	NA	NA	28,2
Vänern north	3 FPN	F	19	8	11,3	3,4	NA	NA	33,1
Vänern north	3 FPN	F	20	1	0,0	0,0	NA	NA	83,9
Vänern north	3 FPN	F	21	3	14,0	4,4	NA	NA	55,6
Vänern north	3 FPN	F	22	4	13,8	5,1	NA	NA	47,9
Vänern north	3 FPN	F	23	1	0,0	0,0	NA	NA	81,8
Vänern north	3 FPN	F	24	1	0,0	0,0	NA	NA	76,6
Vänern south	3 FPN	F	11	8	10,1	2,6	NA	NA	33,5
Vänern south	3 FPN	F	12	9	7,8	1,1	NA	NA	31,9
Vänern south	3 FPN	F	13	20	9,1	2,2	NA	NA	20,7
Vänern south	3 FPN	F	14	22	7,7	1,8	NA	NA	20,2
Vänern south	3 FPN	F	15	23	5,5	1,7	NA	NA	18,7
Vänern south	3 FPN	F	16	12	8,6	2,6	NA	NA	27,6
Vänern south	3 FPN	F	17	11	10,1	2,9	NA	NA	29,1
Vänern south	3 FPN	F	18	6	12,9	4,4	NA	NA	39,0
Vänern south	3 FPN	F	19	4	19,0	7,3	NA	NA	49,7
Vänern south	3 FPN	F	20	4	18,6	4,6	NA	NA	47,3
Vänern south	3 FPN	F	21	4	17,4	5,1	NA	NA	48,8
Vänern south	3 FPN	F	23	2	0,5	2,9	NA	NA	61,7
Vänern south	3 FPN	F	24	2	3,8	1,2	NA	NA	62,2
Vänern south	3 FPN	F	27	1	0,0	0,0	NA	NA	77,4

Table 3 b.) Grand mCV of weight at age (Weight) and length at age (Length) achieved for **silver eel**, females (F) only, and sampling unit “SD and pound nets (FPN)” in R out-put format. (Age) is the grand average of SD over all age classes of the mean proportion in age class x.

SD	Q	Gear	Sex	N	Weigth%	Length%	Sex%	Mat%	Age%
23	4	FPN	F	204	9.497	2.789	NA	NA	0.019
24	3-4	FPN	F	209	10.292	2.968	NA	NA	0.017
25	3	FPN	F	217	7.316	2.207	NA	NA	0.015
27	3	FPN	F	202	5.952	1.866	NA	NA	0.015

SD	Q	Gear	Sex	Other	N	Weigth%	Length%	Sex	Mat	Age
Hjälmaren al		3 FPN	F	No	107	8.544	2.562	NA	NA	0.015
Mälaren all		3 FPN	F	No	242	7.312	1.969	NA	NA	0.014
Vänern all		3 FPN	F	No	250	6.968	1.95	NA	NA	0.013

Table 4 a.) For each age, mCV of weight at age (CV_W) and length at age (CV_L) achieved for **yellow eel**, females (F) only, and sampling unit “SD and fyke nets (FYK)” in R out-put format. . (AgeC) is age class and (nAge) is number of individuals in each age class in original sample. (CV_AC) is standard variation of the mean proportion of age class x in the population.

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
20	2	FYK	F	5	10	4.642	1.648	NA	NA	26.119
20	2	FYK	F	6	20	4.318	1.531	NA	NA	18.043
20	2	FYK	F	7	7	8.581	2.444	NA	NA	35.358
20	2	FYK	F	8	31	7.07	1.68	NA	NA	14.314
20	2	FYK	F	9	47	5.332	1.467	NA	NA	12.833
20	2	FYK	F	10	4	18	5.756	NA	NA	52.629
20	2	FYK	F	11	33	11.133	2.749	NA	NA	21.049
20	2	FYK	F	12	10	17.36	5.293	NA	NA	35.639
20	2	FYK	F	13	8	18.444	6.701	NA	NA	43.19
20	2	FYK	F	14	4	15.873	6.386	NA	NA	55.466
20	2	FYK	F	15	2	14.791	5.548	NA	NA	73.796
20	2	FYK	F	16	2	3.031	2.688	NA	NA	73.072
20	2	FYK	F	17	3	24.218	7.582	NA	NA	68.022
20	2	FYK	F	18	1	0	0	NA	NA	107.706
20	3	FYK	F	4	1	0	0	NA	NA	119.209
20	3	FYK	F	5	8	6.395	2.158	NA	NA	31.58
20	3	FYK	F	6	30	4.874	1.442	NA	NA	13.502
20	3	FYK	F	7	14	8.555	2.722	NA	NA	22.513
20	3	FYK	F	8	31	7.769	2.308	NA	NA	15.879
20	3	FYK	F	9	51	6.184	1.663	NA	NA	11.744
20	3	FYK	F	10	17	17.006	4.809	NA	NA	29.4
20	3	FYK	F	11	14	16.228	5.059	NA	NA	29.972
20	3	FYK	F	12	16	10.782	2.874	NA	NA	31.79
20	3	FYK	F	13	7	13.3	3.747	NA	NA	50.188
20	3	FYK	F	14	1	0	0	NA	NA	108.035
20	3	FYK	F	15	3	40.98	11.676	NA	NA	61.877
20	3	FYK	F	16	1	0	0	NA	NA	106.237
20	3	FYK	F	17	1	0	0	NA	NA	113.88
20	3	FYK	F	18	2	26.196	8.247	NA	NA	63.238
21	2	FYK	F	5	1	0	0	NA	NA	107.709
21	2	FYK	F	6	2	2.859	0.539	NA	NA	82.574
21	2	FYK	F	7	2	16.324	3.371	NA	NA	82.26
21	2	FYK	F	8	14	11.666	2.994	NA	NA	24.029
21	2	FYK	F	9	17	9.509	2.314	NA	NA	21.542
21	2	FYK	F	10	12	19.236	4.929	NA	NA	28.258
21	2	FYK	F	11	30	8.617	2.47	NA	NA	16.059
21	2	FYK	F	12	14	11.574	3.379	NA	NA	26.276
21	2	FYK	F	13	8	3.431	0.983	NA	NA	25.494
21	2	FYK	F	14	7	14.27	3.826	NA	NA	40.049
21	2	FYK	F	15	3	43.057	8.431	NA	NA	57.838
21	2	FYK	F	16	4	31.722	9.444	NA	NA	57.114
21	2	FYK	F	20	1	0	0	NA	NA	122.973
21	3	FYK	F	5	2	9.256	4.479	NA	NA	56.999
21	3	FYK	F	6	7	22.356	5.545	NA	NA	39.869
21	3	FYK	F	7	3	24.313	6.317	NA	NA	51.174
21	3	FYK	F	8	20	8.789	1.833	NA	NA	15.536
21	3	FYK	F	9	18	9.499	2.292	NA	NA	17.681
21	3	FYK	F	10	8	13.891	4.372	NA	NA	33.245

Table 4 a. Cont

SD	Q	Gear	Sex	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
21	3	FYK	F	11	10	15.274	3.89	NA	NA	31.71
21	3	FYK	F	12	8	36.851	9.593	NA	NA	44.484
21	3	FYK	F	13	3	14.688	5.534	NA	NA	71.865
21	3	FYK	F	14	2	5.853	1.743	NA	NA	104.392
21	3	FYK	F	15	2	4.734	5.072	NA	NA	111.331
21	3	FYK	F	17	1	0	0	NA	NA	160.16
23	2-3	FYK	F	2	2	15.914	4.197	NA	NA	63.251
23	2-3	FYK	F	3	21	7.23	2.156	NA	NA	21.551
23	2-3	FYK	F	4	55	5.192	1.538	NA	NA	10.38
23	2-3	FYK	F	5	15	13.895	3.557	NA	NA	23.926
23	2-3	FYK	F	6	50	7.514	2.125	NA	NA	12.44
23	2-3	FYK	F	7	6	35.728	10.517	NA	NA	41.614
23	2-3	FYK	F	8	19	13.161	3.643	NA	NA	22.283
23	2-3	FYK	F	9	14	15.942	4.063	NA	NA	26.974
23	2-3	FYK	F	10	6	20.658	6.832	NA	NA	43.894
23	2-3	FYK	F	11	4	23.083	5.278	NA	NA	49.376
23	2-3	FYK	F	12	2	33.074	8.062	NA	NA	66.524
23	2-3	FYK	F	13	1	0	0	NA	NA	98.338
23	2-3	FYK	F	14	1	0	0	NA	NA	95.183
23	2-3	FYK	F	18	1	0	0	NA	NA	102.165
27	2-3	FYK	F	4	2	0.67	2.11	NA	NA	63.895
27	2-3	FYK	F	5	15	13.775	3.623	NA	NA	24.007
27	2-3	FYK	F	6	16	11.167	3.61	NA	NA	23.547
27	2-3	FYK	F	7	3	35.241	11.52	NA	NA	54.222
27	2-3	FYK	F	8	5	26.172	7.281	NA	NA	44.861
27	2-3	FYK	F	9	15	11.971	2.878	NA	NA	25.006
27	2-3	FYK	F	10	24	9.421	2.687	NA	NA	18.792
27	2-3	FYK	F	11	50	5.89	1.507	NA	NA	11.765
27	2-3	FYK	F	12	22	7.808	1.87	NA	NA	20.167
27	2-3	FYK	F	13	16	7.502	2.369	NA	NA	22.288
27	2-3	FYK	F	14	8	15.222	4.847	NA	NA	33.507
27	2-3	FYK	F	15	10	7.869	2.436	NA	NA	30.912
27	2-3	FYK	F	16	9	14.11	3.842	NA	NA	32.83
27	2-3	FYK	F	17	2	23.856	8.232	NA	NA	66.099
27	2-3	FYK	F	19	1	0	0	NA	NA	80.667
27	2-3	FYK	F	21	1	0	0	NA	NA	77.02

Table 4 b.) Grand mCV of weight at age (Weight) and length at age (Length) achieved for **yellow eel**, females only) and sampling unit “SD and fyke nets (FYK)” in R out-put format. (Age) is the grand average of SD over all age classes of the mean proportion in age class x.

SD	Q	Gear	Sex	N	Weigh%	Length%	Sex%	Mat%	Age%
20	2	FYK	F	182	7.753	2.258	NA	NA	0.021
20	3	FYK	F	197	8.381	2.45	NA	NA	0.02
21	2	FYK	F	115	11.321	2.982	NA	NA	0.019
21	3	FYK	F	84	13.203	3.401	NA	NA	0.021
23	2-3	FYK	F	197	9.976	2.788	NA	NA	0.029
27	2-3	FYK	F	199	10.005	2.833	NA	NA	0.02

Table 5 a.) For each age, mCV of weight at age (CV_W), length at age (CV_L) and sex-ratio (CV_Sex) (Sex-ratio only gear FPO) at age achieved for **Salmon** and sampling unit either “SD, area in SD and trap nets (FPO) or “Long lines (LLD)” in R out-put format. (AgeC) is age class and (nAge) is number of individuals in each age class in original sample. (CV_AC) is standard variation of the mean proportion of age class x in the population.

SD	Q	Gear	Sex	Area	AgeC	nAge	CV_W%	CV_L%	CV_Sex%	CV_Mat%	CV_AC%
30	2-3	FPO	Both	Skeppsmalen	1	16	6.183	2.23	11.26	NA	23.592
30	2-3	FPO	Both	Skeppsmalen	2	60	3.025	0.885	6.114	NA	9.372
30	2-3	FPO	Both	Skeppsmalen	3	48	2.883	1.047	6.858	NA	11.2
30	2-3	FPO	Both	Skeppsmalen	4	3	13.579	4.751	30.35	NA	53.919
31	2-3	FPO	Both	Seskarö Furö	1	13	8.718	2.913	8.607	NA	27.417
31	2-3	FPO	Both	Seskarö Furö	2	64	2.248	0.79	5.627	NA	8.429
31	2-3	FPO	Both	Seskarö Furö	3	32	3.815	1.347	7.895	NA	14.971
31	2-3	FPO	Both	Seskarö Furö	4	6	10.14	3.459	22.322	NA	39.674
31	2-3	FPO	Both	Seskarö Furö	5	1	0	0	0	NA	82.632
31	2-3	FPO	Both	Skellefteå archipelago	1	22	6.276	1.296	5.962	NA	19.889
31	2-3	FPO	Both	Skellefteå archipelago	2	178	1.91	0.554	2.925	NA	5.121
31	2-3	FPO	Both	Skellefteå archipelago	3	94	2.938	1.082	4.887	NA	8.387
31	2-3	FPO	Both	Skellefteå archipelago	4	35	3.316	1.082	7.735	NA	16.592
31	2-3	FPO	Both	Skellefteå archipelago	5	6	7.098	1.805	0	NA	41.247
31	2-3	FPO	Both	Skellefteå archipelago	6	1	0	0	0	NA	83.533
25-29	1-4	LLD	NA	NA	1	88	3.483	0.995	NA	NA	9.458
25-29	1-4	LLD	NA	NA	2	260	2.807	0.661	NA	NA	3.867
25-29	1-4	LLD	NA	NA	3	57	3.873	1.334	NA	NA	12.584
25-29	1-4	LLD	NA	NA	4	22	4.836	1.499	NA	NA	21.02
25-29	1-4	LLD	NA	NA	5	1	0	0	NA	NA	84.376

Table 5 b.) Grand mCV of weight at age (Weight), length at age (Length) and sex-ratio at age (Sex) (Sex-ratio only gear FPO) achieved for **Salmon** and sampling unit either “SD, area in SD and trap nets (FPO)” or “Long lines (LLD)” in R out-put format. (Age) is the grand average of SD over all age classes of the mean proportion in age class x.

SD	Q	Gear	Sex	Area	N	Weight%	Length%	Sex%	Mat%	Age%
30	2-3	FPO	Both	Skeppsmalen	127	3.626	1.21	7.632	NA	0.027
31	2-3	FPO	Both	Seskarö Furö	116	3.784	1.31	7.401	NA	0.032
31	2-3	FPO	Both	Skellefteå archipelago	336	2.714	0.825	4.112	NA	0.019
25-29	1-4	LLD	NA	NA	428	3.187	0.862	NA	NA	0.018

Annex I b

Estimation of mean CV for herring, sprat and cod in the Baltic, and mean CV for herring, sprat, cod, plaice, haddock and witch flounder in the North Sea and East Arctic

Here details regarding the precision levels given in Table III.E.3 - Sampling intensity for stock-based variables in section III.E Biological – stock-related variables are presented.

Method for estimation of mCV for weight, length, sex-ratio respectively maturity at age

Sampling for herring, sprat, cod and witch flounder is based on random samples app 400 – 650 individuals per unit (stock, quarter, gear). However, since there are very few samples per stratum (subdivision, gear, and quarter), analytical methods for calculating coefficient of variation (CV) is not appropriate, and the bootstrap method was used instead (see WKSCMFD 2004).

When calculating mean CV (mCV), stock was considered as the standard sampling unit. We have from a sample unit of n individuals made bootstrap samples of n individuals of the original data. For each bootstrap sample we calculated mean weight, length, sex ratio and maturity at age. The bootstrap sampling was repeated 100 times for each data set. We calculated the dispersion of mean values as the standard deviation across all bootstrap samples. However, as dispersion tend to increase with increasing size of individuals we divided the standard deviation with mean values of weight and length at class, for weight and length at age respectively. This is our estimated mCV. Note that we did not do this correction for sex ratio and maturity as there is no reason to believe dispersion should change with mean values in any systematic way as these were proportions. Instead we kept standard deviation of the means over all 100 bootstrap samples as our estimate of dispersion of mean values.

The estimated mCVs at each age are presented for each species and sampling unit in **Tables 1-10** below. An average of mCV (afor age classes representing 90 % of the stock) is presented in table III.E.3.

During surveys, herring, sprat, cod, plaice, haddock, saithe and norway pout, are sampled with length stratified sampling method (ALK method). Boot strap method was used to calculate mean weight, length, sex ratio and maturity at age and the bootstrap sampling was repeated 100 times for each data set. Only data from surveys conducted during quarter 1 was included in the CV calculations, except from the Acoustic survey (BIAS). The estimated mCVs at each age are presented for each stock by survey in **Tables 11 - 13** below. The mCV for each stock and survey is presented in table III.E.3.

Table 1. Herring sd25-29 mCV of weight at age (CV_W), length at age (CV_L), sex-ratio (CV_Sex) at age and maturity at age (CV_Mat) achieved in R out-put format. (AgeC) is age class and (nAge) is number of individuals in each age class in original sample. (CV_AC) is standard variation of the mean proportion of age class x in the population.

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
HER	2529	all	all	F/M	No	0	8	7,755	3,097	NA	0	35,598
HER	2529	all	all	F/M	No	1	178	4,286	1,457	3,532	1,059	7,479
HER	2529	all	all	F/M	No	2	478	3,436	0,947	2,425	2,678	4,845
HER	2529	all	all	F/M	No	3	1119	1,754	0,447	1,507	1,165	2,574
HER	2529	all	all	F/M	No	4	1610	1,568	0,382	1,278	0,81	1,962
HER	2529	all	all	F/M	No	5	747	2,405	0,544	2,023	1,022	3,439
HER	2529	all	all	F/M	No	6	480	2,059	0,511	2,404	0,794	4,19
HER	2529	all	all	F/M	No	7	290	2,928	0,617	3,051	0	5,729
HER	2529	all	all	F/M	No	8	244	3,189	0,831	3,099	0	6,577
HER	2529	all	all	F/M	No	9	65	5,663	1,723	6,985	0	13,231
HER	2529	all	all	F/M	No	10	15	10,141	2,939	13,977	0	23,972
HER	2529	all	all	F/M	No	11	8	20,904	4,75	14,447	0	34,67
HER	2529	all	all	F/M	No	12	3	42,782	11,806	26,717	0	53,292
HER	2529	all	all	F/M	No	14	1	0	0	0	0	89,262

Table 2. Herring sd22-24

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
HER	sd24	all	all	F/M	No	0	7	7,863	2,301	19,612	0	41,675
HER	sd24	all	all	F/M	No	1	108	1,339	0,45	5,238	3,047	8,565
HER	sd24	all	all	F/M	No	2	243	2,952	0,716	3,204	2,263	6,465
HER	sd24	all	all	F/M	No	3	318	1,966	0,531	2,748	0,26	4,829
HER	sd24	all	all	F/M	No	4	334	1,66	0,513	2,742	0,315	4,709
HER	sd24	all	all	F/M	No	5	145	2,238	0,754	4,626	0	7,863
HER	sd24	all	all	F/M	No	6	97	2,922	1,036	4,662	0	10,903
HER	sd24	all	all	F/M	No	7	30	5,508	2,09	8,581	0	17,065
HER	sd24	all	all	F/M	No	8	31	4,959	1,858	9,679	0	20,092
HER	sd24	all	all	F/M	No	9	7	15,77	5,023	19,513	0	41,456
HER	sd24	all	all	F/M	No	10	1	0	0	0	0	80,566
HER	sd24	all	all	F/M	No	11	2	4,117	1,9	0	0	60,168

Table 3. Sprat IIIb-d

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
SPR	IIIbd	all	all	F/M	No	0	8	6,813	2,789	NA	0	33,458
SPR	IIIbd	all	all	F/M	No	1	257	3,561	0,959	3,209	2,599	6,09
SPR	IIIbd	all	all	F/M	No	2	279	1,911	0,54	3,116	3,013	5,448
SPR	IIIbd	all	all	F/M	No	3	1281	0,725	0,216	1,25	1,098	1,942
SPR	IIIbd	all	all	F/M	No	4	348	1,282	0,381	2,88	2,681	5,397
SPR	IIIbd	all	all	F/M	No	5	345	1,425	0,433	2,25	2,82	4,976
SPR	IIIbd	all	all	F/M	No	6	77	2,566	0,707	5,355	5,146	9,94
SPR	IIIbd	all	all	F/M	No	7	61	2,956	0,912	5,894	6,241	12,563
SPR	IIIbd	all	all	F/M	No	8	79	1,98	0,654	5,567	6,252	11,961
SPR	IIIbd	all	all	F/M	No	9	16	5,299	2,049	13,281	10,358	24,571
SPR	IIIbd	all	all	F/M	No	10	10	7,316	2,135	16,603	19,025	30,487
SPR	IIIbd	all	all	F/M	No	12	1	0	0	0	0	80,554
SPR	IIIbd	all	all	F/M	No	13	1	0	0	0	0	74,052
SPR	IIIbd	all	all	F/M	No	15	1	0	0	0	0	83,894

Table 4. Cod sd2224

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
COD	2224	all	all	F/M	No	2	174	3,493	0,996	NA	NA	7,569
COD	2224	all	all	F/M	No	3	453	2,625	0,883	NA	NA	4,503
COD	2224	all	all	F/M	No	4	265	3,125	1,118	NA	NA	6,088
COD	2224	all	all	F/M	No	5	300	1,801	0,636	NA	NA	6,123
COD	2224	all	all	F/M	No	6	162	2,799	0,853	NA	NA	8,596
COD	2224	all	all	F/M	No	7	65	4,434	1,646	NA	NA	12,373
COD	2224	all	all	F/M	No	8	56	6,274	1,985	NA	NA	14,596
COD	2224	all	all	F/M	No	9	15	10,748	3,604	NA	NA	28,105
COD	2224	all	all	F/M	No	11	1	0	0	NA	NA	71,819

Table 5. Cod sd2529

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
COD	2532	all	all	F/M	No	2	92	3,773	1,131	NA	NA	9,998
COD	2532	all	all	F/M	No	3	482	3,267	0,887	NA	NA	3,818
COD	2532	all	all	F/M	No	4	484	2,458	0,872	NA	NA	3,634
COD	2532	all	all	F/M	No	5	439	1,486	0,521	NA	NA	3,934
COD	2532	all	all	F/M	No	6	180	2,341	0,789	NA	NA	7,595
COD	2532	all	all	F/M	No	7	83	4,011	1,316	NA	NA	10,307
COD	2532	all	all	F/M	No	8	40	5,479	1,922	NA	NA	15,06
COD	2532	all	all	F/M	No	9	11	13,427	3,658	NA	NA	33,443
COD	2532	all	all	F/M	No	10	1	0	0	NA	NA	78,541
COD	2532	all	all	F/M	No	11	2	31,205	9,187	NA	NA	58,824

Table 6. Herring IIIa

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
HER	IIIa	all	all	F/M	No	0	46	2,882	0,93	1,79	0	15,221
HER	IIIa	all	all	F/M	No	1	1284	0,852	0,256	0,868	0,3	2,183
HER	IIIa	all	all	F/M	No	2	2307	0,622	0,151	1,084	0,872	1,361
HER	IIIa	all	all	F/M	No	3	338	1,612	0,391	2,635	2,325	5,504
HER	IIIa	all	all	F/M	No	4	142	2,101	0,636	4,753	2,738	8,448
HER	IIIa	all	all	F/M	No	5	62	3,068	0,864	5,914	2,722	11,328
HER	IIIa	all	all	F/M	No	6	26	4,48	1,316	8,137	4,722	19,374
HER	IIIa	all	all	F/M	No	7	15	2,96	1,111	12,047	0	26,759
HER	IIIa	all	all	F/M	No	8	6	8,803	2,705	20,958	0	44,456
HER	IIIa	all	all	F/M	No	9	2	9,122	1,22	0	0	60,795
HER	IIIa	all	all	F/M	No	10	1	0	0	0	0	90,547

Table 7. Sprat IIIa

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
SPR	sd20	all	all	F/M	No	1	284	1,152	0,333	2,895	0,859	4,446
SPR	sd20	all	all	F/M	No	2	358	1,161	0,342	2,341	2,402	3,913
SPR	sd20	all	all	F/M	No	3	53	1,962	0,706	4,788	7,132	13,921
SPR	sd20	all	all	F/M	No	4	35	3,391	1,253	7,87	7,951	18,515
SPR	sd20	all	all	F/M	No	5	10	7,596	2,615	0	0	30,503
SPR	sd20	all	all	F/M	No	6	1	0	0	0	0	66,106
SPR	sd20	all	all	F/M	No	8	1	0	0	0	0	101,775

Table 8. Cod in Kattegat

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
COD	21	all	all	F/M	No	1	8	13,15	3,509	NA	NA	35,056
COD	21	all	all	F/M	No	2	249	2,969	0,837	NA	NA	5,347
COD	21	all	all	F/M	No	3	607	1,597	0,528	NA	NA	2,625
COD	21	all	all	F/M	No	4	70	4,187	1,502	NA	NA	12,341
COD	21	all	all	F/M	No	5	44	4,423	1,491	NA	NA	15,845
COD	21	all	all	F/M	No	6	52	4,379	1,57	NA	NA	14,577
COD	21	all	all	F/M	No	7	11	9,79	3,794	NA	NA	31,674
COD	21	all	all	F/M	No	8	2	23,09	6,877	NA	NA	57,227
COD	21	all	all	F/M	No	9	2	7,981	1,045	NA	NA	65,072
COD	21	all	all	F/M	No	10	1	0	0	NA	NA	81,095

Table 9. Cod sd20

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
COD	20	all	all	F/M	No	1	18	3,378	1,221	NA	NA	22,619
COD	20	all	all	F/M	No	2	568	1,692	0,509	NA	NA	3,006
COD	20	all	all	F/M	No	3	437	1,914	0,625	NA	NA	4,17
COD	20	all	all	F/M	No	4	211	2,642	0,82	NA	NA	5,997
COD	20	all	all	F/M	No	5	119	2,613	0,845	NA	NA	7,479
COD	20	all	all	F/M	No	6	105	2,321	0,807	NA	NA	10,292
COD	20	all	all	F/M	No	7	37	4,298	1,407	NA	NA	12,526
COD	20	all	all	F/M	No	8	28	5,009	1,945	NA	NA	17,514
COD	20	all	all	F/M	No	9	14	5,686	1,471	NA	NA	26,403
COD	20	all	all	F/M	No	10	6	11,919	3,721	NA	NA	37,976
COD	20	all	all	F/M	No	11	5	14,421	4,251	NA	NA	45,891
COD	20	all	all	F/M	No	12	3	13,692	3,511	NA	NA	48,366
COD	20	all	all	F/M	No	14	1	0	0	NA	NA	96,309
COD	20	all	all	F/M	No	15	1	0	0	NA	NA	89,037

Table 10. Witch Flounder IIIa

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
WIT	sd20	all	all	F/M	No	3	4	2,566	1,284	27,044	22,328	41,753
WIT	sd20	all	all	F/M	No	4	138	1,611	0,436	4,612	3,33	7,159
WIT	sd20	all	all	F/M	No	5	47	3,344	0,798	8,19	6,427	13,828
WIT	sd20	all	all	F/M	No	6	160	2,193	0,565	3,816	3,961	5,961
WIT	sd20	all	all	F/M	No	7	49	4,327	1,35	6,448	7,59	12,323
WIT	sd20	all	all	F/M	No	8	28	5,817	1,703	6,264	9,092	18,019
WIT	sd20	all	all	F/M	No	9	22	4,76	1,406	5,603	10,557	20,346
WIT	sd20	all	all	F/M	No	10	10	7,462	2,032	0	15,207	29,9
WIT	sd20	all	all	F/M	No	12	2	10,542	1,926	0	0	62,137
WIT	sd20	all	all	F/M	No	14	1	0	0	0	0	73,543

Table 11. BITS q1 survey 2011

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
COD	2529	1	OTB	both	No	0	46	38,485	7,692	NA	NA	42,993
COD	2529	1	OTB	both	No	1	136	5,427	2,089	7,766	3,807	14,062
COD	2529	1	OTB	both	No	2	307	1,526	0,492	2,341	2,611	3,044
COD	2529	1	OTB	both	No	3	332	1,969	0,625	3,082	2,671	4,627
COD	2529	1	OTB	both	No	4	105	10,924	2,686	9,745	7,572	18,672
COD	2529	1	OTB	both	No	5	26	34,061	8,472	18,896	8,993	51,827
COD	2529	1	OTB	both	No	6	10	65,443	18,261	30,005	0	84,243
COD	2529	1	OTB	both	No	7	2	25,718	9,161	0	0	79,748
COD	2529	1	OTB	both	No	8	1	0	0	0	0	92,028
COD	2529	1	OTB	both	No	9	1	0	0	0	0	583,212

Table 12. BIAS q4 survey 2011

Species	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
HER-BIAS	3	OTB	both	No	0	573	3,026	0,681	9,492	0,222	4,012
HER-BIAS	3	OTB	both	No	1	108	3,362	1,159	5,691	4,16	10,872
HER-BIAS	3	OTB	both	No	2	178	3,022	0,787	3,739	2,887	7,341
HER-BIAS	3	OTB	both	No	3	348	1,567	0,468	2,405	2,322	4,38
HER-BIAS	3	OTB	both	No	4	373	1,571	0,459	2,307	2,273	4,341
HER-BIAS	3	OTB	both	No	5	196	2,419	0,665	3,321	3,074	6,419
HER-BIAS	3	OTB	both	No	6	139	2,927	0,898	4,711	2,053	8,87
HER-BIAS	3	OTB	both	No	7	75	4,354	1,206	6,841	0	13,433
HER-BIAS	3	OTB	both	No	8	96	3,542	1,032	5,611	0	10,887
HER-BIAS	3	OTB	both	No	9	29	5,668	1,553	10,385	0	21,081
HER-BIAS	3	OTB	both	No	10	7	9,923	3,18	9,121	0	42,549
HER-BIAS	3	OTB	both	No	12	1	0	0	0	0	91,528
SPR- BIAS	3	OTB	both	No	0	547	1,122	0,342	3,45	NA	3,079
SPR- BIAS	3	OTB	both	No	1	238	1,058	0,295	2,74	NA	5,166
SPR- BIAS	3	OTB	both	No	2	84	1,331	0,473	4,853	NA	9,032
SPR- BIAS	3	OTB	both	No	3	391	0,628	0,214	2,381	NA	4,024
SPR- BIAS	3	OTB	both	No	4	94	1,737	0,673	5,318	NA	10,147
SPR- BIAS	3	OTB	both	No	5	128	1,656	0,658	5,995	NA	9,584
SPR- BIAS	3	OTB	both	No	6	38	3,456	1,164	9,13	NA	22,815
SPR- BIAS	3	OTB	both	No	7	40	3,762	1,277	10,027	NA	19,846
SPR- BIAS	3	OTB	both	No	8	133	1,786	0,709	6,242	NA	11,098
SPR- BIAS	3	OTB	both	No	9	171	1,813	0,705	4,957	NA	12,07
SPR- BIAS	3	OTB	both	No	10	17	5,5	2,324	24,195	NA	41,212
SPR- BIAS	3	OTB	both	No	11	6	4,656	2,193	39,246	NA	67,813
SPR- BIAS	3	OTB	both	No	12	21	5,793	2,543	20,373	NA	36,733
SPR- BIAS	3	OTB	both	No	13	8	6,783	3,22	38,945	NA	66,489
SPR- BIAS	3	OTB	both	No	14	9	6,472	3,636	33,011	NA	61,259
SPR- BIAS	3	OTB	both	No	15	14	4,91	1,969	24,873	NA	54,382
SPR- BIAS	3	OTB	both	No	16	7	9,248	4,73	32,482	NA	61,684
SPR- BIAS	3	OTB	both	No	17	1	0	0	0	NA	104,166

Table 13. IBTS q1 survey 2011

Species	SD	Q	Gear	Sex	Other	AgeC	nAge	CV_W %	CV_L %	CV_Sex %	CV_Mat %	CV_AC %
COD	sd20	1	OTB	both	No	0	88	3,393	1,055	6,702	0	3,193
COD	sd20	1	OTB	both	No	1	159	14,127	4,923	5,914	0	12,068
COD	sd20	1	OTB	both	No	2	154	14,539	4,286	10,678	4,36	19,501
COD	sd20	1	OTB	both	No	3	33	24,769	9,381	27,492	30,325	44,311
COD	sd20	1	OTB	both	No	4	10	17,662	5,854	42,266	22,948	80,253
COD	sd20	1	OTB	both	No	5	2	46,045	13,05	49,946	0	92,696
COD	sd20	1	OTB	both	No	6	3	21,302	5,097	49,896	0	394,737
COD	sd20	1	OTB	both	No	7	2	15,06	2,108	51,64	0	212,165
COD	sd20	1	OTB	both	No	8	1	0	0	0	0	251,259
COD	sd21	1	OTB	both	No	0	53	2,859	0,797	8,149	0	2,768
COD	sd21	1	OTB	both	No	1	136	15,67	4,215	8,169	0	10,509
COD	sd21	1	OTB	both	No	2	104	11,373	3,65	12,404	13,423	24,446
COD	sd21	1	OTB	both	No	3	94	19,88	6,532	14,672	9,973	33,761
COD	sd21	1	OTB	both	No	4	5	28,5	8,605	0	0	116,731
COD	sd21	1	OTB	both	No	5	1	0	0	0	0	0
COD	sd21	1	OTB	both	No	7	1	0	0	0	0	0
HAD	IIIa	1	OTB	both	No	0	125	3,227	1,04	5,506	0	5,793
HAD	IIIa	1	OTB	both	No	1	133	7,528	2,27	4,08	1,108	6,904
HAD	IIIa	1	OTB	both	No	2	84	3,573	1,109	5,186	5,176	9,299
HAD	IIIa	1	OTB	both	No	3	52	6,388	2,011	9,836	7,379	14,817
HAD	IIIa	1	OTB	both	No	4	9	15,398	3,991	23,583	25,304	41,462
HAD	IIIa	1	OTB	both	No	5	4	25,842	7,125	49,334	45,484	207,292
HAD	IIIa	1	OTB	both	No	6	8	38,087	11,022	6,559	7,984	62,581
HAD	IIIa	1	OTB	both	No	7	2	13,214	4,484	0	0	1000
PLE	IIIa	1	OTB	both	No	0	20	27,1	2,183	17,086	0	16,114
PLE	IIIa	1	OTB	both	No	1	134	4,636	1,66	5,16	1,202	9,475
PLE	IIIa	1	OTB	both	No	2	211	3,234	1,073	3,211	2,631	6,661
PLE	IIIa	1	OTB	both	No	3	242	2,903	1,016	3,068	3,322	5,257
PLE	IIIa	1	OTB	both	No	4	234	3,057	0,912	3,264	3,058	5,071
PLE	IIIa	1	OTB	both	No	5	141	5,056	1,633	4,204	3,703	6,599
PLE	IIIa	1	OTB	both	No	6	84	5,91	1,994	5,7	5,686	10,615
PLE	IIIa	1	OTB	both	No	7	35	12,25	3,61	7,977	4,033	14,098
PLE	IIIa	1	OTB	both	No	8	14	24,418	6,376	14,257	11,416	27,95
PLE	IIIa	1	OTB	both	No	9	13	13,891	4,82	14,767	6,171	26,141
PLE	IIIa	1	OTB	both	No	10	15	22,428	4,702	11,947	9,865	23,318
PLE	IIIa	1	OTB	both	No	11	17	17,905	4,366	9,702	0	22,684
PLE	IIIa	1	OTB	both	No	12	22	14,763	3,953	9,555	6,939	22,454
PLE	IIIa	1	OTB	both	No	13	8	31,53	9,329	17,676	0	39,177
PLE	IIIa	1	OTB	both	No	15	1	0	0	0	0	69,658

POK	IIIa	1	OTB	both	No	1	3	45,103	17,061	42,179	0	80,617
POK	IIIa	1	OTB	both	No	2	4	5,582	2,439	19,587	0	40,127
POK	IIIa	1	OTB	both	No	3	26	4,301	1,196	7,632	4,22	12,252
POK	IIIa	1	OTB	both	No	4	47	3,66	1,103	6,078	2,479	8,704
POK	IIIa	1	OTB	both	No	5	21	10,994	3,653	16,283	12,328	29,824
POK	IIIa	1	OTB	both	No	6	20	16,989	6,006	18,148	21,063	35,346
POK	IIIa	1	OTB	both	No	7	6	7,202	2,169	37,966	0	70,458
POK	IIIa	1	OTB	both	No	8	1	0	0	0	0	161,69
POK	IIIa	1	OTB	both	No	9	2	22,036	2,334	46,776	0	134,005
NOP	IIIa	1	OTB	both	No	0	70	2,022	0,621	NA	NA	2,199
NOP	IIIa	1	OTB	both	No	1	103	23,419	5,42	11,13	0	17,845
NOP	IIIa	1	OTB	both	No	2	59	27,246	7,646	28,948	30,566	56,894
NOP	IIIa	1	OTB	both	No	3	5	25,69	9,168	0	0	134,742
HER	IIIa	1	OTB	both	No	0	383	0,865	0,276	1,423	0	3,163
HER	IIIa	1	OTB	both	No	1	1155	1,314	0,374	1,159	0,102	1,66
HER	IIIa	1	OTB	both	No	2	820	1,79	0,474	2,847	2,229	4,966
HER	IIIa	1	OTB	both	No	3	266	4,381	1,039	6,231	6,2	11,725
HER	IIIa	1	OTB	both	No	4	148	11,247	3,458	10	9,508	20,178
HER	IIIa	1	OTB	both	No	5	59	37,441	11,377	29,237	14,486	42,115
HER	IIIa	1	OTB	both	No	6	31	38,501	10,602	39,797	0	66,392
HER	IIIa	1	OTB	both	No	7	21	59,025	11,909	20,046	0	71,308
HER	IIIa	1	OTB	both	No	8	10	12,527	5,213	49,946	0	92,696
HER	IIIa	1	OTB	both	No	9	2	8,869	2,887	57,735	0	0
SPR	IIIa	1	OTB	both	No	0	1	0	0	0	0	174,792
SPR	IIIa	1	OTB	both	No	1	403	1,356	0,423	2,62	0,429	5,2
SPR	IIIa	1	OTB	both	No	2	496	0,819	0,262	2,057	1,962	3,14
SPR	IIIa	1	OTB	both	No	3	222	0,96	0,324	3,587	2,965	6,013
SPR	IIIa	1	OTB	both	No	4	121	1,797	0,629	5,233	4,742	9,471
SPR	IIIa	1	OTB	both	No	5	106	1,735	0,634	4,784	6,119	10,609
SPR	IIIa	1	OTB	both	No	6	40	2,115	0,892	11,321	11,295	20,586
SPR	IIIa	1	OTB	both	No	7	19	4,961	1,785	14,865	18,412	36,858
SPR	IIIa	1	OTB	both	No	8	6	9,736	3,214	0	25,811	50,762